HOBBYIST'S GUIDE TO THE
UFP STARFLEET
AND ITS HISTORY

(a work in progress)

Timo Saloniemi

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Foreword

For those obsessed with the world claimed to be 'real':

This book is a work of fiction. It is not a non-fiction book about a fictional universe – nothing within these pages is real. Or, rather, it's as real as you wish it to be.

Everything described here is based on definite sources, however; sources like imagination, vision, enthusiasm. Some of these sources are directly tied to the Desilu/Paramount/CBS TV show Star Trek, and are actually the intellectual property of CBS or its artists. Others derive indirectly from this show. When creating the fictional world of this book, I in turn used some of these sources – and disagreed with others. Thus, even when I express thanks to a group or organization, I may in fact be contradicting their opinions on the Trek universe rather severely. Rest assured that I do this without any remorse. I'm just as mad about Star Trek as you are.

But there is method to my madness. In compiling this work, I have always given priority to information that is either supported by aired Trek episodes or movies, or then simply not contradicted (or contradictable!) by them. Sometimes people call this kind of information 'canonical', and I rather like the word. This information is then glued together using various 'non-canonical' sources plus my own imagination. Who created this information is of no consequence to the end result. For this reason, I wish to express my thanks to my various sources in a big collective hug instead of detailing who did what in which work.

So here comes:

Jonah Rapp, Ryan McReynolds, Boris Scrbic, Bernd Schneider and all the folks from Flare Forum and TrekBBS; James Dixon, the grand master of Trek timelines; Joseph Creighton & Joshua Bell, the FAQ wizards; Michael & Denise Okuda, Rick Sternbach, and the other heroes at Paramount and Pocket Books; Franz Schnaubelt, Shane Johnson, Todd Guenther, aridas sofia, Geoff Mandel, Jaqueline Susann, Harold Robbins and the rest of the Giants; and of course everybody else who ever had the patience to listen to me ranting about Trek.

And from here on, this work is pure fiction. No escapes to the real world until a short chapter in Appendix A.

Let's see what lies out there.

Introduction

This guide is intended to provide the reader with information on the technical, historical and political aspects of the United Federation of Planets Starfleet and its starships. To this end, it chronologically lists and to some depth describes a hundred of these starfaring vessels and some of their ancestors in the pre-Federation fleets, as well as a large number of support vessels, smaller ships and craft, in the process outlining Starfleet history and sociopolitical and technical developments during the past 400 years. Thus, the guide is not a simple ship recognition manual. Visual identification of ships without extensive computer assistance has not been a viable combat procedure for centuries; this work mainly caters for the enthusiastic hobbyist seeking both in-depth information and wide perspective on Starfleet and its starships.

The actual ship listing is divided into three main parts describing in chronological order first the large starships, then categorically the smaller interstellar vessels like corvettes and couriers, and finally the shuttlecraft and other auxiliary craft in Starfleet service. By necessity of history, each part also includes ships that served before the founding of the United Federation of Planets and its Starfleet in 2161 – the historical perspective is necessary to understand the technological, operational and political reasons behind the creation of each of the UFP Starfleet vessels mentioned here.

Three appendices are provided to help the reader navigate the jargon-filled text. First, a typical ship statistics and specifications chart is presented and explained in detail. Next, a short glossary on starship terminology and some common abbreviations is provided. Finally, a combined timeline/index lets the reader move between entries in an organized manner. Ship lineages are here presented according to ship type, and one can access the appropriate entry by clicking the timeline bar featuring the desired ship class name. The reader is encouraged to begin by examining the first two appendices, then to proceed in roughly chronological order to get full advantage of the format of this guide. Later, the guide can also be used as a simple manual, disregarding chronology.

WARNING: THIS GUIDE IS A WORK IN PROGRESS.

There are few graphics included at this point, and any functionality or linkability of the sort described above is yet to be installed. EVEN IF YOU DO NOT SEE IMAGES WHERE YOU THINK YOU SHOULD, DO NOT ADJUST OR REPLACE YOUR EYES.

I Starships and other large vessels

'The starships of the Federation are the physical, tangible manifestations of Humanity´s stubborn insistence that life does indeed mean something.' – Spock

There exists some ambiguity as to what is meant by 'starship'. Modern reference works often go by the modern definition, a straightforward approach somewhat ill suited for describing even the relatively brief history of Starfleet vessels. While any interstellar vessel from rather arbitrary size up can nowadays be considered starship, the designation was originally reserved for the best and biggest ships only. During the 22nd and 23rd centuries, 'starship' was largely analogous to the 19th-20th century designation 'battleship' in describing a rare and expensive capital ship that could take as much as she could dish out and triumph over all other vessel types. Such martial criteria only told half the story, of course, as a starship was also characterized by her exceptional speed and range, as well as by the quality and quantity of the research gear she carried. While lesser vessels could challenge a starship in any one of these fields, the truest definition for starship in this time period must be 'ace of all trades'.

Given the obvious ease by which vessels from outside Earth could trump humanity's high card in the formative years of the United Federation of Planets, it should further be simple to understand why Earth documentation from that era almost invariably attributes such ships with the starship designation. The scope of this work limits our ability but also our need to more closely examine the native designation schemes for off-Earth designs, until these merge with the UFP Starfleet practices.

Of the lesser vessels, too many variants gross and subtle exist or have existed to be listed here. Large combat-dedicated vessels have been built to many different specifications, nomers like 'frigate' or 'destroyer' being applied under criteria that have varied with time or political pressures. Research has called for specialized as well as generalized types, depending both on the subject and scope of the study and the circumstances in which the research has to be conducted. Half a dozen distinct types of logistics vessels have always existed under the generic military designation 'transport', and an untold number of special types have filled the many niche roles without which a space combat and exploration force could not survive.

The evolution of the various categories of large stargoing vessels will unfold in the following chronologically ordered chapters. Obvious parallels are to be found in the waterborne navies of Earth, from which the Standard vocabulary used here largely derives.

Before 2063 -The Playground

Space has never been empty. As long as there has been space and time, there has also been matter or energy in it in some form. Structure has existed ever since the birth, or creation, of space and time. The appearance of the complex structures we know as life was just a matter of time and space, and rather mundane compared to what had taken place before. The earliest forms of structures we could regard as life are believed to have existed in the very first minutes of time, but contacts to them have been indirect and ultimately inconclusive. Biological life appeared in space no later than 11 billion years ago, as evidenced by proton-dating of the oldest surviving spaceborne organisms. DNA-based units have existed in our galaxy for some eight billion years, and humanoids, the primary type of intelligent life encountered, have been around for at least 4.5 billion years.*

We are all children of space and time, yet we know very little of our parents. But we never cease to try and learn more. To this end, humanoids have roamed space for at least the time of their existence, perhaps even longer. Today, only five humanoid species are known to be naturally capable of life in interstellar vacuum; most of us have to resort to spaceships of some kind. And since space is a formidable ally in the fight against time, many examples of ancient craft still survive in the vacuum between stars, silent proof of interstellar travel conducted millions or even billions of years ago.

The handiwork of the ancients has largely been forgotten, however, and the oldest starfaring vessels in use today are usually at most ten thousand years old by design or by physical structure. It appears that every aspiring galactic power has to develop warp technology or comparable interstellar travel anew to build its empire, and most succumb after a couple of thousand years of reign, taking their technology with them. Thus, the first chapter of this work does not dwell on these past achievements. Instead, it concentrates on describing the earliest attempts at starflight by the culture that seems destined to have its shot at ruling the galaxy in the next few millennia.

Planet Earth is an ascending world at the moment, and its space forces are of great interest now that they are close to achieving the capacity required for exploring and perhaps later also controlling this galaxy in its entirety. Other currently aggressive local cultures, like the Klingon and Romulan empires, have expressed little interest in galaxy-wide spheres of influence. And although their space navies are highly interesting by themselves, it is evident that the mainly Earth-run Starfleet is the organization whose history and development will be of most interest to present and future readers. Thus, the choice of the scope of this work; let history be the judge in deciding whether this is simple arrogant speciesism or logical pragmatism.

*) Signs of humanoid intelligence older still have been located on planet NFC 522-IV, nowadays named after Dr Helmut Kreutzer who first discovered the planetwide ruins in 2172 during a standard precolonization assessment mission of the surveyor *USS Schliemann*. However, it is now believed that the ruins are in fact the result of time travel and not of an intelligence born 7.5 billion years ago.

DY series (sublight)

Interplanetary transports
1989-2128

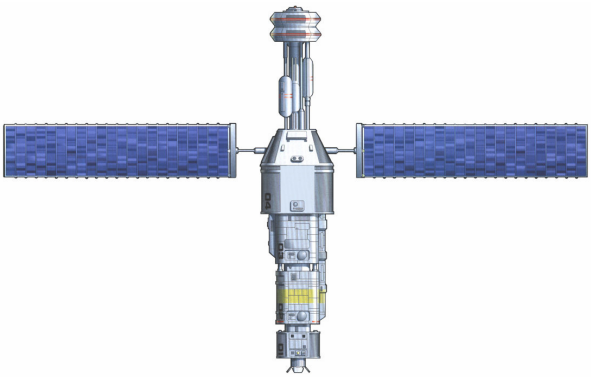
Completed:	161 total:
	2 *Shuguang* (DY-50, PRC) 4 *Vayu* (DY-100, ISRO) 12 *Kaitouzhe* (DY-100, PRC) 21 *Zeus* (DY-100, ECSN) 18 *Copernicus* (DY-100, USAF) 2 *Iskra* (DY-100, RRKS) 17 *Atlatl* (DY-B, ISA) 48 *Atlatl* (DY-B, UEDP) 31 *Brenton* (DY-120, UEDP) 6 *Black Mamba* (DY-135, UEDP) 12 *Helsinki* (DY-140, UEDP)
Length:	107.6 m (DY-100) 149.0 m (DY-135)
Beam:	48.8 m (DY-100) 30.1 m (DY-135)
Height:	32.3 m (DY-100) 30.3 m (DY-135)
Mass:	2,200 tons (DY-50) 2,720 tons (DY-100)

	3,500 tons (DY-110, typical) 2,170 tons (DY-B) 4,100 tons (DY-120, typical) 3,850 tons (DY-135) 5,200 tons (DY-140, typical)
Max.speed:	0.005 c (DY-50) 0.4 c (DY-100, 110, B) 0.5 c (DY-120, 140) 0.75 c (DY-135)
Endurance:	4 months (DY-50) 1 year (DY-100, 110, 135) 1.5 years (DY-120, 140) 5+ years (all cryosleep variants)
Crew:	2 (DY-50) 24 (DY-100, 110, typical) 29 (DY-120, 140, typical) 20 (DY-135)
Passengers:	20 (DY-100, w/o cryogenics) 100 (DY-100 w/ cryogenics) 300 (DY-120, typical) 500 (DY-140, typical)
Weapons:	None (standard) Experimental lasers, missiles, railguns or mines (select early vessels) Plasma cannon (100 MW – 5 GW) (UEDP transport variants) 4 laser emitters (DY-135) 1 missile tube w/ 36 fusion missiles (DY-135)
Shields:	Normally none Glass-cloud anti-laser shields or reflective armor fitted on some vessels
Laboratories:	Various fits, depending on mission; typically none
Auxiliaries:	Various fits, depending on mission
SOURCES:	D TOS, TNG (aridas sofia et al.) N TOS, TNG (aridas sofia et al., own) H TOS, TNG (own, adapting TOS, TNG and SFC)

Apex
Mission spacecraft
(1991-2008)

Completed:	12
Length:	107.6 m
Beam:	48.8 m
Height:	32.3 m
Mass:	2,810 tons
Propulsion:	Fission-powered ion thrust
Max.speed:	0.4 c
Endurance:	3 years
Crew:	6
Passengers:	6 (cryosleep)
Weapons:	None
Shields:	None
Laboratories:	1 planetary sciences
Auxiliaries:	1 Venus or Mars lander
Mission:	Exploration of Venus and Mars

Afrodite

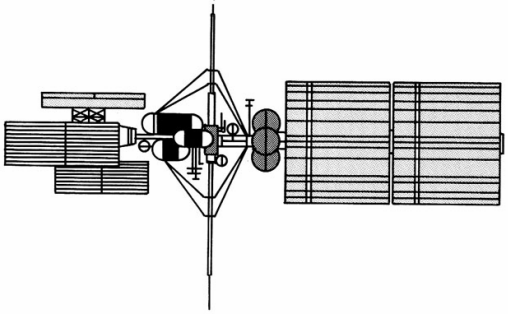


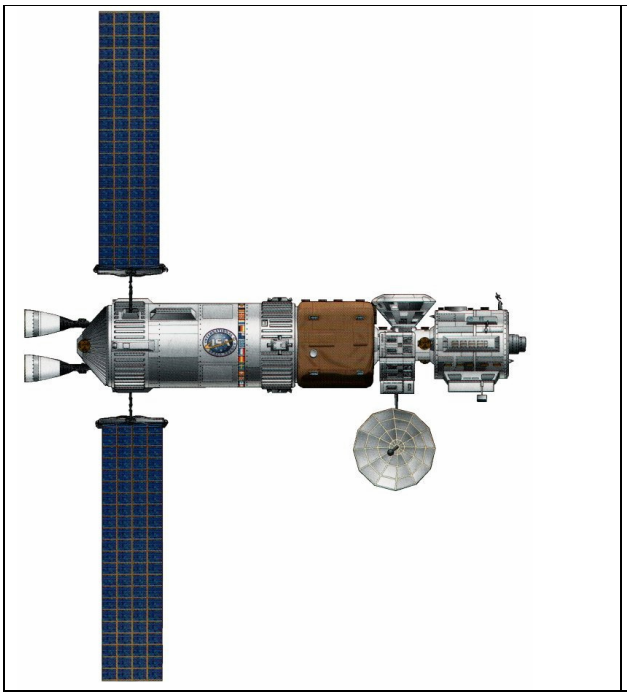
Mission spacecraft
(2001-2047)

Completed:	22
Length:	61.2 m
Beam:	97.6 m
Height:	6.6 m
Mass:	680 tons
Propulsion:	Fission-powered ion thrust
Max.speed:	0.4 c
Endurance:	3 months
Crew:	2
Passengers:	8
Weapons:	None (standard)
Shields:	Normally none
Laboratories:	1 planetary sciences
Auxiliaries:	One Venus lander or two asteroid landers
Mission:	Exploration of Venus, exploitation of asteroids

Aventeur
Mission spacecraft
(2008-2039)

Completed:	6
Length:	126.0 m
Beam:	28.5 m plus antennas
Height:	28.5 m plus antennas
Mass:	2,810 tons
Propulsion:	Fission-powered NTR
Max.speed:	0.4 c
Endurance:	8 months (w/o cryosleep) Up to 30 years (w/ cryosleep)
Crew:	3
Passengers:	12 (cryosleep)
Weapons:	None (standard)
Shields:	Normally none
Laboratories:	2 planetary sciences
Auxiliaries:	Two exoatmospheric landers, two work pods
Mission:	Exploration of outer planets, exploitation of asteroids

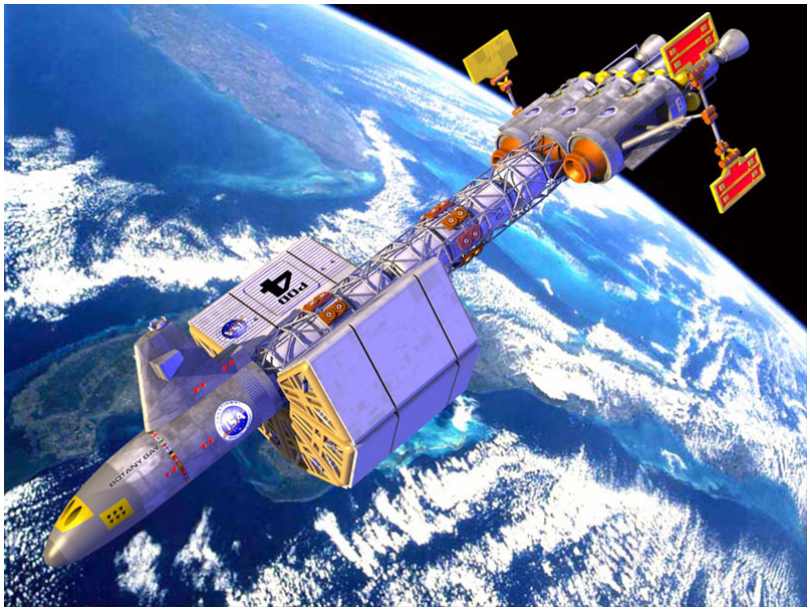




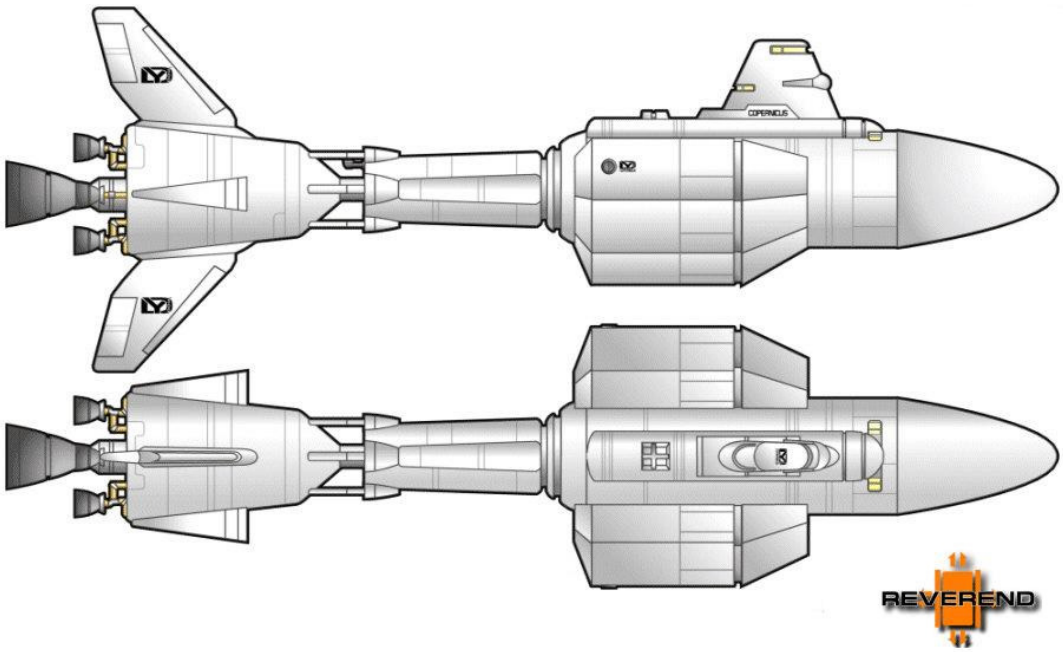
Ares
Mission spacecraft
(2030-2048)

Completed:	8
Length:	37.3 m
Beam:	48.8 m
Height:	6.6 m
Mass:	92 tons
Propulsion:	Fission-powered ion thrust
Max.speed:	0.4 c
Endurance:	4 months
Crew:	2
Passengers:	4-10
Weapons:	None
Shields:	EM fields (4T)
Laboratories:	1 planetary sciences
Auxiliaries:	One ballistic, one aerodynamic Mars lander
Mission:	Exploration of Mars

The Dinyan-Yoyodyne Conglomerate DY series space transport vessels represent a continuous chain of shipbuilding tradition, from Earth's first practical commercially produced manned interplanetary craft in the 1990s to the colonization and cargo ships of the late 23rd century. Considering that for the first hundred years of operations, all the various types of spacecraft in the DY series were vastly inferior to the ships of most extraterrestrial races and alliances of the time, it seems rather curious that they would in fact propel Earth into becoming a major military and exploratory power in the region. The sociopolitical reasons for the success of Earth's colonial expansion have been exhaustively discussed elsewhere, but these would not have come to play had Dinyan-Yoyodyne not produced these humble colonization vessels in notable quantity.



The experimental DY-50 was an early attempt at a ship capable of interplanetary travel at a then incredible Δv of 0.005c. Two ships of this type were constructed in 1989 in the province of Xuhan in the country of China, part of the vast number of technology breakthroughs of that time that were the result of a long international, clandestine eugenics program. The genius of the selectively bred, chemically and genetically augmented scientists could not be hidden for long: in 1992, the results were dramatically made public as these supermen took over most of South and Southeast Asia. Despite an initial civilized establishing of diplomatic relations, the rulers soon began an endless cycle of revolutions and coups in a quest for ultimate power. But many leading nations still turned a blind eye on the supermen's cruel reign, lest the stream of new technology and scientific breakthroughs from their R&D centers end. As an example of this tolerance, mass production of DY spaceships was continued in China, and also expanded to Russia and the United States.



An early model DY-100 blasts out of Earth's atmosphere on chemical thrust, utilizing a finned booster stage typical of these pathfinding vessels. In the later DY-100 ships, this stage would be replaced by an improved fission propulsion module that featured no aerodynamic surfaces and only served as dead weight during liftoff from Earth. In space, the stage would unfold a series of radiator panels and be energized to propel the ship to previously undreamed-of accelerations and speeds. Later vessels in the family would introduce even more advanced sublight propulsion systems, including fusion power, and would serve as a sturdy basis for warp-capable colonizer vessels as well. Note the smooth instrumented nose cone of this vessel, as well as the partial cluster of payload modules complete with their forward atmospheric fairings – apparently, a circumlunar mission not involving independent orbit-to-surface operations was intended for this DY-100.

In the hectic years of the rule of Khan Noonian Singh, perhaps the most famous of the victors of superhuman wars of supremacy, technologies flourished in a way that put to shame the industrial revolution and the birth of computer technology. There are persistent rumors of longevity drugs and antigravity devices, perhaps even time travel methods, having been developed by Khan's or his less civilized usurpers' scientists; given our fragmentary knowledge of that era, no such rumors can be completely discredited. What is certain, however, is that spaceflight technology took a major step forward. Superefficient reaction drives were built for DY-100 fission-powered interplanetary craft expanded from the early cislunar DY-50 hulls, and used to found a spaceborne industry for Singh's kingdom. As the movement spread to northern Africa, several spaceports were built there to support

this industry. Other countries were sold parts of this technology, usually heavily laden with propaganda and sometimes also with hidden psychochemical weapons.

DY-100 was an ingenious design featuring a pencil-like central hull with two support decks and two full-width longitudal zero-gee habitat decks, a ring of wedgelike jettisonable fuel tanks or cargo pods, a one-, two- or three-chamber solid-core fission rocket with adjoining radiator assemblies and possible chemical boosters, aerodynamic surfaces and other mission-specific additions at the stern, and an offset control/docking tower at the bow. For planetary takeoff, the ship used a cluster of four to six huge solid booster rockets attached aft of the fuel wedges. While this complex configuration required an elaborate gantry system to stack, the simplicity of the propulsion system facilitated rapid launch preparations; a DY hull and a set of boosters could be taken from storage, equipped for the mission, stacked and launched in less than two days if necessary.

'Landings' were theoretically possible on low-gravity worlds like asteroids and the moons of Mars, both of which were targeted by manned missions in the 1990s and 2000s. It was usual to utilize a dedicated landing craft housed inside a bow shroud or carried in place of a cargo container for true orbit-to-surface operations, for example on Earth's Moon. No DY ships ever returned to Earth surface, but were refueled in orbit by dedicated tankers launched on simple, throttleable-combustion single-stage solid boosters not unlike those used to loft the ships themselves to space. The boosters were also used for a variety of other missions, most importantly for launching orbital laser platforms to bolster the military muscle of the supermen. Between 1990 and 1995, the rate of orbital launches from Earth grew by almost 200% every year, and more than twenty interplanetary launches were performed between 1993 and 1996 alone, mostly to Mars where the Great Khanate unsuccessfully tried to establish a colony of supermen.

Theoretically capable of acceleration to 0.4 lightspeed with full fuel load and minimum cargo, the DY-100 could also carry 6,000 tons of material swiftly across interplanetary distances; had the relatively stable Singh rule continued for another decade, the ships would no doubt have established a systemwide industrial base for the supermen. But the final breakthrough in interplanetary travel came just before the collapse of the Singh kingdom. As the surrounding countries finally prepared to join and end the constant war between the genetic supermen, scientists at Delhi perfected the first practical long term cryogenic sleep technology, earlier used only to preserve biological samples or even dead bodies in bizarre attempts at afterlife. And when the walls of Khanton came crumbling down in 1996, a group of Singh's followers were able to escape on one of the final-batch DY-100 ships they had prepared for interplanetary 'seeding' operations. No one outside the regime suspected that these ships would be capable of interstellar travel, though – Khan Singh's escape was only revealed 270 years later, when his ship was found adrift in space in the Mutara sector, some fifty lightyears away from Earth.

The Singh kingdom left some two dozen DY craft and their associated launch equipment lying around in various states of construction, an enormous technology base for the rest of the world even though the original Dinyan-Yoyodyne Conglomerate factories and labs now lay in ruins. In addition to two active ships operated by USAF and one by RRKS, half a dozen abandoned Chinese-flagged vessels were adrift in Earth orbit. International missions were mounted to salvage these craft; no such effort was made on the doomed Martian conquistadors. It has been speculated that some of these ships, also equipped with crude cryogenics, may have allowed more supermen to escape the way Khan did, but no evidence has been found to support such speculation.

‘Upgrades’ and ‘refinements’ to the original design yielded mixed results. The DY-120 series from the 2020s was a moderate success, yet the further enlarged DY-130 failed to perform according to specifications, reflecting the science community’s poor theoretical understanding of the original inertia manipulation breakthroughs. More than four hundred and fifty DY-120 and -140 series ships were eventually finished by commercial operators; a total of 43 saw UEDP service under the respective class names *Brenton* and *Helsinki*. The unsuccessful DY-130 in turn spawned the DY-135 military project, half a dozen high speed patrol vessels armed with four laser cannon and a missile tube and backing up the slower *Liberty* class in defending Sol in the late 21st century.

Two DY-142 improved lunar transports orbit Earth’s sole satellite, with a tug about to lower four cargo modules down to lunar surface. A DY-B5 interplanetary booster is being fueled in the background, and carries the Ares III *mission spacecraft* Lucifer *for the 2032 mission to Mars, the thirteenth successful manned sortie to reach that planet. All the vessels are equipped with advanced fission propulsion modules, distinguishable from each other mainly by their differing radiator panel assemblies. Conversions from one standard to another were common as well, a DY-B booster mission being a likely end for a veteran transport of another model.*

The extended interplanetary operations of the second generation of DY vessels were facilitated by an improved Amjet gas-core fission powerplant assembly that required only 50% of the propellant mass of the original design. For lunar runs, a simple landing tug was carried; up to 16 cargo wedges could be externally mounted onto the core stage, and the tug could carry four at a time down to lunar surface.

For fast translunar missions, standard practice still called for a mission spacecraft to be added to the booster stage. The *Apex*, *Afrodite* and later *Ares* ‘upper stages’ utilized a conventional fission-powered ion engine for regular flights to and from Venus and Mars, while the much heavier *Aventeurs* relied on a cluster of the same nuclear thermal rockets that propelled the booster stages when launching on ‘Grand Tours’ to the outer planets. The *Aventeurs* were also able to fulfill mankind’s dream of an offworld colony, running a steady stream of supplies to the Moon from asteroid mining rigs, as well as setting up automated bases at Ganymede.

The first of the Grand Tours. Christopher, Fontana and O’Herlihy launched on Aventeur I*, the* Lewis and Clark *(2009), riding via Jupiter (2014) to Saturn (2020) with a payload of 12 scientists in deep cryosleep. It was only at the return of the*

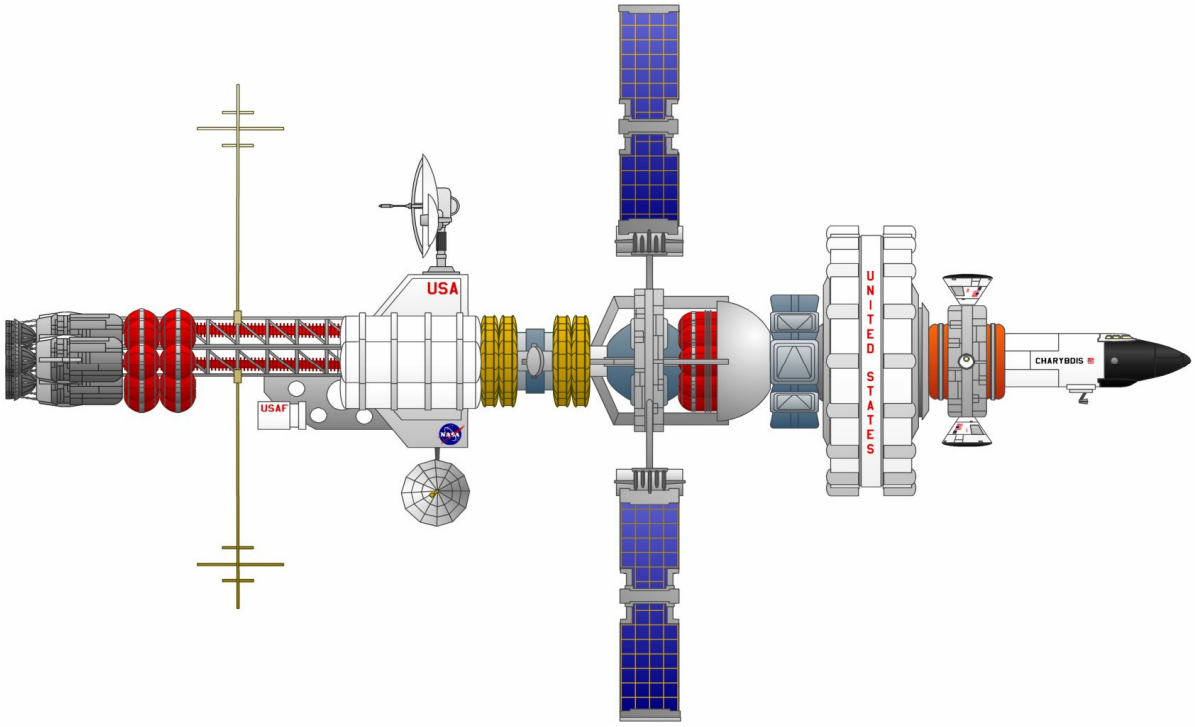
spacecraft, in 2039, that reports were released on the team's discovery of evidence of alien mining at Enceladus and Dione. By that time, the Aventeur *design was propulsively completely outdated: Lagan, Murray and Ulrich and their coldsleep chattel on* Aventeur V*, the* Frémont, *were actually recalled halfway to Neptune when it became evident that they would be preceded there by expeditions launched much later.*

The permanent settling of Mars was once again put on hold, however. Far more interesting dreams were now taking its place, as the wave of probes built with the new technology began sending back evidence of near-Earthlike worlds in this area of space.

TAU series

Extrasolar exploration vessels
2036-2069

Completed:	8
Length:	102.4 m 149.3 m (w/ booster stage attached)
Beam:	23.3 m (in launch configuration) 60.6 m (w/ antennas extended)
Height:	23.3 m (in launch configuration) 60.6 m (w/ antennas extended)
Mass:	6,400 tons (*Daedalus*, *Charybdis*, *Phlebas*) 6,200 tons (*Betelgeuze*) 6,800 tons (*Jacob*, TAU VI-VIII)
Max.speed:	0.5 c
Endurance:	6 years w/ cryosleep
Crew:	15-18
Weapons:	None
Shields:	Electromagnetic shield (max 12 T)
Laboratories:	None
Auxiliaries:	1 atmospheric craft (*Daedalus*, *Charybdis* and *Phlebas* only), 2 maintenance pods
SOURCES:	(D Kris Trigwell) (N own) (H own, adapting TNG and SFC)



In the first decade of the 21st century, various new countries on Earth entered the space race. Technology leaps implemented by the genetically-augmented scientists enabled most industrialized nations to mount elaborate space programs. Between 2000 and 2009 alone, a total of 212 interplanetary and 51 interstellar probes were launched, and six major manned orbital platforms were assembled – typical actions by a fledging space power, although the time scale is slightly shorter than the galactic average. Manned missions to Mars, the asteroids and the Jovian and Saturnian moons were performed using combined NTR and ion drives and cryosleep techniques. A tentative colony was founded on the Moon but later abandoned and destroyed; today, the basalt bed of Lake Armstrong covers the site of the ruins. All the time, the various nations were preparing for the next giant step for mankind: the first manned interstellar mission.

The first crewed probeships to attempt flight outside the star system of Sol were built in the late 2030s. The program was mainly run by the de facto only surviving economical superpower, the United States, although international crew was selected for the missions to appease vocal critics of the US in the New United Nations. Still, France, Texas, China and India were skeptical, to say the least, of the motivations behind the technology alliance that created the craft.

Like most early 21st century craft, the so-called TAU ships (Thousand Astronomical Units, the grandiose but ultimately unrealistic intended range of the craft) were put together around Amjet engines copied from Singh empire vessels. Crew facilities and other equipment were developed and built around the world in an international co-operation effort of previously unseen scale. This cooperation was not without incidents, as evidenced by sabotage of component shipments by both Texan and Greenpeace submarines and the daring theft of five experimental EM shield generators by suspected Russian operatives. The completed vessels, built in Earth orbit, took the shape of multi-modular 'trains', with a large booster stage attached to the stern. The booster was used to throw the craft out of the solar system, after which gas-core fission engines, coupled with Singh-style hypervelocity exhaust systems, provided continuous 0.8 g acceleration, theoretically up to as much as 0.5 c. Ahead of the booster and the fission stage lay support system compartments, sporting communications antennas and long radiator surfaces. Foremost were a centrifugal habitat

compartment and a command pod, with maintenance pods and, in some cases, landing craft attached.

Five manned TAU vessels of slightly varying configurations were sent to probe the space beyond the heliopause. Their missions varied, from the testing of future interstellar flight hardware or military spacecraft systems like EM shields to experiments on long-term life support and cryosleep. With some flights reaching as far as 350 AU from the sun, long-base interferometry measurements were conducted in hopes of locating extrasolar planetary systems and perhaps even civilizations.

Unfortunately, shielding on the craft proved woefully inadequate. Contact with the main computer of the *Daedalus* was lost five months into the mission, soon after the ship had passed the orbit of Pluto. After a month of frantic efforts at re-establishing communications, brief telemetry contact with the monitoring systems revealed a series of onboard fires and subsystem failures. Soon thereafter, the ship vanished in the inner Oort cloud, and was presumed destroyed. A massive charge buildup on her hull was deemed the likely cause after a detailed telemetry analysis. TAU Two, the *Betelgeuze*, incorporated extensive protective measures and was configured to carry two crewmembers awake at all times, to provide a better response to such completely unexpected contingencies as the *Daedalus* catastrophe had been. The *Betelgeuze* completed a six-year mission into interstellar space and finally proved the concept of cryosleep as a long term life support method.

Beyond the orbit of Uranus, engines idled, the Betelgeuze *prepares for the coasting phase of her mission by orienting herself for optimal thermal control. Torque forces from the centrifugal-gravity habitat section at one end of the support truss and the massive thrust complex at the other made maneuvering such vessels a slow and tedious business.*

TAU Three, the *Charybdis*, was lost as her still rather poorly understood Singh-derived drive systems apparently jammed open and propelled the ship out of communications range. Two of the following missions attempted to locate the vessel, without any success. It was later found that the ship had been rescued/abducted by unknown extraterrestrials who had apparently transported her to θ 116 system; the remains of the sole survivor of the crew, mission commander Lt. Col. Stephen Richey, USAF, were in 2365 found on θ 116-VIII by the away team of *USS Enterprise* (NCC-1701-D). A similar fate must have befallen several space probes and manned missions in the early 21st century, but the identity of the abductors still remains a mystery. Vulcan survey files from the early 21st century appear devoid of clues in this respect. The abductions seem to have ended after the invention of warp drive on Earth.

The two disasters could have been expected to end all efforts at interstellar travel for a good while. Instead, interest in such missions increased constantly. A fierce econo-technological competition between the US compact and a new Eurasian alliance called the Econ drove both researchers and

manufacturers to double their efforts in constructing an interstellar exploration vessel, at virtually any cost. During the 2030s, Earth spaceflight rapidly progressed beyond the level reached by the genetically engineered supermen, and it very much seemed as if interstellar flight would indeed become reality within the next twenty years. Unfortunately, the two competing superpowers had other goals as well – among them elimination of the competitor and supremacy of mankind's own solar system. Numerous combat spacecraft, both cislunar and interplanetary, were fielded and weapons of mass destruction based on Earth orbit. By the 2040s, it was difficult to predict which of the wishes of the superpowers would be met first.

Columbus series

Interstellar sublight explorers
2040-75

Completed:	5
Length:	120.0 m
Diameter:	102.3 m (launch configuration) 37.2 m (cruise configuration)
Mass:	24,000 tons (launch configuration) 8,600 tons (cruise configuration)
Max.speed:	0.85 c
Endurance:	13 years w/ cryosleep
Officers:	4 (interstellar ops)
Crew:	36 (interstellar ops)
Weapons:	None (interstellar variants) 4 laser emitters (90 MW), 25 fusion missiles (UNSS *Columbus* refit)
Shields:	Electromagnetic shield (14 T) Gas envelope deflectors
Laboratories:	1 general-purpose/planetary sciences lab
Auxiliaries:	1 atmospheric craft, 2 maintenance pods
SOURCES:	(D SFC) (N SFC) (H SFC, own)

Despite the setbacks suffered by the TAU explorers, international competition had driven the US-led alliance to undertake a more complex program of interstellar sublight flight. While fission-powered vessels already plied the skies in some quantity, fusion propulsion remained a dream – a pipe dream, some insisted, after the hyperexpensive *Galileo* laser-fusion/NTR project ended in utter financial and technological disaster. In 2035, the multi-national manned prototype AFP-1 experimented on e-beam pulsed fusion detonation drive but met with a disaster of a more concrete kind, with 14 lives lost.

Yet scientists and engineers everywhere agreed that fission systems of known types could never attain the power/mass ratio required for successful interstellar flight, not even with the non-Newtonian trickery of Singh-type reaction drives. And the threshold of unacceptable casualties kept climbing with each personnel-hour spent in space: by the 2040s, some 600 people had already perished off-Earth. The AFP-1 accident barely made the news, even though secrecy and paranoia around the project was somewhat less intense than the global norm of the day. In this callous atmosphere, it was hardly surprising that the first successful interstellar fusion-based propulsion

system would be one forgoing innovation and relying on a combination of previously failed solutions.

In 2040, the state of the art enabled the construction of a 0.85 c maximum speed, 2.3 c total Δv spaceship, using methane as the primary propellant and deuterium as the fusion fuel. Main acceleration propellant was stored in four jettisonable wedgelike tanks, surrounding a cylindrar core stage roughly 40 m in diameter, with an instrumentation and habitat compartment riding atop the core. The fusion reactor would initially work much like the fission powerplants of typical Singh drives, providing both hot exhaust gases and MHD-tapped energy for an exhaust accelerator, which would in turn drive the methane propellant. After the acceleration phase, fusion would be spiked with antimatter for pulsed detonation drive. The huge combined thrust chamber and exhaust accelerator was rightfully called 'the most expensive compromise in the history of mankind', featuring the worst of both worlds – but working.

Fusion fuel and some propellant for deceleration were stored in the core stage, in two large spherical tanks, but in situ propellant production was to be used to fill the tanks up to capacity again. And what would this situ be? Nothing less than the atmosphere of a planet circling an alien sun. The primary goal of the craft was to propel mankind to its first interstellar journey. Secondary goals were set as well, since the core stages were capable interplanetary or extrasolar explorers on their own right; in fact, on acceleration mode, they were just greatly expanded versions of the boosters routinely used for manned missions launched to Mars and the asteroid belt. Still, all the five vessels of *Columbus* class were furnished with cryosleep systems that could sustain life across interstellar instead of mere interplanetary distances. The significant improvements in propulsion technology had already made interplanetary cryosleep virtually unnecessary, and the test run of *UNSS Columbus* to Saturn and back was performed with the test crew of thirty fully awake.

In 2045, all five spaceframes included in the program were ready. Equipment was mounted for interstellar exploration, including a versatile atmospheric shuttle with a fission drive of its own, a battery of wide-spectrum telescopes, a laboratory adaptable for various planetary studies and a series of small lander probes for planetary surveys. Interferometry telescopy and probe flybys had already confirmed the existence of at least seven planets in the α Centauri system, assured the scientists that return propellant could be manufactured there, and hinted at the presence of carbon-based life on the fourth and seventh planets of α Centauri A. Four other systems visited by Earth probes were also chosen, and five ships fueled for launch.

A serious accident during the fueling of *UNSS Columbus* in late September, 2045, led to eight fatalities and damaged the spacecraft. Her mission to α Centauri had to be given to *UNSS Icarus* and the journey of that ship to 40 Eridani delayed indefinitely. *UNSS Nautilus* was thus the first ship to boost out of Earth orbit, in January 21st, 2046, on her way to Tau Ceti. Other ships launched within six months of the *Nautilus*, each carrying 40 men and women in cryosleep. But tragedy struck in May 5th: The *Nautilus*, traveling at almost 0.4c, hit an interplanetary object too large for the meteoroid protection system to handle. Apparently, not only was the ionic activity in the inner Oort cloud badly underestimated, so was the density of macrometeoroids and cometary fragments. What little communications with the *Nautilus* could be maintained through the exhaust plume were now disrupted as the vessel entered uncontrollable oscillatory movement. Hundreds of successive meteoroid impacts and dangerous charge buildup were recorded before total communications loss. The onboard computer could not handle the situation, and Earth controllers could only watch through space telescopes as the ship tore herself apart in a matter of days.

There were heated demands of recalling the other three vessels, but such complex instructions could not be sent to the ships – the crews would have to have been awakened prematurely, which would have been an extremely dangerous procedure. Resignedly, the various governments wrote off the intrepid explorers as total losses, shut down telemetry networks when the ionization storms cut communications with the rest of the fleet, and downscaled their interstellar programs.

Evidently, mankind was not destined to reach the stars quite yet, and there was much to do on Earth in the meantime. For one, there was again a war in the brewing. The repaired *Columbus* was appropriated by the United States and equipped with four laser cannon and a rack for 25 fusion missiles for inner system offensive use, but destroyed in 2053 by an Econ kinetic-kill missile on Earth orbit before she had the chance to fire a single shot.

Yet after demanding decades-long journeys (lasting physically only years from the viewpoint of the relativistic-speed ships, and biologically mere days or weeks for the crews in hibernation), the *Icarus*, *Hector* and *Prometheus* did get through to α Centauri A, Arcturus and ε Indi, respectively. The crews awoke, extended their sensor gear, and were hit by radio-frequency broadcasts, low enough in power not to be discernible outside the systems' ionization bubbles but still undoubtedly marks of advanced civilizations. Excitedly, the crews set to work to prepare for first contact with extraterrestrial cultures, not knowing that this had already taken place on Earth several years ago.

The rest, as the approximately 1,800 human-visited inhabited worlds now stand witness, was history. Before this history could be written, however, there were two more chapters to be added to the human spaceflight chronicles: the midpoint of the 21st century would mark the birth of a unified combat fleet for Earth, and the launch of a bold experiment that would take this fleet to the stars.

The Icarus *at α Centauri A IV. Mankind's first successful interstellar envoy performed a flawless mission despite unexpected hardships at both star system boundaries. It is something of a miracle that none of the* Columbus *ships ran into fatal trouble in deep interstellar space: the supposedly indifferent void often ends up killing sublight travelers one way or another. Piracy of warp-incapable sleeper vessels is a common (and, outside the UFP territories, continuing) problem, because typical sublight spacecraft of primitive cultures can be counted on to carry easily accessible, perfectly good, and perfectly free fusion fuel. Whether the pirates express an interest in slave trade will then decide the fate of the sleeping crew.*

Liberty

System defense cruiser
2058-93

Completed: 51

Length:	154.0 m (radiators closed) 145.0 m (radiators extended)
Diameter:	47.3 m (radiators closed) 75.4 m (radiators extended)
Mass:	26,300 tons
Officers:	9
Crew:	30
Max. speed:	0.35 c
Endurance:	2 years
Weapons:	4 plasma cannon (300 MW) on fwd hull 2 rocket turrets w/ 300 kinetic-kill rockets on midhull 4 missile racks w/ 20 fusion missiles
Shields:	Electromagnetic shield (18 T)
Laboratories:	None
Auxiliaries:	3 boarding pods

Ships of historical interest:

USS Bonhomme Richard (CDH-047)

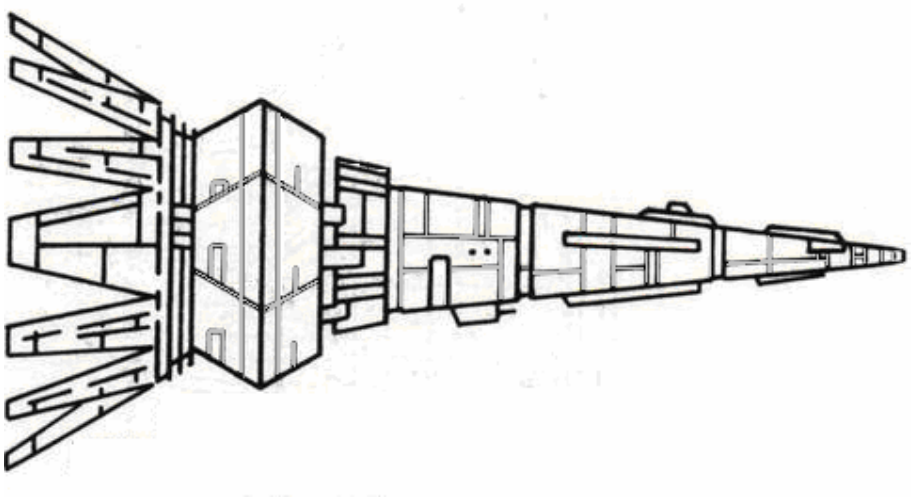
SOURCES: (D SFC)
(N SFC)
(H SFC)

The story of the dramatic rebirth of Earth's spaceflight capability after WWIII typically concentrates on three near-legendary elements: the warp breakthrough of 2063, the arrival of the staggeringly advanced Vulcans and their technological assistance, and the proliferation of peaceful Earth interstellar exploration and colonization vessels through refitting of prewar designs with warp drive. In surveys made throughout the 23rd and 24th centuries, well-educated Earth citizens frequently express the belief that all military space activity around Earth came to a halt with the destruction of the last active orbital weapon platforms in WWIII, and that Earth's defenses in the latter half of the 21st century hinged on the presence of intimidatingly powerful Vulcan voidships. However, this belief has little basis in fact. As early as 2058, the United States of America was building its first postwar transorbital warships. And even though the global collapse of infrastructure slowed down the national re-escalation, by the late 2060s the *Liberty* class system defense cruisers were Earth's main line of defense against both interstellar intrusion and indigenous spatial conflict.

The *Liberty* ships were by most accounts very conservative vessels. These conical warships were built around fusion NTR engines with exhaust accelerators and petal-like radiator surfaces. Carrying plasma cannon, rockets and fusion-tipped missiles, they were intended to fight enemies both large and small at close, medium and long insystem ranges alike. They could in theory reach one-third lightspeed at constant acceleration but lacked the fuel reserves, protective systems and astrogation gear necessary for interstellar journeys. Yet they should not be mistaken for cheaply cobbled-together efforts by a dying civilization: the level of technology represented by the vessels is impressive by the standards of comparative interstellar history. From the very beginning, the *Liberty* program was intended to be the first step in humanity's reconquest of its native star system, and to rapidly surpass the achievements of the 2000s-2040s. Had Zephram Cochrane not succeeded in his audacious private warp experiment – or had USAF been able to proceed with the planned 2055 launch of its own WD-1 faster-than-light test vehicle – Earth's spaceflight history might have taken a very different form, with the *Liberty* class as its inspiration.

Fusion-powered NTR drive was made possible mainly through the perfection of compact reactors combining tokamak-style magnetic confinement and laser energizing. This form of fusion technology was ideal for spaceflight due to its low mass compared with reactors using combined magnetic confinement and energizing, or heavy e- or n-beam energizers. It did require large radiators to dissipate cyclically produced excess heat. In the *Liberty* design, the radiators were coupled with field guides for the exhaust accelerator system, forming a petal-like arrangement astern – an engineering solution peculiar to Earth, one out of many.

The rest of the defense cruiser was mundane engineering. Six biconical fuel/propellant tanks surrounded the reactor. Forward of a radiation shield, crew facilities featured standard zero-gee accommodation with provisions for ±2.5 g acceleration in standard flight mode. In combat mode, the crew would board liquid-filled acceleration stations, to allow the cruiser to perform 80 g maneuvers that would bring to bear the four steerable bow plasma cannon, the twin rocket launchers, or the long range fusion missile racks. Alternately, the enemy could be burned to cinder with the drive plume hundreds of thousands of kilometers long.



Two sunrises on Ganymede. The drive plume of USS Liberty *easily bests Sol in brightness, and nearly equals the radiation flux of Jupiter in deadliness, as the spacecraft establishes orbit around the moon and above the former mining colony. The* Liberty *vessels were not equipped for landing or carrying of orbit-to-surface auxiliaries, yet were elemental in re-establishing human presence in the Jovian system and indirectly in bringing back online the mines and refineries. Bases around Saturn would have to wait a bit longer, being reactivated mainly with Vulcan help once Terran economies had stabilized in the early 22nd century.*

The first *Liberty* ship gradually attained nominal drive capacity by 2062, but USAF could not afford to perform an immediate test run due to the 2060 closing of the surviving White Sands spaceport and loss of heavy spacebus launch capacity. Construction crews did not finish orbital installation of armament until early 2064. By that time, though, six new *Liberty* hulls had been launched to orbit for installation of systems, in a desperate bid to show teeth in front of the Vulcan expeditions. And by 2070, there were no fewer than 51 of these 'baby teeth' in operation – but not in USAF hands. Vulcans had stepped in during the 2065 diplomatic expedition, and the Sparon-DeSoto treaty that was forced upon the national militaries now dictated international crewing of all armed spacecraft within 5,000 AUs of Sol.

The humblest of the visiting Vulcan vessels could naturally have blown the entire *Liberty* fleet out of the sky with minimal risk, had such an act of violence become necessary. But Vulcans insisted that the chances of a military confrontation within the Sol Transient Social Acclimatization Zone (far too intransient to the tastes of many a bitter human) were less than 2.3% unless the humans themselves provoked a crisis. Yet the Vulcans with their characteristic equanimity also insisted that there was no Vulcan blockade of the Sol system, and that visitors from the outside would be just as welcome to Sol as the humans were free to leave the system.

True enough, the remains of the pre-war defense net of Earth eventually detected an intruder: a small vessel of unknown configuration entered a Neptunian approach corridor claimed by both Texan and Central African gas mining corporations in 2073. A task force of ten ships led by the profilic Nigerian Adm. Abel Niwen, UEDP, aboard *USS Bonhomme Richard* of *Liberty* class intercepted the craft without waiting for orders from United Earth Space Central, and enraging several nations. The remaining nuclear and biological missiles in their silos were readied, and for the last time in mankind's history, the defense net stood by to explode unto itself, as soon as it was ascertained which nation was responsible for the intrusion. But to the astonishment of everybody, the ship turned out to be a somewhat lost alien explorer-merchantman carrying a crew of Tellarites, a race contacted at their homeworld 61 Cygni V by warp surveyor SS *Leif Eirickson* only days before. As Earth studied the captured Tellarite ship, the radio transmissions of the *Eirickson* sped towards home to relay the news of the discovery, of the worldwide panic the 'sneak attack' of the *Eirickson* had caused on Tellar, and of the peaceful solution to that panic by the hand-and-hoof-shake of Captain Anders and monarch Gartov. But the transmissions would not arrive for another eleven years, and the public was far more inclined to believe the rumors that hideous aliens were preparing for an invasion of Earth...

Despite the best efforts of doomsayers, no invasion force followed in the footsteps of the Tellarites. Nor did the Vulcans intervene in any manner military or diplomatic – an amazing degree of restraint that convinced most UE Defense Pact members that Earth still retained sovereign control of its star system and foreign relations. Disarmament of national militias, effectively stalled as a counterreaction to the Sparon-DeSoto treaty, now proceeded with vehemence and sincerity unimaginable back in the 2060s or early 2070s. In the end, the de-escalation also spelled the end of *Liberty* operations, and the large family of planned successor designs failed to materialize. A warp-powered successor did emerge, in the form of *USS Jules Verne* and her seventeen sisters, but this path proved a dead end as well.

By 2087, the UEDP was disbanded and most of its space assets given over to a truly unified UE Starfleet. The remaining *Liberty* vessels, now refitted with proper inertial damping, mainly saw training use in the colors of UESF Academy, instated in 2091. Built to enact a bygone doctrine, though, the ships proved of scant significance and were retired by 2093.

Phoenix

Warp drive testbed
2063

Length:	17.4 m (warp drive section) 29.6 m (drive section/booster stack)
Diameter:	3.1 m (stowed drive section/booster) 19.0 m (extended drive section)
Mass:	420 tons (warp drive section, original crew pod) 193 tons (drive section / booster stack, fueled)

Max.speed:	0.03 c (reaction engine) w 1.02 (warp drive)
Crew:	3 (original crew pod) 6 (extended crew pod)
Weapons:	None
Shields:	None
SOURCES:	D ST:FC, DS9 N ST:FC H ST:FC

World War III finally came in 2053. For some, it was a gracefully unfolding master plan, dutifully following all the field manuals of 21st century strategists. For others, it was devoid of reason, sparing the guilty and wiping out the innocent. Everybody was invited to participate; there was not a country spared from the madness, some areas being hit by nuclear blasts, some by biological weapons, and some succumbing to internal chaos. Just as the scientists had predicted, some 10% of mankind died within the first two years – of radiation, diseases, hunger, despair.

Yet, the slate was not wiped clean, the civilization not erased. The centers of power survived, due to their super-technology protective systems, but they were deprived of everything that had made them powerful. Less developed areas were hit badly, but ultimately gained in power as they were able to provide the remaining cities with food, water and other sustenance. For a while, few organizations on Earth could operate a hovercar, much less an aircraft or spaceship. But in some remote enclaves, capacity for research, development and construction of space systems survived. One of the unlikeliest was the small township of Resurrection, Montana, the location of a former Titan V missile base, and the one-time home of one Zephram Cochrane (2030-?), PhD, SOB, drunkard and genius.

Before the war, Cochrane had been a young and moderately successful physicist in a local research conglomerate. As dark clouds began to gather over humanity, Cochrane decided to pursue a vision of a radical new technology that would revolutionize physics and turn the ideas of Einstein and Hawking upside down. Gathering a small research group, he formulated his theory of continuum distortion and sold the idea of possible future applications in propulsion and communications technology to various organizations. Weapons research corporations were especially interested, but the young scientist resisted their temptation.

But then the bombs began to fall. Cochrane lost everything, including his team, his backers, his hometown, and his belief in humanity. Within two months, he put his dream on sale for the highest bidder. To his surprise, several powerful organizations still expressed interest. Arranging simultaneous backing from all the competitors, Cochrane set base on an abandoned missile complex and began to build testbeds for the continuum distortion superimpellor, a device he alternately advertised as a powerful weapon, a revolutionary form of transport, and a fantastic new power source.

In 2061, Cochrane tested the first unit inside an underground Titan V/VI assembly hangar, and was able to accelerate a test payload to lightspeed by expending his energy budget for the next five years 500 times over. Work began on prototypes of a spaceborne propulsion platform. In 2063, such a platform stood proudly atop a Titan V lower stage, being readied for manned flight to the amusement of the township of Resurrection, and to the great interest of observers from once-powerful corporations and crumbling militaries.

The ship incorporated a modified Titan VI upper stage reaction engine, four orbital maneuvering engines, and a toroid fusion reactor all clustered on the aft end of the main body. Fuel tanks were located atop this cluster, flanked on both sides by the equipment required to extend the twin hearts of the superimpellor drive – cylindrar nacelles containing the continuum distortion coils. These coils, made primarily out of doped copper alloys instead of the currently used vertenium cortenide, were excited by streams of plasma, energized by the fusion reactor and a small fusion-powered antimatter accumulator that 'spiced' the fusion through carefully controlled intermix of hydrogen and antihydrogen. The subspace field thus created would decouple the vehicle from normal space, countermanding several of the most cherished rules of classic Earth science.

Atop the machine was a small three-man control pod, constructed of titanium and partially covered with a ceramic heatshield. It was to carry the test pilot and two technicians throughout the experiment, and then to eject for a safe parachuted landing. The test rig was to be left on orbit, to be recovered by another spacecraft when (or if) any of Cochrane's backers could afford to launch one. For financial security, Cochrane had also included a powerful self-destruct mechanism in the design of the rig.

On the eve of the test launch, however, a surprise strike was performed against the missile site, killing most of Cochrane's new research team and damaging the test ship *Phoenix*. The attacker was never identified, but is believed to have been either a group of former Econ military leaders with access to orbital bombardment weapons, or then a mere automated misfire of the said weapons against a target that no longer was valid.

Befitting of her name, the ship rose from the ashes, however. Cochrane quickly drafted nearby villagers to help him repair the craft, and embarked on a historic test flight on April 4th. Some eyewitnesses claim there were two observers aboard, but history records Cochrane as having broken the light barrier solo. No recordings of the actual flight exist – the pitiful remains of the satellite surveillance network were directed elsewhere at the time, or deliberately jammed by the competing backers of the Cochrane team. What is known is that the tiny 1,028-millicochrane warp field of the *Phoenix* was observed by the passing Vulcan survey ship *T'Plana-Hath*, and a first contact with Earthpeople initiated by the Vulcans in late 4th of April, 2063.

The crew pod of the ship was recovered by parachutes and airbags. The warp engine itself was left in orbit for some weeks, until no less than sixteen organizations claimed her on basis of being the sole financial backers of the Cochrane team. However, negotiations with Vulcans were filling the remaining communication networks at the time, and in a spectacular return to the idealism of his youth, Cochrane asked the Vulcan technicians to insert the complete specifications and blueprints of his warp drive to the Bellnet. Within 24 hours, there was not a country or alliance in the world that did not know how to build a warp engine. It soon became clear that there was not a country or alliance in the world that had the resources to do that, however, since the national industrial infrastructures were too badly damaged. The only way to build warp drives was to form an international network of relationships, just as Cochrane had done.

The original warp engine received a second, larger crew pod with a 5th of November, 2064 launch of a multicorporation recovery team. A wide meteoroid shield was also installed aft of the pod to combat micrometeoroid erosion at extreme subluminal and virtual-particle bombardment at superluminal speeds. In this configuration, the ship performed a series of seven test flights, the last of which took it as far out as Saturn. The flights also gave the first warnings about the instability of

primitive warp fields in the vicinity of gravity wells, almost leading to the loss of the vessel near the Moon. As the *Phoenix* was retired in 2065 (and the warp section stored in a high orbit and eventually brought down in the early 22nd century to be preserved in the Smithsonian Institute), hundreds of other warp engines were already under construction. The infrastructure to build them was being erected at breakneck pace, revitalizing transportation and communication and totally relocating the industry in a way that made many former political boundaries meaningless. The political alliances of the time bore no relationship to the pre-war ones; simple east-west and north-south antagonism was transformed by the emergence of powerful agricultural nations in the south, end of factionalization in the east, and the worldwide sharing of the technological lead of the west. The political principles on which the briefly defunct but now resurrected New United Nations was founded were getting antiquated fast, and it would be only a matter of years until the NUN finally collapsed, giving way to a truly unified world government.

For a major part, this unification of the Earth and the ultimate emergence of a world government is attributed to Zephram Cochrane's achievements as scientist and statesman. The inventor survived the post-war chaos and depression to see the brave new world take shape around him, then participated in the first interstellar colonization efforts, relocating to α Centauri even before that colony became self-sustaining. In 2119, Cochrane left the spaceport of Cochrane City aboard a small warp yacht for parts unknown; his body was never found. Today, there is no major human colony out there without a Cochrane Building or a Cochrane Plaza, complete with a statue of the inventor (although most are a bit more subdued than the 120-meter colossus on Earth Colony Two), and several worlds bear the name of the benefactor of mankind. The famously open-minded Zephram Cochrane himself might find more delight in the fact that his name is revered in several nonhuman cultures as well.

The original Cochrane Memorial at Resurrection. The statue rests about 20 m from the silo that launched the historic first mission of the Phoenix*. An exhibit in the nearby Bozeman SFB museum in turn includes a replica of the underground control and laboratory complex. The original was sealed due to (at the time unmanageable) radiation contamination, and basically destroyed in the process.*

2063-2130 - The Incredible Expansion

Warp drive is a rare example of a technology that takes vast amounts of resources and time to develop, but then immediately offers total compensation for the effort. Vulcans have once calculated that a culture will either initiate a massive exploration and colonization program within 50 years of the invention, thus beginning the inevitable arc of galactic conquest, later complacency, and final fall to complete oblivion; or then it will hesitate with using the warp drive, and stagnate completely until awakened by warp-borne visitors. In the rare case it meets an aggressive neighbor in near-equal terms, it may also become a single-planet military power bent on isolationism and highly proficient in achieving that goal.

Earth seems a type A1 example of the first path. Despite the wounds of the recent nuclear war, the planet sent out more than 50 warp-powered ships within ten years of Cochrane's flight. Within thirty years, more than *five thousand* vessels had left for parts unknown, and six colonies had been founded on empty class M worlds (and one of them lost soon thereafter, not deterring the other hopefuls in the slightest). No warp-capable cultures were expanding into Earth's immediate vicinity: the Vulcans were already past their colonization phase, the Andorians mired down in their conflict with the Vulcans, and the Klingons licking their wounds from their Vulcan misadventure and undergoing a social upheaval. The earliest years of Earthfleet thus represent a rare opportunity to observe a space navy evolving in a power vacuum, unhindered and uninspired by external threats. Whatever hindrance or inspiration Earth's Vulcan protectors provided remains a matter of some disagreement even after several centuries of study.

The types covered in the next chapter are in many ways exceptional for an ascending interstellar power. Races beginning their star travel amidst other FTL cultures are often forced to adopt an excessively military posture to survive in the competitive environment, and this normally limits the experimentation done on high speed and long range propulsion, as well as curtailing exploration programs. The basic design of the following Earth vessels in turn places great importance on these very aspects, while featuring very limited offensive and defensive armament. The ubiquitous 'Boomer ship' of the 2090s-2140s is a remarkable exception from galactic norm, a design sacrificing everything else for the superior ability to engage in interstellar trade. The conscious choice of UESF to dedicate major resources to aiding in the creation of this nonmilitary fleet is an equally unique sacrifice in galactic history, at least among those cultures that have survived beyond their first century in space.

Defiant and Valiant

Survey cruiser
2064-2066 (*Defiant*)
2064-2073 (*Valiant*)

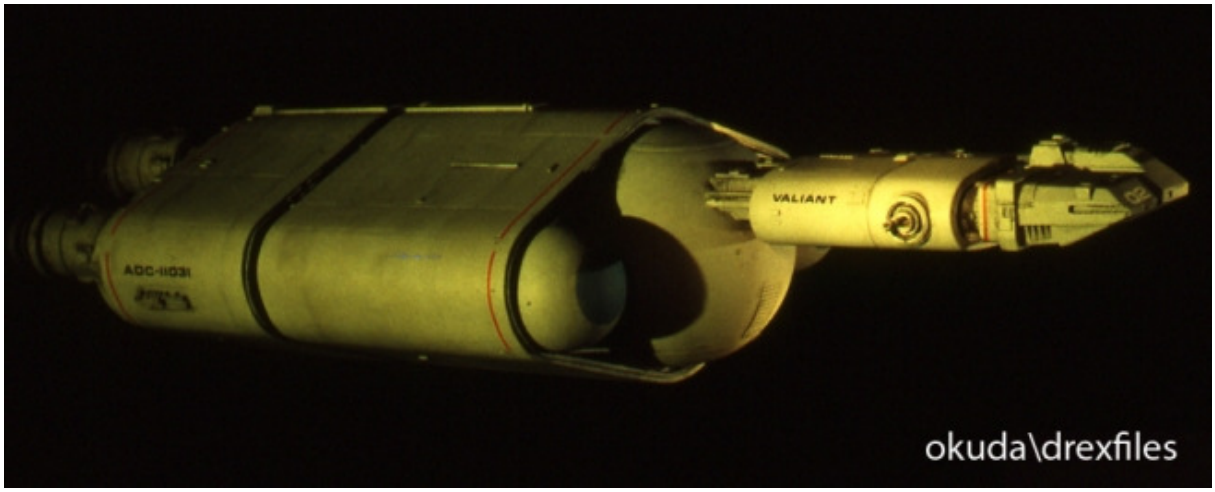
Completed:	2
Length:	92.4 m
Beam:	41.1 m
Height:	17.0 m
Mass:	16,300 tons (*Defiant*) 16,900 tons (*Valiant*)
Max.speed:	w 2.5

Endurance:	20 years (w/ hydrogen scoops and possible planetside replenishment of air/water/organic consumables)
Officers:	4
Crew:	26
Weapons:	2 laser emitters (190 nm / 12 MW) on habitat hull 1 missile rack w/ 6 fusion missiles (10 kT) and 18 probes beneath habitat hull
Shields:	Electromagnetic shields (max. 24 T) Electromagnetic deflector beam at fuel tank bow Glass-cloud anti-laser shields Gas envelope deflectors Reflective armor
Laboratories:	1 astrophysics
Auxiliaries:	4 maintenance pods
SOURCES:	(D Chronology, Greg Jein / Michael Okuda) N TOS H TOS

In 2064, barely a year after the pioneering flight of Zephram Cochrane, two ships equipped with warp drive zoomed out from Earth orbit towards the upper and lower edges of the galactic disk. Survey cruisers *Defiant* and *Valiant* were sent to find out the limits of human reach with the new drive. Sending back reports on radio waves only, the ships quickly disappeared into the galactic void.

Few on Earth could have predicted the creation of the bold surveyors even a year in advance. Admittedly, Western American and Econ industrial communities had begun their separate efforts to rebuild humanity's presence in space, erecting new space stations in place of the ones blown to dust in the war and building spaceports for heavy duty surface-to-orbit craft in place of the craters that once were cosmodromes. However, very little of this new space network was in place when the *T'Plana-Hath* decelerated to orbit and lowered her sensor screens. Reactions from across the globe ranged from impotent panic to stunned silence: none of the nations had observed the vessel approaching, and none could as much as send a spacebus to meet the mighty visitor, let alone challenge her presence. Three weeks later, when Cochrane made public his warp technology, fear and desperation drove together the East and the West. There was no alternative to cooperation now: Earth had to gain warp capability for the sakes of all her nations and alliances.

The East was to provide the spaceframes. Five of the *Akademik Mstislav Keldysh* class cruisers had been ordered back in 2049 to serve the interplanetary interests of the Econ, and four of them completed before the war. The ships were roughly the equivalent of the Western *Companion* class, capable of Earth-Mars or Earth-Jupiter runs and optimized for hunting down enemy shipping and anti-shipping vessels, but were mostly used for sabotaging satellite networks just prior to the war. Four giant nozzles of the fusion reaction engines heated ammonia propellant from a huge centerline tank by fusing deuterium from lateral saddle tanks, all enclosed in an outer armor shell of rounded-diamond cross section. Missile racks and laser projectors dotted the exterior in the original configuration.



View of the Valiant *(CX-02), formerly* Akademik Sergey Vavilov *(AOS-NOZ 1), before the installation of the warp engines. The habitat section added to bow consists of a standard pressure section taken from a biosynthesis factory satellite, plus a custom-built nose section with command facilities, navigation gear and sensors.*

The West became the major system contractor. Two of the cruisers were in 2064 modified for interstellar operations by cutting off the bow structures, adding a separate fusion powerplant within the ammonia tank, and bolting on two warp coil nacelles, simple scale-ups of the upgraded *Phoenix* engines and capable of englobing the craft in a 3-cochrane field. Total fueled mass was increased from 4,500 to 16,300 tons, most of that in the warp coils. Interstellar hydrogen (mainly from icy bodies to be encountered) was to boost the craft when ammonia ran out, and to serve as fusion fuel. Standard mode of operation required the ships to drop out of warp at the edge of the next star system, replenish fuel, and conduct observations including mapping the next leg of their journey.

As in the original *Keldyshes* and many of their contemporaries, the crew of the warpships was housed in a pod in front of the fuel/propellant tank, well separated from the reaction chambers. The zero-gravity conditions aboard necessitated comprehensive medical support for the crew, and cryosleep was used to ease the strain on the life support systems. Although already obsolete in interplanetary applications, the technique of slowing down metabolism to near standstill was nevertheless quite practical in conserving the resources required for interstellar flight. The nominal survey radius of the ships was intended to be 150 lightyears, or ten years in both directions, provided that only three of the thirty crew were awake most of the time. The theoretical figure, worthy of envy from later starship captains, owed much to cryosleep techniques, but the truth was that such an impressive radius could only be reached if fuel and various consumables could be replenished underway as efficiently as the Vulcan-backed calculations predicted. In other words, the missions took huge risks and braved a true point of no return after just one or two years.

In addition to life support equipment, the two-deck armored pod contained several telescopes of various types, as well as a powerful laser projector extending to starboard, intended both as a scientific instrument and communication device and as a defensive weapon. No FTL instruments were available, though. In front of the pod was an angular utility compartment featuring e.g. a bridge superstructure and a large airlock. Defensive systems mounted here included glass bead cloud emitters to fool lasers, and a rack-type launcher for nuclear missiles as well as probes – weaponry gathered from the military space programs of various nations from all sides of the recent nuclear conflict. Four small maintenance pods were also berthed in the structure connecting the habitat pod to the ammonia tank. The ships were not supposed to conduct exhaustive planetary

surveys; their mission was one of interstellar mapping and technology demonstration, and the survey equipment carried aboard was of limited use in studying (or reaching!) planetary surfaces. There was no real intention of contacting alien species. Vulcans had provided the explorers with rudimentary translation programs for the alien languages they admitted to being familiar with, but the ships were not going to visit space inhabited by the speakers of those languages.

Both of the vulnerable little vessels failed to return from their missions. *SS Valiant* sped to galactic south at maximum speed, but ended up getting caught in a spatial fold within an ion storm, encountering the galactic barrier in early 2073 and falling prey to its effects. According to investigations by *USS Enterprise* in 2265, Captain Tarasco initiated self-destruct as the dire consequences of the encounter with the barrier were realized. *SS Defiant* was destroyed a year after her departure in a region of space later found to be claimed by the Barrier Alliance. Few on Earth cared; the war and its chaotic aftermath had ravaged the deep space listening networks, and most of the knowledge gained and sent back was never received. Some data was later recovered by colonist spacecraft speeding past the radio waves, utilizing the only form of 'time travel' allowed in the Cochrane version of theory of relativity.

But the main message was not lost. It would take some twenty years before Earth could again launch craft across such vast expanses of space. Yet when the dust of the war settled for good, humans possessed the knowledge that long range warp travel was possible, and proceeded to build a mighty fleet of FTL ships with the assistance of Zephram Cochrane and the benevolent aliens he had encountered. These ships were used for colonization of nearby planets and for contacting neighbor cultures, launching the first real wave of human expansion.

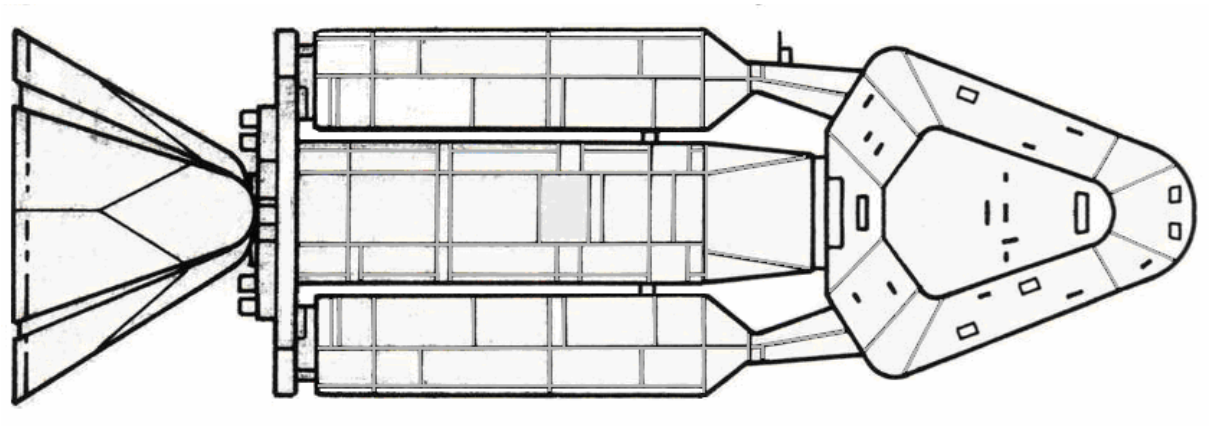
SS Defiant *leaves Earth orbit in 2064. Note the rocket engine burn – warp fields were at that time largely incompatible with gravitational wells, so the ship used the ammonia propellant to leave the solar system first. Later also the centerline tank was to be filled with deuterium from extrasolar sources, adequate as propellant and useful as fusion fuel. The hybrid powerplant was also compatible with antimatter 'spicing'; the ships used fusion power to create tiny amounts of antimatter while coasting between warp jumps and making observations of the path ahead, then expended the antimatter in a brief warp 2.5 jump.*

Bonaventure

Survey cruiser
2064-2077

Length:	206.1 m
Beam:	63.4 m (radiator wings deployed)
Height:	66.7 m (radiator wings deployed)
Mass:	79,400 tons
Officers:	5
Crew:	40

Cruise speed:	w 2
Max. speed:	w 2.5
Endurance:	6 years
Weapons:	2 laser emitters (390 nm / 300 MW) on fwd hull
Shields:	Electromagnetic shield (10 T) Gas envelope deflectors Glass-cloud anti-laser shields
Laboratories:	1 GP, 1 planetary sciences
Auxiliaries:	2 atmospheric shuttles and 2 shuttlepods
SOURCES:	(D SFC, Arcas) (N SFC) (H SFC)



The development of the *Defiant* and the *Valiant* had created a significant pool of expertise and skill among the international construction teams. Earth still lacked the resources to mass-produce warp explorers, but the teams wished to push on with development of more practical warp drives and more useful exploration vessels. The national pride that had driven earlier space programs was replaced by a combination of professional pride and competitive spirit, with the frighteningly advanced Vulcans as the opposing players.

In 2052, during the final stages of the econo-technological race against Econ, the US government had begun to construct a large defensive space cruiser, tentatively christened the *Seneca*, for challenging Econ orbital supremacy in the 800-4000 km region. The vessel was in many ways just an enlarged copy of the *Keldysh* design, and something of a departure from the classic USAF spacecraft lineage. Indeed, the more traditional, less ambitious *Guardian* series of large manned combat spacecraft remained the budgetary favorite, and work on the *Seneca* was aborted before the outbreak of the war. In 2064, the ship was floating dead on a decaying orbit within the shrapnel cloud that had been Freedom Assembly Berth 02 prior to the war. The warp development teams promptly attached a tug into the hulk and towed it to the *Valiant* construction berth.

Within a year, the ship sported two 30,000 ton warp coil assemblies in hexagonal protective nacelles fashioned out of the lateral fuel tanks, and a three-chamber fusion powerplant with huge radiator surfaces bolted astern of the centerline tank. Her old national insignia were retained, but the registry and name were painted over to give room for the national symbols of the rest of the teams. Instead of the rather martial names chosen for the first warp explorers, the ship proudly carried the

words ‘Bonaventure – the dream is alive’ on her hull. Still, the ship was far from being a purely pacifist science project, as the financial backers of the project did not wish to see their interstellar envoy appear defenseless to the unknown dangers of space. Two laser emitters were installed on the arrowhead-shaped forward hull, and a full range of missile warning systems and glass bead emitters covered the propulsion modules and nacelle assemblies.

Since the ship was primarily intended to explore strange new planets, she required landing craft and remote mapping gear, neither of which was provided for in the original cruiser design. Two former USAF sentry platform maintenance shuttles were hauled from Earth and bolted onto the ventral surface of the fuel tank, and a selection of telescopes crowded the forward hull. A completely closed-circuit life support system was also installed for a maximum endurance of six years, representing a quantum leap over the primitive systems aboard the *Valiant*/*Defiant* ships.

The gigantic vessel fared better than the two initial survey cruisers: her second operational warp sortie under the command of Captain Huckleby took her to Tau Ceti and, more significantly, back. Mankind’s first two-way interstellar journey had been completed in just eight years. During the following decade, the successful *Columbus* sublight explorers would also return to Earth, but too late to claim the honor. It mattered little that the *Bonaventure* went missing on her third mission, to Sirius – Earth had been firmly established as capable of interstellar exploration now, and would continue to expand its efforts in the upcoming years.

While the capability of Earth to construct something the size of the *Bonaventure* was severely limited in the postwar environment, scavenging of existing space structures would help Earth equip for its warp exploration spree. The basic structure demonstrated by the *Defiant*, the *Valiant* and the *Bonaventure* would remain popular in early purpose-built warp vessels as well. A central fuel tank and reactor compartment flanked by two nacelles and mounting reaction engines and fusion powerplant aft, and an angular habitation compartment forward: all this would see service well into the mid-2100s, although the amount of onboard fuel required would gradually decrease and thus free internal space for other applications.

The most direct successors of the *Bonaventure* would be the *Messier* class heavy cruisers, Earth’s first true interstellar warships that in the 22nd century would be drafted to serve in the desperate struggle against the Romulans. However, the course of Earth warp technology was far from charted in 2064, and at least two major competing basic configurations would soon emerge. It is a matter of

some specieist pride to humankind that the native *Bonaventure* configuration would persevere where the alien-influenced competitors would not.

Verne

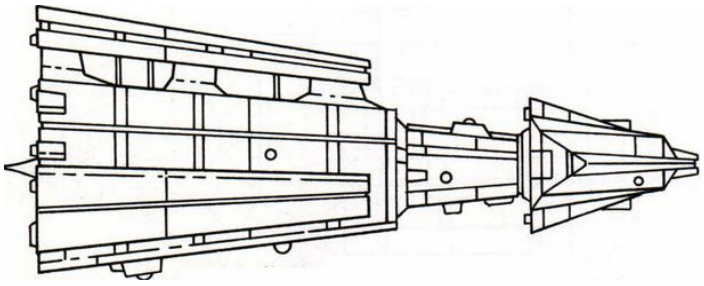
Survey cruiser (later system defense destroyer)
2064-2095

Completed:	18
Length:	235.9 m
Beam:	80.4 m
Height:	50.0 m
Mass:	25,000 tons
Officers:	9
Crew:	103
Cruise speed:	w 2.5
Max. speed:	w 2.7
Endurance:	2.5 years
Weapons:	4 laser emitters (390 nm / 700 MW) on fwd hull (survey cruiser) 8 laser emitters (390 nm / 700 MW) on fwd hull (destroyer) 2 missile tubes w/ 50 fusion missiles or sublight probes on fwd hull
Shields:	Electromagnetic shield (10 T) Anti-laser glass-cloud dispensers (destroyer)
Laboratories:	1 GP, 1 planetary sciences
Auxiliaries:	2 atmospheric shuttles and 2 spatial shuttlepods (survey cruiser) 2 spatial shuttlepods (destroyer)

Ships of historical interest:

USS Hammer (CS/DD-24), *USS Fletcher* (CS-08), *USS Scythe* (CS/DD-25)

SOURCES: (D SFC)
(N SFC)
(H SFC)



The late 2060s saw a swift rebirth of industrial networks across and above the surface of the Earth. In consequence, the proliferation of warp technology and its adaptiveness to existing ship configurations enabled almost any organization with access to space to equip a warp-powered explorer. Literally hundreds of different ships exploded out of the solar system in search of new life, civilizations, raw materials, explanations and answers of all kinds – or just for the fun of it. The surviving governments of the time were determined to get their piece of the action as well, and in 2073, the first series-produced interstellar spaceship class, the *Verne* survey cruiser, was fielded to

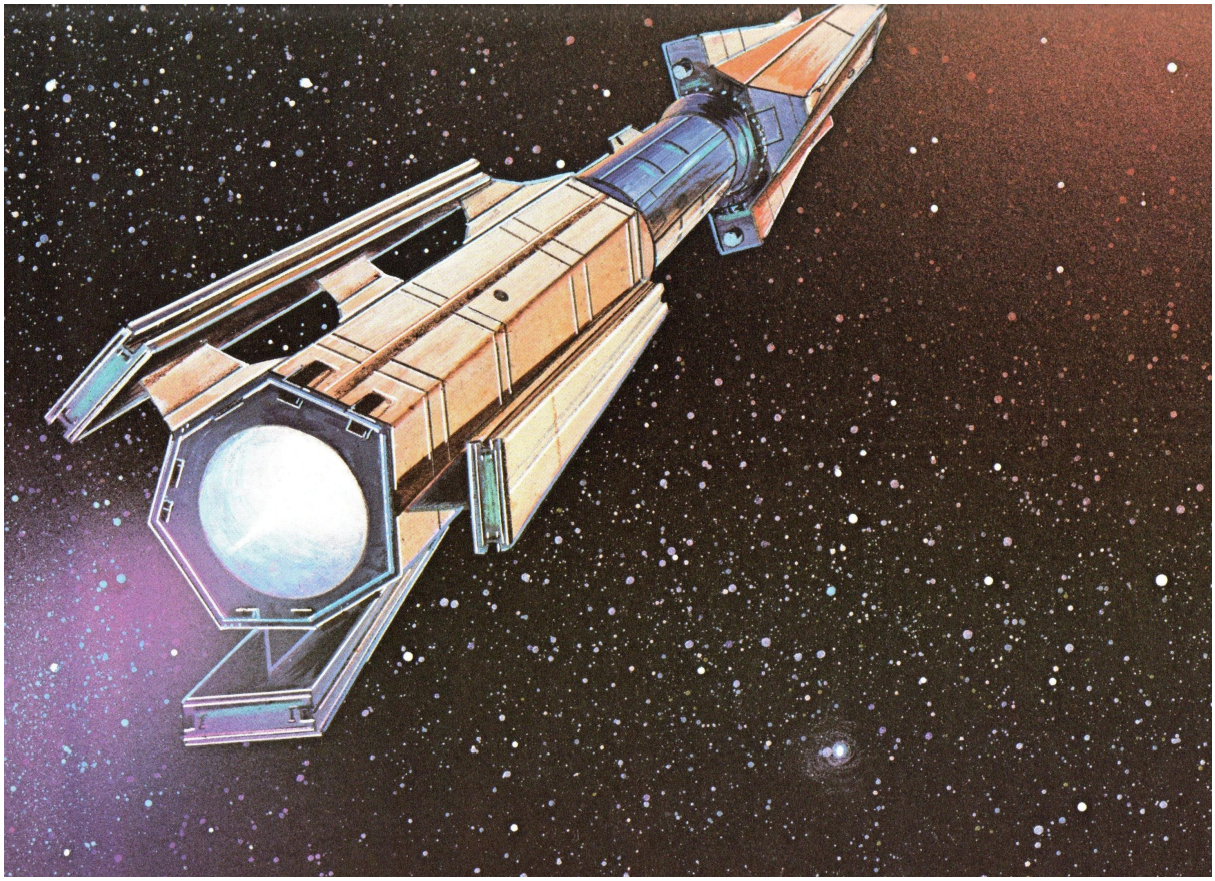
serve under the United Earth flag. The story of the ship class had begun much earlier, however, in the form of the final major nationalistic spacecraft program under NUN colors.

The original *Verne* ships were built jointly by the countries that had survived the devastation of WW III with the least damage – mainly the larger North American nations that were protected well enough, and South American and African nations not worthy of having been nuclear targets. They featured a hull taken from the promising *Guardian* series of USAF prewar near-Earth warships, a huge cone similar to the postwar *Liberty* hulls yet technologically less ambitious and consequently more robust. Modifications to this design had been on the drawing boards for some time, and had held back prewar series production. Now these plans helped speed up the conversion of the *Guardians* into warp explorers that would give the West an edge over Terran competition.

In 2064, three *Guardian* hulls were available in orbit, but none were originally deemed salvageable. Instead, a completed yet so far unlaunched hull now blasted off the reinstated Edwards SFB, with the name *Jules Verne* painted next to the NUN livery. Launches of three flat, monoelement Korngold-McHale warp nacelles soon followed. These were mated to the aft hull at 120 degree intervals, not in the style of the Cochrane experiment but in the configuration of the USAF plans from the early 2050s. A warp power source of three Singh-derived fusion reactors replaced half the fuel tankage as well as all the particle cannon from the original blueprints. As long planned, the fission NTR reaction engines from the late 2040s were replaced by fusion NTR propulsion that utilized a single gigantic nozzle. Alterations to hull form were minimal, and did not attempt the kind of endurance increases the truly international *Defiant*/*Valiant* and *Bonaventure* programs had aimed for. Instead, much of the original martial nature of the design survived. For example, the bow cone retained the original two missile tubes while gaining some protrusions necessitated by extended life support systems.

A successful sublight test flight in October 2064 paved way for the first warp run, initiated safely outside the orbit of Uranus in December 14th, 2065. The *Jules Verne* reached warp 1.02 under the close supervision of a Vulcan chase ship. Never mind that the test run proved incorrect most of the USAF calculations, resulted in terminal damage to the nacelles, and was greeted by the Vulcans as 'a most irresponsible and ill-advised act of *experimentation*', an apparent cussword in Vulcan science circles. Nor did the Sparon-DeSoto clamp-on that squashed the original political goals of the program deter the participating nations. They still granted funding for the re-engining of the *Verne*, completion of three more vessels out of unlaunched components, and conversion of the orbital derelicts to operational warp explorers.

By 2075, eighteen *Vernes* had been constructed, seventeen of them had attained warp capability, and sixteen had been launched on missions of exploration, to Epsilon Eridani, Altair, Arcturus, Sirius. In 2073, the nations operating the *Verne* ships promised to make all their findings public through the UE Space Probe Agency (a promise only partially kept), and in 2089 relinquished control of their ships to the UE Starfleet (a more honest show of idealism). Little of this mattered to the ships and crews themselves, typically underway on decades-long journeys. Unlike the long-shot *Defiant* and *Valiant* missions, the *Verne* ships systematically surveyed the homeworlds of the newly encountered races and estimated their resources and military strength, charting nearby space for possible expansion. A top speed of warp 2.7 allowed the ships to outrun many private warp vessels and thus to attain certain leverage over such entrepreneurs. The limited range of the *Vernes* often forced them to seek replenishment from the worlds they explored, leading to rudimentary trade agreements and improvised diplomatic overtures.



On the first human diplomatic-scientific expedition to Vulcania, USS Amity *approaches 40 Eridani A, with the innermost planet of the system visible off starboard bow. The two orbit-to-surface craft, modified from* Patriot *transorbital interceptors, have already undocked; the photograph is taken from one of them, just prior to the craft engaging its rather formidable reaction drive for an independent rendezvous with planet Vulcan. The show-off maneuver was in fact necessitated by an embarrassing drive malfunction aboard the* Amity*, leaving the mothership stranded on a circumstellar orbit. Vulcans were led to believe that the approach maneuver had ceremonial roots, while the crew of the* Amity *performed frantic and ultimately successful repairs.*

Back on Earth, the *Verne* project initially faced stiff criticism from many nations struggling with the post-war horrors. Terrorist attacks frequently threatened the launches of components, and funding was hard to come by. But the rapid recovery of infrastructures in the 2060s and 70s made it possible to start fighting the rampant poverty and hunger and the environmental devastation. The recovery owed as much to the continuing space program as it owed to the Vulcan beneficiaries. Asteroid mining and weather and communications satellite networks were widely advertised as essential to Earth's recuperation, and in the late 70s the public opinion had turned in favor of space exploration and exploitation. In the 80s, less than 20% of Earth's population suffered from hunger and poverty – a feat never before attained. The remaining distress would disappear thanks to space resources and interstellar trade, promised the new world government.

The *Verne* ships frequently made the news with intriguing scientific discoveries and daring recovery operations of old sublight colonization ships. Dozens of colonies sprung up around distant stars, and Earth's solar system bustled with activity once again. But there were many setbacks in the space program as well. Most notably, it was found out that contacts with hostile alien cultures were quite possible, and that Earth would have to be ready for violent encounters. *USS Mercury* and *USS*

Banshee were the first vessels of the class to be lost in deep space in 2077. No official explanation was ever found for the losses, and the Vulcan High Command strongly discouraged such solo missions, at least until better communications networks would be in place. Existing Vulcan military networks were strictly off limits, however, presenting Earthfleet with a chicken-and-egg problem: contact with deep space explorers could only be maintained after extensive exploration of deep space.

On the other hand, nobody was left in the dark when *USS Fletcher* exploded and scattered debris to the upper atmosphere after a warp drive failure in Earth's gravity well in 2086. The early warp drives were notoriously unreliable anywhere near gravity gradients, and the three-lobed fields of the *Vernes* far more so than the Cochrane-style ones. Indeed, the *Fletcher* explosion factually spelled the end of the Korngold-McHale style of warp propulsion, leaving the Cochrane and Tellarite multi-coil drives and the Vulcan ring-engine drive as the only serious competitors on the field. *Verne* vessels back in the Sol system at the time of the accident were assigned sublight duty and a destroyer designation, assisting the *Liberty* class in guarding Earth's front yard against the next alien intrusion.

In 2089, *USS Scythe* briefly brought back to public view the *Verne* class for the last time as she accidentally fired her lasers at sister destroyer *USS Hammer* and the more modern *USS Emnity* in training maneuvers, resulting in significant casualties. The class was withdrawn from both combat and training use soon thereafter. No vessels of this type survive today, as the decommissioned destroyers were efficiently used for target practice.

Conestoga

Colonizer
2067-2098

Completed:	3
Length:	197.2 m
Beam:	71.0 m
Height:	34.9 m
Mass:	239,400 tons (*Conestoga*) 238,100 tons (*Spirit*) 240,000 tons (*Ascender*)
Officers:	5
Crew:	20
Passengers:	200
Cargo:	20,000 tons
Cruise speed:	w 1.6
Max. speed:	w 2.0
Endurance:	10 years
Weapons:	None
Shields:	Electromagnetic shield (10 T) Gas envelope deflectors
Laboratories:	1 planetary sciences
Auxiliaries:	2 atmospheric shuttles and 2 shuttlepods

SOURCES: D ENT
N ENT
H ENT

In 2064, fielding a warp explorer was a herculean effort, an adventure of uncertain success and unlikely financial return. It would have been incredible, even insulting, to claim that such a project would be considered 'relatively simple' mere two years later. Yet the *Conestoga* enterprise of 2066 left all earlier warp spacecraft projects in its shadow, in technological complexity as well as scope of mission.

Recent findings from extremely long base interferometry measurements and the *Friendship* and *Messenger* fast flyby probes had been a disappointment to the general public: a habitable yet uninhabited world could be discerned in only one of the star systems within 20 ly from Earth. On the other hand, planetologists and xenobiologists were elated, as the actual incidence of habitable worlds exceeded their wildest dreams. The political leadership of Earth certainly understood the serendipity of the Eta Cassiopeiae III find: cautious inquiries confirmed that Vulcans held no claim to this region of space, nor knew of any competition to a Terran claim, should one be made.

Earth did not hesitate for a day. Once the formalities with the Vulcans were out of the way, all due haste was also applied on the technological aspects of the process. Rather than send an exploration spacecraft to the multi-year journey, Earth opted for a more aggressive approach in staking its claim. Two hundred volunteers were chosen for the founding of Earth's first interstellar colony, in a single sortie by a single ship. The latest in warp propulsion and cryogenics would secure their safe transit, and the most recent experiences from the re-established lunar colony would be put to use in allowing them to lay down a permanent presence. To be sure, Eta Cas III was a much less hostile environment than the Moon; indeed, had it not been almost perfectly Earthlike, the entire venture would have been considered far too risky. Still, some 20,000 tons of assorted equipment and supplies would be needed to ensure the survival of the settlers, as there was no time for a second probe flyby to ascertain the exact needs of the colony.

The advanced vehicle that would transport the colonists and their cargo was laid down on Earth orbit in August 22nd, 2065. The incredibly tightly scheduled program once again made use of preexisting design elements from operational or planned interplanetary vessels. The colony ship was designed and redesigned 'on the fly', the only guideline for the engineers a backward compatibility with what had already been built. The ship reached her final shape in early March, 2067, at which point the name *Conestoga* was assigned.

The structural strongback of the colonizer was a box some 11 meters wide, a hundred meters long, and 18 meters or six longitudal decks high at midpoint. The forwardmost eighteen meters were dedicated to two compartments serving navigation functions. The upper held the command center, to be permanently manned by ten of the 25 awake crew. The facility was extensively covered by transparent surfaces, both to facilitate coordinated final stages of atmospheric entry, and for psychological reasons during transit. In fact, the psychological impact was just the reverse of the one intended, deepening the feeling of claustrophobia by adding agoraphobia; shuttering of part of the windows was among the first inflight modifications performed by the crew, although not the last. The lower compartment held no pressurized spaces, but instead mounted the STL and crude FTL navigation sensors, the debris deflector field spire, and mapping sensors for final assessment of Eta Cas III prior to entry.

Aft of these sections was the crew habitat, as well as an airlock complex and an internal equipment hold. On both sides, outside the central pressure box, were the gas envelope shield injectors. Behind the aft bulkhead of the crew section began the passenger area, with cryochambers for the 200 colonial hopefuls, and upper and lower support system levels. This heart of the ship was flanked on both sides by bulging equipment holds, which doubled as radiation protection in transit, and tripled as construction elements for surface habitats after landing. Six large space doors were provided for loading of equipment and for the odd underway repair needs. Forward and aft dish antennas were added to the exterior for lightspeed messaging; a subspace communicator of Vulcan manufacture was to be activated down on the surface of Eta Cas III for near-realtime contact.

Earth Colony Ship Spirit *sets down on* α *Centauri A II, received by Centauran advance surveyors. External differences between the three* Conestogas *were minimal, and the basic configuration was also adapted for several succeeding colonizer types.*

The quadruple sublight propulsion system featured combined fusion thrust chambers and accelerators of tried and true Westinghouse 4W900 type, each mounting a huge external hydrogen tank at launch but jettisoning it after initial acceleration and relying on internal stores of deuterium for sublight maneuvering at the target system. Dorsally outriggered nacelles at the tips of gracefully curving pylons held the Cochrane Warp Dynamics AC-1A warp coils, and were to be jettisoned just prior to planetfall, after having provided near-constant warp 1.6 thrust for almost a decade. Gravitics and lift engines on lower keel would ease the ship to a soft landing, to be followed by driving down of the fusion reactors and dismantling of the hull. Afterwards, one of the reactors would be restarted to act as the powerplant of the newborn community.

Launch of the *Conestoga*, 'the Great Experiment', took place on the third anniversary of Cochrane's test flight. Captain Fabian Mitchell's farewell message from the duonetopause made official what the public had known for a long time: a little over nine years hence, Eta Cassiopeiae III would be known as Terra Nova.

Arrival in late 2076, thawing of the colonists and atmospheric entry all proceeded as intended. What happened afterwards deviated from the plan, however. Slightly at first, as reports to Earth became infrequent. More severely later on, when a growing group of dissidents, led by former First Officer Mark Logan, gave vocal opposition to the plans on sending over a second batch of 200 colonists on the *Spirit*, completed and awaiting use since 2071. By 2081, matters had escalated to the point where the isolationists held absolute majority at the colony, and threatened to shoot down any Earth

vessel attempting landing on Terra Nova. Earth's response was definitely incendiary, yet could not adequately account for the total silence that followed. As attempts at re-establishing contact failed, Earth reluctantly withdrew the planned second wave, fearing either a hostile reception or then a natural calamity that would claim the second ship as well.

In the meantime, the third vessel of the series had already been launched towards 36 Ophiuci III. The *Ascender* reached the slightly more demanding conditions of the planetary system and successfully established a colony in 2086. The *Spirit* was first to be re-vectored towards Khi Ceti A, a promising half of a wide binary discovered lurking behind the dense Agosoria absorption nebula, and sporting at least one potentially Earthlike planet, possibly two. Vulcan denied passage in this direction for the time being, however. The vessel was eventually sent to α Centauri A, where settlement rights had been negotiated on the second planet.

At the time the colony there was officially founded in 2091, Earth already was aware of at least five previously missed Earthlike worlds within the 20 ly radius. Also obvious now was that these planets could not be naturally habitable, but had to be the result of large scale terraforming, by party or parties unknown apparently even to the Vulcans. This was splendid news for Earth organizations and communities interested in colonization: modest vessels, such as those of the DY lineage, would be capable of establishing a successful colony on such worlds. Also welcome were the news of the hitch-free nine years of cryosleep on the *Conestoga* mission, alleviating earlier fears of radiation damage. The disaster that had befallen the Terra Nova colony, and the lack of any forewarning thereof in the flyby probe data, were lesser concerns now. By the thirtieth anniversary of Cochrane's first flight, five interstellar colonies of Terran origin were extant, and three more in the process of being established. Colony ships in transit were legion, so many being launched every year that some were slipping past official records. The isolationist example of Terra Nova inspired many an emigration movement, and prompted these so-called Diasporan groups to head for ever-deeper space, sometimes without certainty of finding a suitable world at the destination.

The true fate of Terra Nova was first uncovered in 2151 when survey cruiser *Enterprise* (NX-01) paid the world a visit. Impact of a radioactive asteroid had left few human survivors, yet much of the planet was still habitable. Within fifty years, a new community began to thrive on the southern continent, and a population explosion followed in the early 23rd century. The Ophiucus colony in turn became one of Earth's most profitable heavy metal mining ventures, and α Centauri A II an indispensable center of cultural exchange (not to mention a fiercely independent hubworld for the other human colonies in the ternary system). The last *Conestoga* reactors were shut down on these locations in 2209, 2285 and 2291, respectively.

DY series (warp)

Transports / system patrol vessels
2087-2131 (*Hawke*)
2089-2156 (*Dare*)
2069-2168 (*Wheeler*)

Completed:	87 total:
	15 *Hawke* (DY-1100) patrol cruisers 50 *Dare* (DY-1250) patrol corvettes 22 *Wheeler* (DY-500 B/C) transports
Length:	167.1 m (*Hawke*) 90.0 m (*Dare*) 169.5 m (*Wheeler*)

Beam:	90.4 m (*Hawke*) 37.2 m (*Dare*) 32.0 m (*Wheeler*)
Height:	24.0 m (*Hawke*) 37.2 m (*Dare*) 52.8 m (*Wheeler*)
Mass:	49,000 tons (*Hawke*) 45,000 tons (*Dare*) 33,400 tons (*Wheeler*)
Officers:	11 (*Hawke*) 8 (*Dare*) 3 (*Wheeler*)
Crew:	72 (*Hawke*) 51 (*Dare*) 8 (*Wheeler*, typical)
Cruise speed:	w 2.5 (*Hawke*) w 2.0 (*Dare*) w 1.4 (*Wheeler*)
Max. speed:	w 2.7 (*Hawke*) w 2.5 (*Dare*) w 1.4 (*Wheeler*)
Endurance:	2.5 years (*Hawke*) 1 year (*Dare*) 2 years (*Wheeler*)
Weapons:	*Hawke*: 2 laser emitters (390 nm / 700 MW) on wings 2 missile tubes w/ 50 fusion missiles or sublight probes on fwd hull *Dare*: 4 plasma cannon (1.8 GW) on midhull 1 laser emitter (390 nm / 700 MW) on ventral bow 3 missile tubes w/ 12 fusion missiles on dorsal bow 1 mine tube w/ 120 fusion mines *Wheeler*: None (standard) 1 plasma cannon (1.8 GW) on ventral bow (select vessels)
Shields:	Electromagnetic shield (10 T) Anti-laser glass-cloud dispensers (*Hawke*, *Dare*)
Laboratories:	1 GP, 1 planetary sciences (*Hawke*) None (*Dare*, *Wheeler*)
Auxiliaries:	Various (*Wheeler*) 1 atmospheric scoutcraft and 2 shuttlepods (*Hawke*) 2 shuttlepods (*Dare*)

Ships of historical interest:

SS Leif Eirickson (CA -31), USS Daniel Dare (CV-101), USS Jeffrey Hawke (CP-01)

SOURCES:	(D Matt Jeffries, Larry Niven/Jerry Pournelle, et al.) N TNG (Lawrence Miller, own) H TNG (AMT)

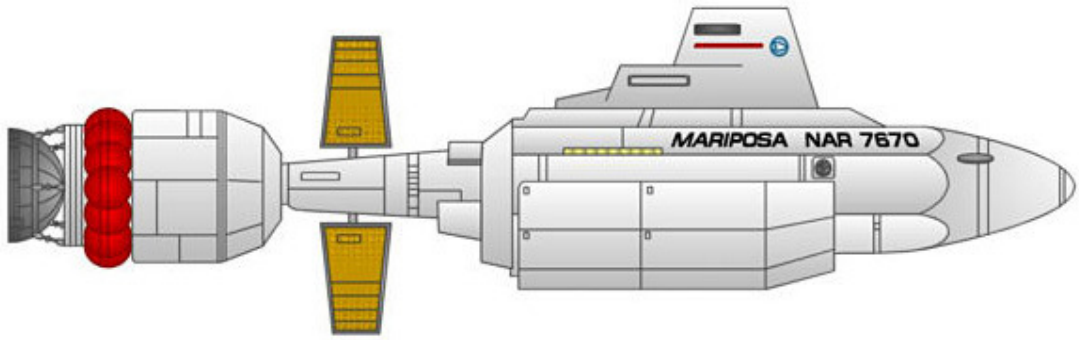
The *Conestoga* project had been lavishly supported by the rapidly solidifying alliance of major Earth governments. Yet individual nations and corporations had at least equal interstellar ambitions as of the second half of the 21st century. To meet the needs of the fantastic new market, Dinyan-Yoyodyne quickly expanded its range of products to include warp-capable colonization, transportation and exploration vessels. While few of these designs ever entered Earth government service let alone joined UE or UFP Starfleet, a collective look at the design family reveals their significance to Earth's interstellar expansion as a whole.

As soon as the secrets of warp technology entered public domain, a number of DY-100, -130 and -140 series sublight transports were quickly, even hastily upgraded with warp propulsion, to yield the equivalent '200 family' of vessels. These almost distressingly slow warpships originally served as insystem rather than interstellar transports, but several eventually found a deep space niche in corporate or private hands. Numerous 230 and 240 series vessels performed adequately as explorers and merchantmen in sectors close to Earth until the mid-23rd century.

The organizations in original possession of the converted sublight vessels were quick to dispense with the upgraded versions when the newbuilt DY-500 colonization vessels entered the market. Based on the general design of the DY-100 series, yet enlarged and equipped with a new propulsion section featuring a single inboard warp coil set, these still relatively small and affordable vessels could span the 50 lightyears needed for the average colonization expedition in a couple of years. Closer to a hundred such vessels were built, accompanied by the stretched 700 and 900 series and several dozen examples of the 550, 750 and 950 transport variants. The largest vessels had the capacity to establish a fully functional 500-person colony across distances of up to 100 lightyears. Before, during and following the Romulan War, these ships formed the second major 'Gold Rush' of Earth colonists, carrying hopeful settlers to Gourami and Nebed sectors and pushing Earth zone of influence far antispinwards.

A typical colonization mission would involve a promising star system being picked from the accumulating database; a DY series vessel being stocked with the gear needed for settling on a class M planet, in the hopes that one would exist in the target system; the colonists being loaded aboard mostly under stasis, with a small operating crew awake; the ship being launched, and spending years or decades in transit; and finally, a planetfall being made, a colony founded, and a transmitter built for sending back to Earth a triumphant message of success (unless the colonists aimed for complete isolation and independence, a goal of some 20% of the missions).

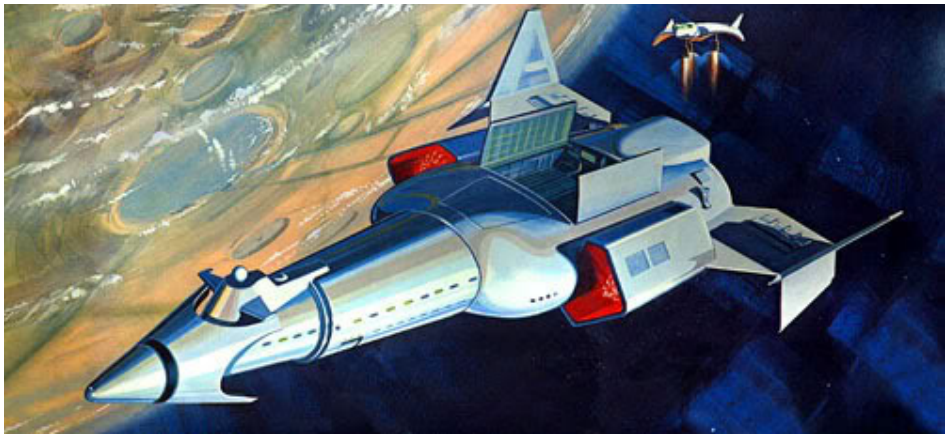
Having delivered their payload, the ships were generally left idle until the colony would start producing a commodity that needed to be shipped back to Earth. When the time came, the old colonizer would be the ideal first choice for cargo carrier – automated operations would negate the need to maintain the often finicky life support systems, and the sturdy propulsion machinery could well remain operational for centuries. It would only be in the early 23rd century that faster commercial vessels would finally take over the cargo carrier role from the old colonizers.



DY-500 vessel Mariposa *in launch configuration, 2123. Note scabbed-on modern navigational sensors on command tower, the increased diameter of the central hull as compared with DY-100, as well as the ventrally mounted hull extension that housed colonization gear and consumables. Low-warp colonization vessels of this or derived types were produced until 2188, and some are still believed to be in transit. Surprisingly few disasters befell these extremely primitive vessels – a colonization mission success rate of 58% is reported.*

The newly formed United Earth Defense Pact made purchase of four vessels of DY-500 type early on, and had boosted its fleet of warp transports to 22 by 2075. A far more involved variant family was already under development at Dinyan-Yoyodyne's new Wellington headquarters, however. The ships in the 1000 series were to feature significantly extended midhulls for housing warp engines of greater performance. Their intended primary market was not in interstellar settlement itself, but rather in the exploration and prospecting enterprises that were mushrooming to support the lucrative colonization businesses. Such trailblazer vessels would need greater speed and operational flexibility than the colonizers that were to follow, and DY took pains to equip the 'Millennium Series' for demanding transatmospheric operations as well as for sustained warp 2.5 flight.

Arguably the most successful design in the series was DY-1100, building on a Rigelian basic hull available on the interstellar market but featuring cowlings for indigenous warp engines and broad delta wings for maneuvering in atmospheres. A variable geometry nose cone gently eased the vessel bow first into the shockwave of atmospheric entry, and an incredibly robust three-point landing gear could take the combined weight of the vessel and her warp coils in gravities up to 1.6 Earth standards. Some surfaces would still remain inaccessible for the type, so the broad aft hull of oval cross section also housed a vast hangar for auxiliary craft, with 20 m x 30 m dorsal doors.



The greatest hour of corporate exploration vessel Leif Eirickson*: her scoutcraft* Vega *begins the journey towards the northern continent of 61 Cygni V by separating from the mothership in the protective shadow of the outer moon. The Tellarite first contact remains the only exploratory achievement of note for the DY-1100 series, highlighting the fact that, unlike the simpler sailing days of Lucky Leif, the late 21st century required the utmost of ship technology to yield even minor discoveries of commercial or scientific worth.*

Lacking in range, the 1100 series did not sell as well as expected once it was established that there were few planets of interest in the immediate vicinity of Earth. DY tried to recoup on its losses by pushing the vessels to government work within the Sol system, but competition was fierce. The 1100 series was slightly too large and clumsy for combat maneuvers, fragile in basic construction, and relatively underpowered at impulse. The capacious interiors, originally optimized for long interstellar journeys, were the primary asset in securing a 2087 deal for fifteen DY-1100 hulls to serve in the Strategic Space Command of the newly founded UESF. Further transports based on the Rigelian monohull would also see UFP Starfleet service and even conversion to *Bedford* and *Portsmith* destroyer escorts; despite the historical roots, there would be virtually no DY involvement in these projects.

Squeezed out of the exploration market, DY concentrated on providing for the fledging space navy of the United Earth. A modified DY-200 design served as the basis for DY-1200, a warp corvette for system defense needs. Instead of a cluster of containers, the central spine was surrounded by a bulbous mission hull that served the three roles familiar from DY-1100: providing atmospheric lift, internal volume for mission gear, and a dorsal hangar for auxiliaries. The ring shape around the central body was not a Vulcan drive, as none were available to Earth at the time; its role was purely aerodynamic, and the actual Cochrane warp coils were housed beneath lateral cowlings that slid close for atmospheric flight. To appeal to UESF, DY also provided full structural support, power trunks and dataways for four equidistantly positioned heavy plasma cannon on the ring wing perimeter. The command sail was doubled in width and covered with platforms capable of receiving military C^3I gear, and a trainable weapon mount was provided on the opposite side of the forward hull. The nose cone area was reserved for military gear that was expected to include missile launchers and sensors.

After initial tests, UESF specified the need for mine tubes and decided to mount a railgun in the ventral turret, resulting in the DY-1250 standard, or *Dare* class. Up to fifty vessels of this type were procured to replace the aging *Liberty* sublight defenders, a major coup for the company. Yet a surprising demand also arose for using the original, unarmed DY-1200 in the exploratory role; the Leningrad Institute of Interstellar Studies was the first to procure vessels of this type, boosting its fleet of DY-700 explorer-transports. The subsequent development of the stretched 1300 and 1400 series was a misinvestment for DY, resulting in only a handful of sales, but the 1200 series explorers continued service until well into the 22nd century.

USS Douglas MacArthur*, a warp corvette of DY manufacture, rides shotgun to* VK Lenin*, a DY-700 colonizer headed for the Coalsack nebula. Such years-long colonization sorties would dilute Starfleet strength outside Sol to virtual zero until the introduction of much faster types in the mid-22nd century.*

The role of Dinyan-Yoyodyne spacecraft in military service did not extend much beyond the mid-22nd century. Even as third-rate support assets, these vessels were deemed increasingly frail and slow. Yet while government and commercial spacecraft contracts slipped from DY hands, the propulsion section of the company increased its market share and emerged as one of the strongest providers for the late 23rd century Starfleet. Although it remained one of the last vestiges of the corporate concept amidst the economic turmoil of the following century, its impact on the ascent of Earth as an interstellar power must be seen in a wider context than the mere commercial one.

Messier

Heavy cruiser / attack cruiser
2078-2162

Completed:	48 total: 29 *Messier* heavy cruisers 19 *Thunder* heavy cruisers 2 *Messiers* and 3 *Thunders* refitted to *Verdun* attack cruisers
Length:	258.0 m
Beam:	113.8 m
Height:	72.1 m
Mass:	107,700 tons (early *Messier*) 109,400 tons (late *Messier*) 108,600 tons (*Thunder*) 129,500 tons (Romulan War refit, typical) 134,000 tons (*Verdun*, typical)
Officers:	8 (*Messier*) 25 (*Thunder*, Romulan War refit, typical) 32 (*Verdun*)
Crew:	85 (*Messier*) 158 (*Thunder*) 274 (Romulan War, typical) 242 (*Verdun*, typical)
Troops:	500-700 (*Verdun*)
Cruise speed:	w 2.75
Max. speed:	w 2.9 (original) w 3.1 (final upgrades)
Endurance:	4 years (survey cruiser, attack cruiser) 2.5 years (attack cruiser)

Weapons: <u>Original:</u>
4 laser emitters (290 nm / 700 MW) on main hull
2 plasma cannon (2.0 GW) on main hull
6 plasma cannon (2.0 GW) on aft engine section
2 missile tubes w/ 55 fusion missiles (120 kT) below fwd hull
<u>Refit 2154-56:</u>
2 Type A phased particle cannon (500 GJ / GW) on bow weapons mount
4 laser emitters (290 nm / 700 MW) on main hull
4 laser emitters (320 nm / 300 MW) on aft engine section
4 plasma cannon (2.0 GW) on aft engine section
2 missile tubes w/ 55 fusion missiles (120 kT) below fwd hull

Shields: Electromagnetic shield (26 T) (original)
1-layer graviton/subspace globular forcefield (Romulan War refit)
Reflective armor on forward and engineering hulls (original)
Polarizable armor on parts of forward hull and warp nacelles (Romulan War refit)
Anti-laser glass-cloud dispensers

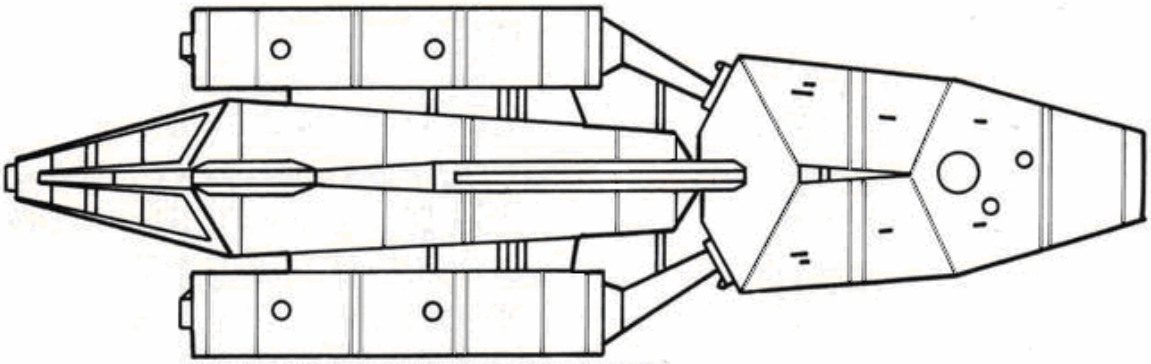
Laboratories: 1 GP, 1 astrophysics, 1 planetary sciences

Auxiliaries: 1 large atmospheric shuttle and 2 shuttlepods (*Messier*)
4 assault shuttles and 8 to sixteen sublight fightercraft (Romulan War contingent, typical)
2 assault shuttles, 12 assault barges and 2 sublight fightercraft (*Verdun*)

Ships of historical interest:

USS Balboa (CA-137), *USS Braxton* (CA-135), *USS Intrepid* (CA-130), *USS Thunder* (CA-200), *USS Ybarka*/*USS Verdun* (CA-231/CS-300)

SOURCES: (D SFC, William Forstchen 'The Forgotten War')
(N SFC, William Forstchen 'The Forgotten War')
(H SFC, dates altered; William Forstchen 'The Forgotten War')

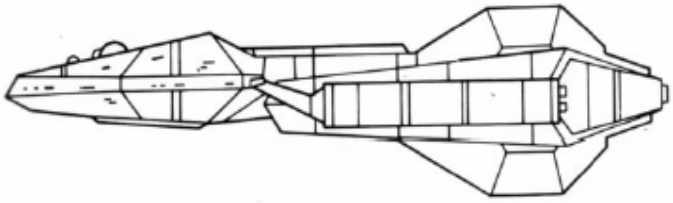


The *Messier* class of heavy space cruisers was the first major Earth interstellar vessel type to be built primarily for space combat against nonhuman adversaries. Yet this attempt at enabling humans to pursue an independent interstellar agenda in fact came to symbolize the onset of human-alien intergration and cooperation, in more ways than one. During its exceptionally long service career, the *Messier* class evolved from an insystem power projection force to a vanguard of interstellar exploration, accumulating new systems, software, experiences, operating practices and even ideologies on the way.

The cruisers of *Messier* class were built on *Bonaventure* principles, initially shunning all Vulcan influences. The powerful sublight propulsion consisted of two large fusion-heated reaction engines, mounted on a huge elongated engineering hull of complex angular shapes. The hull mainly served as a fuel tank and support frame for the reaction engines and the large dorsal and ventral radiator surfaces astern, and had few crew-accessible spaces. Forward of this hull was a wedgelike habitat and command section, also mounting a shuttle hangar and the primary sensors and armament of the vessel. Four lasers and two missile tubes plus a self-defense suite of plasma cannon would allow the ships to patrol space to Saturn and beyond, and intercept intruders similar to the Tellarite expedition that had so alarmed Earth governments in 2073.

The 2076 inclusion of warp propulsion in the design requirements did more than decrease insystem intercept times. A separate fusion reactor inside the forward hull powered the two 40,000 ton spooled-coil, cylindrar warp nacelles via angled plasma shafts. Cruising at warp 2.75 was achieved through brute force; an interstellar range of operations in turn was made possible by the sheer bulk of the vessel. Fuel reserves in the engineering hull gave four-year propulsive endurance. The forward hull, already enlarged to house the warp reactor, was further expanded to provide increased life support. Once the interstellar drive had successfully been integrated to the design, further additions followed in rapid succession.

Subspace communications were introduced for near-realtime contact with Space Central across the 0.5 ly range of defensive operations. Relay buoys, sown every two lightyears, could extend the range almost indefinitely; fifty were typically carried on a deep space sortie. Computing was handled by a versatile Gotherin optical mainframe, capable of in-warp processing of navigational data so that the need for 'orientation stops' was greatly diminished.



Spaceframe SDC-01 as completed in 2075, lacking warp engines and featuring the original small forward hull. Design commonalities with the Verne *class are quite evident here. The new, enlarged forward hull and the FTL engine assemblies would in turn follow the* Bonaventure *lead.*

Flat reflective armor plating covered most of the surface of the *Messiers*, making them shine brightly against the blackness of space in the vicinity of stars, yet blending them to the background in dim interstellar lighting. No laser-absorbing colors were risked on pennants or other hull decoration. Jutting from the armor were sensor domes and a bridge bubble on the forward hull. Ablative coating was applied on the bow surfaces for navigational protection, although powerful electromagnetic fields were the primary means of preventing interstellar particle damage.

Significantly better protection was already seen as a theoretical possibility, however, as Earth teetered on the verge of a breakthrough in gravity control. The first experiments with polarizing the gravitic field of a flat-plate mass had yielded limited practical applications, but once scientists learned how to intensify the field with artificially created gravitons, obvious uses were found. First came onboard artificial gravity for spacecraft of all kinds; then followed higher-power systems that could be used for impact protection against all threats with a mass component. By the first quarter of the 22nd century, such technology could already repel electromagnetic radiation to great efficiency, and the first devices capable of projecting the gravitons at a distance were being sketched.

The early *Messiers* could not yet reap the full benefits of this research, but they did enjoy an artificial gravity system that featured longitudinal decks individually polarized to 0.92 gravities at floor level, and 0.75 g at 2 m height. Complete field attenuation at reverse lobes and overlap areas could not yet be achieved, and several interesting resultant force nodes could be observed in the

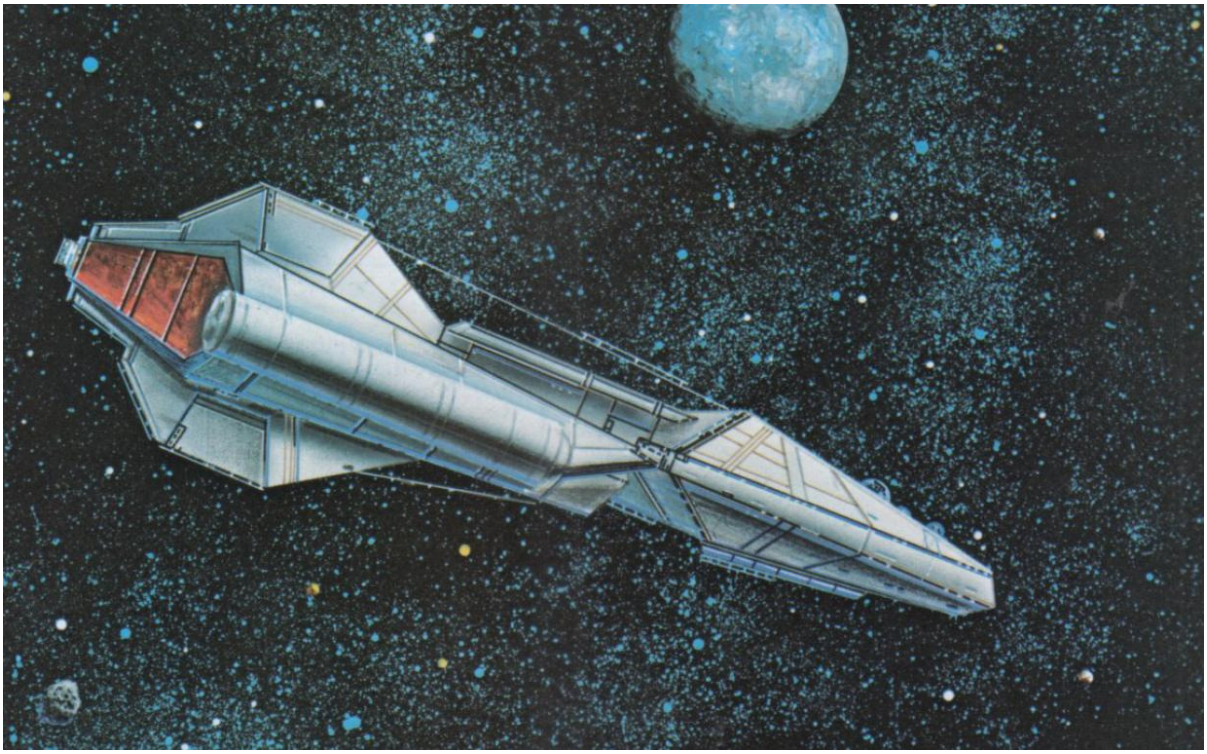
early systems. The ten decks at the bow still provided comfortable and physiologically sound accommodation for the 93 crew, meeting the medical requirements of potentially decades-long journeys.

The improving gravitic technology also greatly affected the economics of orbital construction. Thanks to major advances in the field, significant numbers of the *Messiers* were completed, some 25 between 2078 and 2100 alone, despite the difficult economic and environmental problems plaguing the participating nations or coalitions. Gravitics also increased the traffic flow to Mars and the Jovian moons, and the assembling of actual colonies was begun there. Higher priority was of course given to the class M colonies at α Centauri A II and 36 Ophiuci III, which needed no advanced life support technologies to thrive.

When first fielded in the 2080s, the *Messiers* were used to establish and maintain a military presence near Earth, freeing the numerous other types of warp-converted vessels to exploration and expansion. A series of confrontations with feline Xindi intruders in the late 2090s justified the investment, as warp-jump interception techniques made possible the relatively bloodless repelling of the aggressive felinoids. Had *Liberty* class or similar sublight vessels still been used as the backbone of Earth's defenses in the nineties, the outcome of the skirmishes might have been far more gruesome. As the fourth and last Xindi fleet retreated in 2098, UE Starfleet could pride itself on decisive victory in its first armed space conflict ever – a victory made all the sweeter by the fact that the Vulcans had again acted with great restraint and deliberation, engaging in self-defense of their vessels only.

In their heyday between 2090 and 2130, the *Messiers* also actively participated in exploration, as part of the failed attempt to establish a Dominion of Earth. The *Messier* design underwent three major upgrades to the warp engine systems in 2091, 2115 and finally 2135 to keep up with the expansion of Earth-controlled space. Yet none of the upgrades was fleetwide, for a very simple practical reason: missions lasting for thirty years were not uncommon for the type. A ship returning from a stage-by-stage cruise to a distant star would either be scrapped as hopelessly outdated, or extensively refurbished using the best technologies of the day. Very seldom would even two *Messiers* be processed at the same time and with the same methods. In any case, this 'steady-state' method paid off in terms of mission availability: space up to twenty lightyears from Earth was charted to some accuracy, several longer sorties made, and trade routes to the hubworlds Denobula Triaxa, Vega and Altair tentatively secured.

None of these worlds could be brought under Earth control, however, and the search for further unoccupied class M locations for human strongholds proved futile. Detailed scientific studies were not conducted as part of the missions, because Starfleet's interest in deep space was a purely military one at the time. The long years of travel would offer research opportunities for various civilian organizations purchasing onboard space and time, but the releasing of results would be tightly controlled by the frustrated UESF. It appeared that very little was available for satisfying mankind's appetite for interstellar prominence.



An early Messier *cruiser in maneuvers near Jupiter, unmarked and unidentifiable in her silvery finish. The larger moons, mainly Ganymede and Europa, had become important industrial and military assets by 2080, and a permanent human presence was established in 2081. Dozens of ships made the twelve-hour trip monthly, and many shipments were given a* Messier *escort even though at that time, fewer than ten nonhuman, non-Vulcan ships had actually visited the system.*

The Romulan threat changed the rules of the game. Striking from within a region of space heretofore neglected by the explorers of both Earth and its neighboring cultures, a mysterious race staged a series of surprise attacks, usually against vulnerable and unthreatening targets. No connection was initially made between the attacks and the recent disappearance of *USS Balboa* (CA-137), a *Messier* cruiser visiting 128 Trianguli on long range survey duty. Nevertheless, self-defense became a priority for all UESF vessels operating in the Triangulum Australe direction, and exploration ground to a virtual halt.

USS Intrepid (CA-130) of *Messier* class, commanded by Captain Henry McKenna, was the first Earthship to report back on a Rihannsu raid in 2151. She herself was not attacked, but recovered the wreckage of civilian Earth liner *SS Diana* and found evidence of the previously unknown attackers' identity. However, the full evidence never made it back to Earth, as the *Intrepid* was lost somewhere near Tau 1 Eridani soon afterward.

The mystic-heroic disappearance of the *Intrepid* had three immediate consequences. The newest *Triton* cruiser became her namesake. Outrage and intrigue surrounding the *Diana* raid intensified. And the term Romulans, coined earlier by the crew of *USS Carrizal*, became the household name behind virtually all incidents of ships missing or colonies falling silent (much to the relief of the Orion and Nausicaan pirate captains who still operated behind a veil of secrecy). When the cruiser *Enterprise* (NX-01) in 2152 encountered a Rihannsu Wide Patrol in the process of fortifying a recent conquest at Theta Eridani, UESF Command jumped to understandable conclusions, and began preparing for a punitive expedition to be mounted in this direction. The double error was left uncorrected by the Vulcans, who nevertheless did their best to moderate the human quest for vengeance.

The Xindi strike of 2152 soon put the Romulan question on hold for three unnerving years. The *Messiers* were recalled closer to home. Along with providing an illusion of increased defensive potential, this facilitated the refitting of the aged cruisers into useful combatants. The number of lasers was now doubled, with four emitters mounted on the aft hull. Two powerful phased particle beam cannon were installed in the bow to be used against capital ships from the relative safety of warp speed, away from the talons of the missile boats and fightercraft so prominent in the strikes against Earth assets. In turn, berths for up to sixteen fightercraft were added on the *Messier* dorsal spines, to give an agile offensive weapon to the virtually unmaneuverable juggernauts.

USS Messier *in war livery in 2156. Dull titanium-brown polarizable armor replaces the shiny original finish. The cylindrar AC-12 nacelles refitted in 2135 easily distinguish the refit standard, extended to five vessels. Fighter berths on the spine and laser turrets and targeting sensors on the forward and aft hulls further alter the silhouette.*

On the renamed *Antietam* (CS-303), *Constantine* (CS-301), *Ebro* (CS-304), *Mukden* (CS-302) and *Verdun* (CS-300), assault barges were carried instead, and the voluminous primary hulls were furnished for the carrying of up to seven hundred planetary assault troops. These vessels were collectively known as the *Verdun* class of attack cruisers, even though each vessel had several unique features. Of little use against the Xindi, the *Verduns* nevertheless were deemed an essential element in any future attempt of UESF to project its power across practical interstellar ranges.

In both the space combat cruisers and troop transports, polarizable armor coating was applied in as many places as mass limitations allowed, to replace the now useless reflective plating. Also, warp engines were once again upgraded with new coils and with reactors of larger power output. With all the add-on features, the ships began to resemble hermit crabs that carry borrowed shells and sea anemones for protection.

Frustratingly, the enemy still remained faceless when the first punitive missions in 2155 were mounted. No Romulan body was ever found even remotely intact, no Romulan ships or bases fell into UESF hands, and very little could be achieved by reconnaissance missions mounted in wrong directions. But now the Romulans had been declared guilty, and their continuing malevolent silence in face of Earth overtures also dictated the sentence: a full-scale interstellar war was inevitable. That Romulans were the ones to first openly engage in that military action was not to the liking of the badly surprised UESF, but it did fill the political majority of Earth with grim satisfaction.

Fleet action near γTri in 2157 results in the destruction of a Romulan carrier, but her fighters inflict heavy damage on the two Messier *cruisers forming the core of the fleet. Romulan tactics forced UESF to develop heavier and heavier defensive systems. In many respects, the conflict parallels the Pacific war of 1941-45, the Romulans having 'air superiority' thanks to their fightercraft and using 'carrier' tactics against the 'battleship' strategy of the Earth forces. However, simplified analogies do not do justice to this highly complex confrontation in which many interstellar war theories of both sides were tested for the first time.*

The major military confrontation known as the Romulan War stretched UESF to its limits and beyond, and was to be the final hurrah of the aged *Messiers*. In the unexplored depths of the battlefield, Starfleet strikes often hit empty space – and with barely navigable warp 2.9 ships, a miss might mean a year wasted. But when a *Messier* formation did locate a target, the effect could be devastating. The *Thunder* cruisers *Nimitz* (CA-203), *Gorshkov* (CA-217) and *Yamamoto* (CA-201) made history when they in 2159 surprised and overran a Rihannsu forward staging post in deep Sierra Sector, reducing to scrap dozens of enemy vessels. Alas, the *Nimitz* and the *Yamamoto* were lost soon thereafter, as a Rihannsu self-destruct detonation crippled the drive systems of the vessels and made retreat impossible. Rihannsu retaliation forces nearly caught up with the *Gorshkov* as well, but the cruiser managed to limp back to Chi Eridani with the survivors from aboard her lost sisters.

After the war, most of the remaining *Messier* class ships were immediately decommissioned. Two of the troop transports, the *Verdun* and the *Constantine*, were in 2162 pressed to duty against the Tarn, but the ship shortage that had necessitated their continuing use also meant the cruisers mostly traveled unescorted. Both disappeared without a trace, taking over 700 lives with them. The wreckage of the *Verdun* was discovered by chance during a joint UFP-Tarn survey of Torgu-Va in 2366, the descendants of the original crew still in the throes of a bitter battle with a similar group of Tarn castaways. The remains of the *Constantine* have not been located by the time of this writing.

The last *Messier* to be retired, *USS Braxton* (CA-135), was in 2162 on her way to be preserved in the recently founded Fleet Museum when her warp drive system – its newest components almost thirty years old at that point – created a catastrophic asymmetry and tore the ship into pieces. The skeleton crew of fifteen was killed instantly.

Cosmos

Nearspace survey cruiser
2080-2120

Completed:	21
Length:	229.3 m
Height:	54.0 m
Beam:	101.2 m
Mass:	36,700 tons
Cruise speed:	w 1.2
Max.speed:	w 1.9
Endurance:	8 years

Officers:	9
Crew:	71 + 20 opt. research crew
Weapons:	None
Shields:	Electromagnetic shield (8 T)
Laboratories:	1 GP, 1 astrophysics, 2 planetary sciences
Auxiliaries:	2 large and 2 small atmospheric shuttles

Ships of historical interest:

USS Nirvana (SC-04)

SOURCES: (D SFC)
(N SFC)
(H SFC)

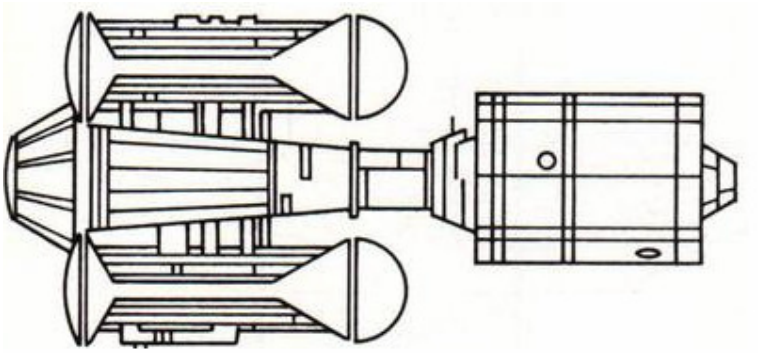
Despite appearances, dislike of all things alien was not the true reason for the major design dissimilarities between Earthships and the advanced starcraft that were visiting Sol. Traditional shipbuilding techniques were rooted deep, and dictated much of the designing process as well. Thus, many of the late 21st century newbuild warp vessels still resembled spacecraft from the first half of that century. Among these was one of the most important designs in the quest of opening up near-Earth interstellar space for human exploitation, the *Cosmos* survey vessel. Outwardly a warp-driven sister of the *Aventeur* insystem explorers from the beginning of the century, the *Cosmos* nevertheless was a complete newbuild. After the Vulcan and Korngold-McHale approaches to warp travel were abandoned, the *Cosmos* model held promise of becoming the definite Earthship design. In the 2080s, it was far from obvious that this was not to be.

The *Cosmos* had several factors speaking for her. A sectored cylinder layout for the primary hull simplified construction, allowed for easy modular refitting for a variety of missions, and had an advantageous area/volume ratio for armoring. On the other hand, centrifugal or null gravity construction philosophies and graviton-based artificial gravity did not work well together. The engineers fought bitterly to gravitize the cylindrar hull with decks perpendicular to thrust axis, but later had to admit that simple tilting of the cylinder by 90 degrees would have created a more workable and functional gravity system while preserving the deck layout. Later Earth shipbuilding with its trademark saucer hulls owes to this concept of a tilted cylinder or pillbox, and to the gravitics work done on the configuration under the *Cosmos* program.

From the warp-dynamic viewpoint, the traditional shape was neither a liability nor an asset. The simple cylindrar fields of the era did not require complex hull-field interaction, as the bewildering collection of hull shapes in Earth's commercial fleet at the time stands witness. The clumsy nacelles that provided combined warp propulsion, fuel storage and reaction thrust for the *Cosmos* ships were each as large alone as some of those commercial vessels. A cruise speed of warp 1.2 was more or less of mercantile standard, as was the dash speed of warp 2. Eight-year endurance paralleled Boomer ship and colonizer records. Considering that a *Cosmos* supported a mostly awake crew of a hundred, though, one should hold the design to a standard of its own.

Equipment carried aboard included a fleet of four shuttlecraft, two of them capable of acting as field laboratories or heavy-duty transports, and two as nimble liaison vehicles; spares existed for building one more of each type. An array of probes could also be sown on arrival to a research area, ranging from simple spatial monitoring buoys and mapping orbiters to penetrating geological sounders and surface- or fluid-roving seeker drones. Some twenty crew were dedicated as VR pilots to these

instruments, since experiences on fully autonomous operations were still rather discouraging. No weapons or devices of defensive or offensive potential were available, nor was there armoring to boost the protective effect of electromagnetic deflector fields. Communications systems were similar to Boomer gear, possessing some limited capacity of tapping into alien networks. Confidential reports to Earth would still have to be sent by slow and relatively insecure EM tightbeam.



Queen to a busy swarm of bees, USS Nirvana *prepares to receive a light shuttlecraft and deploy a wave of survey drones according to intelligence gained on the shuttle mission. Despite the significant unmanned reconnaissance capabilities of the* Cosmos *ships, an initial 'hands-on' landing party survey proved to be a crucial step in directing research efforts. This mode of operations contrasted sharply with gradual Vulcan survey techniques that placed a far greater value on stealth and discretion – rightly so, as the targets of Vulcan study typically weren't just uninhabited lumps of rock like Luyten 789-6-II here.*

The mission of a *Cosmos* entailed careful and prolonged survey of star systems for their resources, colonization potential, and strategic value of positioning in both commercial and military respects. Within the 20 ly radius that Earth hoped to establish as its dominion, some twenty systems were still free for taking. Few held planets of worth, yet Earth prepared a *Cosmos* for each. Surveys performed between 2082 and 2102 would establish the futility of Earth's dreams of an independent 'bubble empire' centered on the home planet. A few survey ships would even be forcibly ousted from target systems by peoples with prior or superior claims. Yet valuable scientific knowledge of the true nature of nearby space would be gathered during these missions, and some beneficial contacts established.

In the end, the *Cosmos* program turned out to be a mere phase Earth had to go through, in both political and technological sense. UESF never took operational responsibility for the vessels, as scientific research was deemed outside the scope of the organization; close integration with UESPA nevertheless meant that operational support for *Cosmos* missions came through UESF assets, providing invaluable precedent for future expansion of the Starfleet mission. The ships served on in general astrophysics survey duty until the 2120s, but received no upgrades or major overhauls. No direct successor design or perpetuator of lineage emerged, either. Earth's hopes of interstellar influence lay beyond the girdle of neighboring star kingdoms, and would have to wait until the introduction of a vessel of far greater range, speed and defensive potency. During the 30-year wait, UESPA and UESF would be coping with a very different set of challenges.

Hercules

Transport
2091-2177

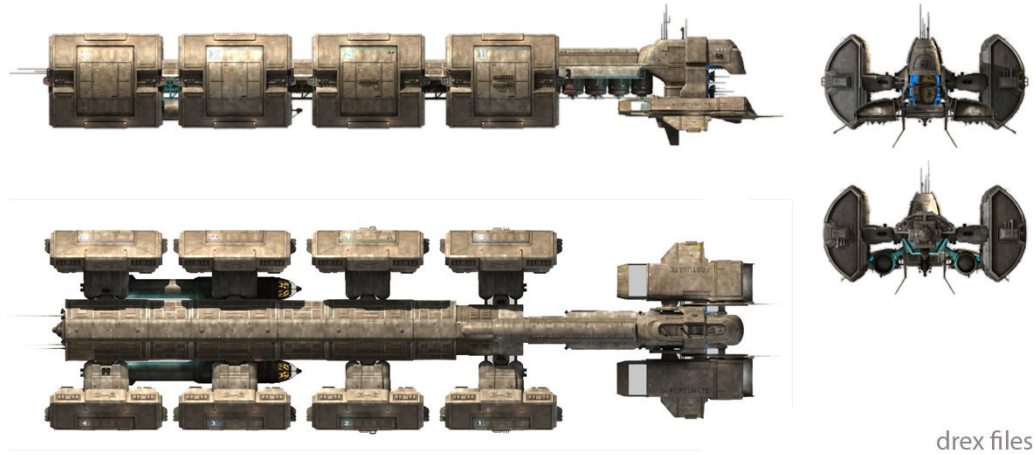
Completed: 29 total:

	4 *Hercules* (FY-100) 22 *Ottawa* (FY-200) 3 *Karakorum* (FY-500)
Length:	240.3 m (FY-100, 200) 322.1 m (FY-500)
Height:	36.2 m
Beam:	43.5 m
Mass:	21,300 tons (FY-100) 22,100 tons (FY-200) 25,700 tons (FY-500)
Cruise speed:	w 1.1
Max.speed:	w 1.8 (FY-100, 200) w 3.0 (FY-200 refit 2162-63) w 1.6 (FY-500)
Endurance:	6 years
Officers:	2
Crew:	17 (FY-100, 200) 21 (FY-500)
Cargo:	40,000 tons (FY-100) 43,000 tons (FY-200) 64,000 tons (FY-500)
Weapons:	1 plasma cannon (2.0 GW) on ventral hull 4 plasma cannon (2.0 GW) on container mounts (select ships)
Shields:	Navigational deflector on bow Electromagnetic shields (max. 8 T)
Auxiliaries:	2-10 work pods

Ships of historical interest:

USS Karakorum (FY-500), *USS Ottawa* (FY-200)

SOURCES:	D ENT (N own) H ENT



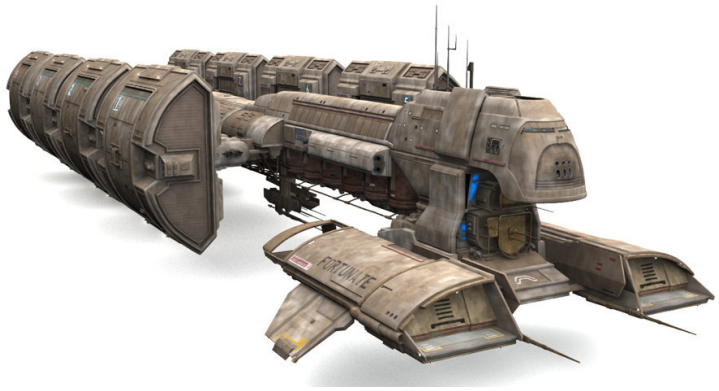
Outwardly, it appears a huge step that the defense and exploration assets of Earth's various spaceflight organizations were in 2089 solidified into an international Starfleet. However, those assets themselves remained largely unaffected by the transformation. The crew of a survey cruiser orbiting a distant star for the fifth successive year would pay little heed to such bureaucracy.

Defensive fleets in the Sol system would already be under international control due to the Sparon-DeSoto clauses. UESPA would still retain control of the waves of probes launched into deep space, and would coordinate the data flows and survey budgets from within Starfleet. The existing hardware largely met the needs of UESF during its formative years – it just happened to be temporarily unavailable, separated from the homeworld by dozens of lightyears and by several years of travel time.

Partial recalling and redeployment of the *Messier* fleet was expected to cater for Starfleet's modest exploration and even humbler power projection programs. Increased trust and understanding between humans and Vulcans allowed Sol defenses to be rearranged so that the antiquated sublight combatants could be retired and replaced by cheaper transatmospheric low-warp interceptors and fixed installations. However, there was one field of operations where Starfleet neither controlled the resources it needed, nor could hope to downscale its operations to fit what resources it did possess. Logistics for an interstellar research, defense and training organization could not be handled by the motley fleet of STL and FTL colonizers or short range tugs and transports loitering in the vicinity of Sol. And the high capacity warp transports that Earth already possessed were only nominally under ECS authority. In practice, no power on Earth could recall them from their profit-hunting cruises in deep space.

It was thus in the interests of UESF to sponsor the development and construction of new warp freighters, suited for its needs as well as for commercial use. Two primary designs emerged within a year. Rather than add warp engines to an originally STL cargo hull, both introduced a warp-optimized spaceframe onto which cargo modules were bolted. The G and Y series vessels were virtual scale models of each other. Both had a central spine element for general goods and lateral grapples for containers. Both featured an amidship section for the main fusion reactor, and a bow section that held impulse engines in low-mounted cowlings and housed a crew of some 20-30 people in tolerable conditions in a four-deck habitat suspended above the centerline; an antenna farm for sensors and deflectors occupied the centerline bow. The G series had a single centerline bay for shuttlecraft, typically with one permanently embarked alongside work pods; the Y series had two bays, at the forward ends of the impulse pods, and carried up to ten cargo handling craft.

The Class G vessels with four 5,000 ton Type II containers were rather modest in performance, though, and UESF concentrated on the acquisition of Y series transports. In military service, these ships were dubbed the *Hercules* class.



A Hercules *at speed. From this angle, the GSC-800 engines are just barely visible at ventral stern, with the impulse coils flanking the bow. Standard Starfleet paint scheme from the 2120s leaves most of the hull titanium-brown but adds blue cheat lines to the containers and forward hull and large black pennants on the sides of the command tower. The classic UESPA arrowhead is not yet part of military livery.*

The grandiose name was fitting enough. At nearly 250 meters, the ships were half again as long as competing DY series heavy variants. Compared with the lumbering *Messiers*, the transports had far superior impulse acceleration. Warp speed using the lightweight GSC-800 coils (sitting below the central spine, with plasma conduits running on the underside of the center hull) was naturally lower than that of the massive cruisers, with theoretical optimum cruise speed at warp 1.1 and maximum speed at warp 1.8. In practice, the transports always cruised at maximum speed, as this fuel-inefficient mode still was the most economic one overall. Both ECS and UESF benefited more from the timely delivery of goods than from conserving of slush hydrogen. In any case, the vast deuterium tanks lined up beneath the midsection provided a safe reserve for a 20-ly cruise to nowhere and back, making the vessel especially attractive as a tramp for adventurous Boomers.

For both Boomer and explorer crews, the Y series meant significantly improved accommodation standards. The spine of the ship was quite available for habitation, and direct underway access to the eight Type II containers was also possible. For Starfleet, this meant suitability to troop transport duties. Actual planetary assault was not in the plans yet, nor would it be for half a century, but personnel transfer to off-Earth garrisons was of interest, either with cryosleep or without. Other duties going beyond pure cargo hauling were also intended. UESPA survey packages provided Earth with scientific data and some sigint victories, and the installation of plasma cannon modules was hoped to give space pirates a nasty surprise or two. The 'Q-ships' carrying four container-mounted 2 GW cannon in addition to one permanent hull-mounted unit did score a few early kills, but only on already relatively secure short haul routes.

Once the initial Y-100 model had been fielded in 2091, UESF decided it actually needed an even more capable design. The improved commercial model Y-200 was bought in some quantity, with up to 22 FY-200 (or *Ottawa* subclass) vessels joining the fleet between 2096 and 2099. The enlarged FY-500 (*Karakorum* subclass) ultimately proved a disappointment, though, and only three were purchased. Commercial use of the clumsy twelve-container behemoth was discontinued in 2125, by which time all three UESF ships had been sold to civilian operators.

Boosted by the warp breakthroughs of the 2150s, Earth continued to operate Y-200 vessels well past the Romulan War. The last military examples, now in UFP Starfleet registry, were retired in 2177. Civilian users persisted into the 23rd century, as the uprated engines were capable of practical deep space speeds, yet the ships still sported the internal volume of 'community vessels'. Postwar designs were optimized for high speeds and subsequently short trips, and were ill suited for the tramp/salesman mode of operations outside normal spacelanes. Even prewar development had steered towards lower habitability standards, driven by the needs of near-Earth mining operations and Starfleet's increasing military commitments. The Boomer subculture and lifestyle was on its way to obscurity at the advent of class J and W transports already, and largely vanished from nearspace by the time of the Romulan War. Its last vestiges could be found in long-ranging class Y vessels, the final few of which disappeared from Federation records in the early 2220s.

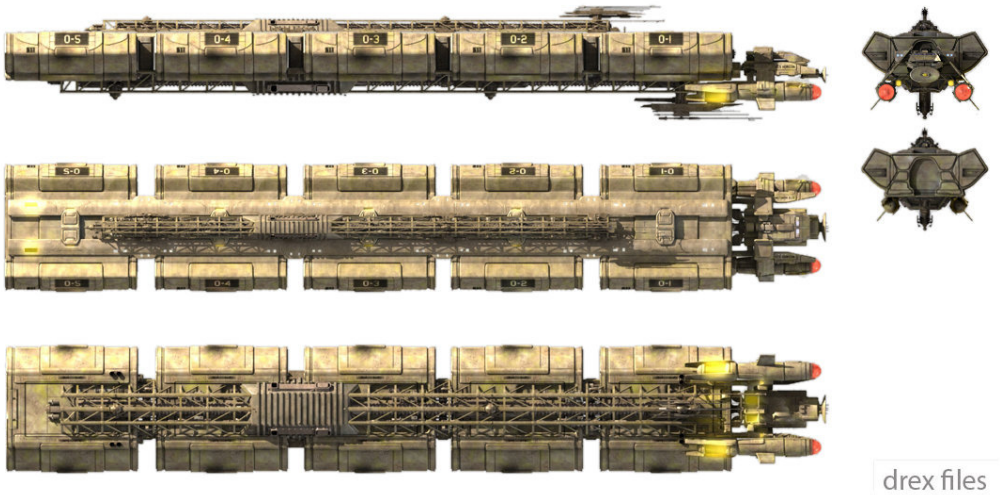
Roanoke

Transport
2101-2279

Completed:	74 total:
	34 *Roanoke* (FJ-100) 12 *Gemini* (FJ-200) 23 *Homa Bay* (FJ-500) 5 *Indian River* (FJ-750)
Length:	76.2 m (tug only) 114.1 m (1 container) 172.2 m (2 containers) 230.3 m (3 containers) 288.4 m (4 containers, FJ-500, 750 only) 346.5 m (5 containers, FJ-750 only)
Height:	32.1 m
Beam:	58.8 m
Mass:	19,400 tons (FJ-100) 19,500 tons (FJ-200) 20,300 tons (FJ-500) 22,000 tons (FJ-750)
Cruise speed:	w 1.1 (FJ-100, 200) w 2 (FJ-500, 750)
Max.speed:	w 1.7 (FJ-100) w 1.8 (FJ-200) w 2.2 (FJ-500, 750)
Endurance:	6 years
Officers:	2
Crew:	17
Cargo:	16,000 tons (FJ-100) 30,000 tons (FJ-200) 38,000 tons (FJ-500) 45,000 tons (FJ-750)
Weapons:	None (FJ-100, 200, original) 2 plasma cannon (2.0 GW) on nacelles (FJ-200 refit) 2 plasma cannon (3.0 GW) on nacelles (FJ-500, 750) 2 plasma cannon (2.0 GW) on ventral spine (FJ-500, 750)
Shields:	Navigational deflector on bow Electromagnetic shields (max. 16 T) 1-layer graviton forcefields (J-500 training vessels, refit 2198) 1-layer conformal shields (J-500 training vessels, refit 2241)
Auxiliaries:	1 atmospheric shuttle Work pods sometimes carried

Ships of historical interest:

SOURCES:	D ENT (N own) H ENT



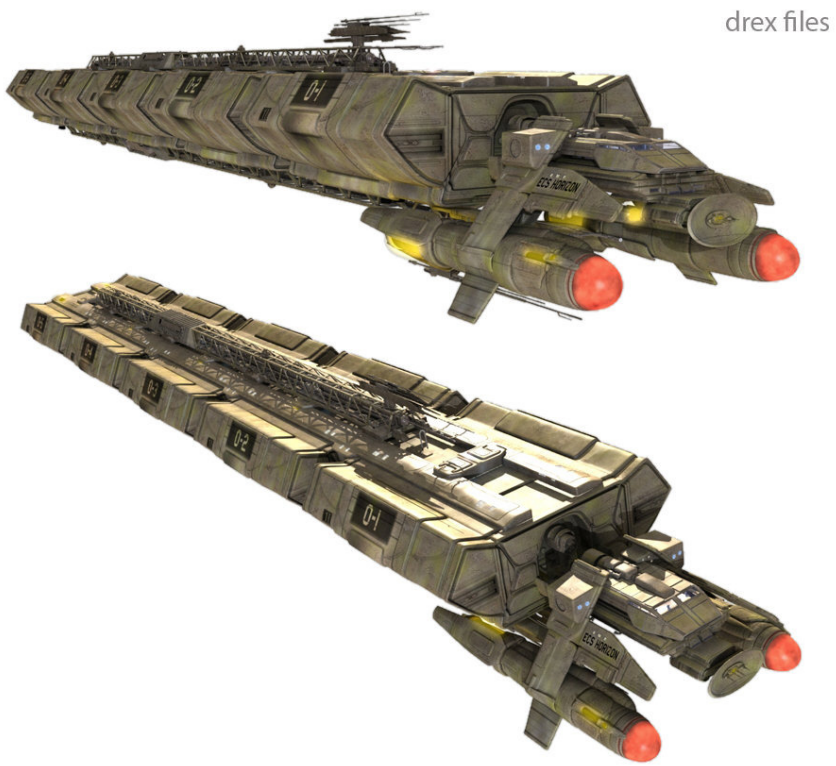
The first successes in Earth's colonization program created an increased demand for transport vessels – not only for spacelanes between the hearthworld and the colonies, but for the trade routes branching off the colonies towards previously unreachable commerce partners. Many Boomer captains chose to sail out in hunt of profits, depleting the inner routes. Tellarite merchants were quick to take advantage. The Arcturus route was soon all but lost to foreign operators. Ships of higher capacity would have to be made available for the primary ore routes, or else the combined loss of profits and key resources could shut Earth off deep space for good.

The featherweight Dinyan-Yoyodyne colonizers hauling cargo for fledging mining colonies at the time were not competitive in the long run. The more capacious but agonizingly slow *Assist*, *Fortune* and *Protector* series warp tugs were a dead end as well, quickly approaching both financial unviability and technological obsolescence. In search of alternatives, even the massive refineries crawling back and forth the Sol asteroid belt were harnessed to bulk transport use, several being launched on interstellar resource hunts. On a more practical vein, Class G and Y container transports, initially intended for high credit to kilogram ratio goods, now found it commercially advantageous to take on bulk cargo.

None of this met the definite and increasingly pressing demand for a dedicated modular ore transport. In 2099, Type III cargo modules were introduced for use in the mining industry, and construction of several fast tug types initiated. Of these, the flexible and surprisingly nimble class J soon proved the most competitive design.

The uppermost level of the class J tug consisted of a flight control center, a communications and general utility assembly, and a reaction control system that, put together and fitted between transverse docking/airlock sections, comprised a detachable orbit-to-surface craft. While this section could in a cinch provide life support for the total crew of nineteen, the next two levels down were the main habitat section. In addition, they held main deflector machinery and sensors at the bow, an accessway to the containers at Deck 2 stern, and the main computing and environmental systems on Deck 3. Space was at a premium compared with class Y or G vessels, especially because there was no habitable space in the spinal structure of the ship. For journeys taking longer than six months, a typical Boomer crew of twenty to thirty would have to convert part of the forwardmost ore container for habitation. For shorter hauls, the need to maximize cargo volume meant cramped conditions indeed.

Pylons angled down from Deck 2, along the sides of the tug, to the two GSC-1400 nacelles, which fed from a primary fusion powerplant on Deck 4. Despite their compact dimensions, the nacelles also housed main reaction engines, feeding directly from primary-loop plasma. While these fired safely beneath the train of cargo containers, they were still carefully shielded by field guide petals. Further field guides jutted down from nacelle centerpoint, and also contained plasma purge vents and heat exchangers. The variable geometry extensions could bias the warp field over one to five containers, although three was the maximum load of the original J-100 and J-200 models. Secondary reaction drive modules would be installed on the aftmost container. Additional fuel was carried in a spine element that could span the full length of three modules for maximum range, but was usually only one third of that. Ramscoops at nacelle forward ends were an efficient range multiplier, if the captain was willing to chase after dense clouds of interstellar hydrogen.



The orbital loading platform above Earth Colony Four at Vega pours the last few tons of uranium ore into a Roanoke *in Starfleet colors, as an ECS vessel waits on a lower pier. Fissionables were still a critical commodity for military applications in the early 22nd century, and the difficulties in developing deep-mining techniques made interstellar transport of semi-refined ore an economically competitive means of acquisition.*

Almost as soon as the first J class ships glided off the construction docks, Starfleet purchased five, and placed an order for twenty-nine more. Dubbed the *Roanoke* class in UESF service, the transports began hauling material to Earth's outer holdings and helping fortify them against raiders of all kinds. The transports themselves were highly vulnerable to attacks, though, and the improved *Gemini* subclass based on J-200 was in 2112 fitted with multidirectional plasma cannon on both nacelles. ECS vessels began mounting similar weapons soon enough, despite the illegality of the act.

By 2120, work on advanced warp drives was producing dividends for transports and starliners as well as for high-profile military and exploration starships. The J class grew with two high capacity models, both of which suited Starfleet's needs. The J-500 and J-750 became the *Homa Bay* and *Indian River* subclasses, respectively. Both were armed to the hilt and equipped with the latest in subspace radio technology – which wasn't saying much, in galactic terms, but did give UESF some confidence in the survivability of the vessels. At least some of the raiders could be kept at an arm's length, and direct contact across some three lightyears maintained without booster relays. Both classes could also haul four full containers, or 38,000 tons' worth of cargo; the FJ-750 could take on an extra 7,000 tons and one more container. Both types could maintain warp 2 for extended periods of time.

The grand total of 74 J class vessels in UESF service survived the fighting of the 2150s remarkably well, being mostly deployed in deep space and remaining in transit throughout the conflicts. By the founding of the UFP Starfleet, 51 of the transports still remained. The last were withdrawn from active Starfleet freight service in the 2190s, yet ten FJ-500s were maintained as navigation training vessels well into the 2260s. They received modern shields and comm systems, but otherwise maintained their original configuration and meticuous finish. When the last FJ-500, *USS Frost Ridge* (still registered NCC-F23) was retired in 2279 and her reactors driven down, dismantling crews were happy to confirm a piece of folklore. Equipped with 23rd century radiation protection gear, they cut off, decontaminated and polished for display a section of the inner reactor casing personally signed by Zephram Cochrane himself.

2130-2161 – Into the Romulan War

When the dust of war had settled on scorched Earth, dozens of Vulcan voidships had arrived to hover over the world of chaos and terror, of pillaged settlements and burned cities. But these ships were no circling vultures: instead, they contacted the surviving Earth governments and entered a series of negotiations on creating new order out of the chaos. With the help of its spaceborne cousins, humanity had clung together, beginning to form new infrastructure on the ravaged Europe, northern Africa and southeastern Asia and the pile of ashes that had been US East Coast.

With the aid of the surviving space fleet, interstellar trade was begun to boost the recovery. Vulcans were happy to help, although they would no doubt have denied such a sentiment; Tellarites traded material for a respectable price; and Andorians were ready to negotiate on the issue of defending the weakened human homeworld. But Earth could not rely on what these cultures had to offer. Efforts continued to chart the uncharted, and to bring in materials and knowledge for the rebuilding of the world from areas of space not owned by the nearby cultures.

It had been almost 700,000 years since a major culture with FTL drives had inhabited the area of space immediately around Earth. The Pnaii, a fringe group of the powerful yet distant Tkon empire, had visited the area, briefly settled on some of its lesser planets, and departed for parts unknown, leaving but some footprints on airless planetoids and a few artifacts on the Saturnian moons. After that, only random visitors like the Preservers wandered by, and a seeming power vacuum was created. Even after gaining their interstellar wings, Vulcans were uninterested in playing the part of conquistadors here, preferring to keep lesser species ignorant of the presence of Others. But when humans broke out to the stars, they found a reality much different from how the Vulcans viewed their dominion. There were powers out there, powers with conflicting agendas and alien mindsets – and a curious pattern of sociological and political lacunae that an opportunistic and unconventional species could exploit.

Map: Earth-explored area and major expeditions before 2100.

Humans took to this role quite naturally. The explorers from Earth soon wandered into space not inhabited, nor visited by the contemporary cultures. They wove a web of warp routes, building an empire of their own to bring in materials to repair the world they had scorched with nuclear war. Unable to conquer planets yet, they created their empire out of abstractions: trade relations, cultural exchange programs, ambitious expeditions. The Others watched as the Earthers sailed out, fearing what they might find. However, the idea of forming alliances to protect against undesirable or unfriendly findings did not yet gain acceptance among them.

For seventy years of Earth starflight, the fear of the unknown proved unsubstantiated. Cargo operators learned to accept the occasional piracy as part of the business; explorers understood that not every star system was open to them. Increasing numbers and types of ships were built for

exploration, transportation, colonization and defense by Earth and her early colonies. Other ships were purchased from neighboring civilizations, and soon a volume of half a million cubic light years could be claimed as known by Man. This ovoid space extending from Earth to the direction of Rigel contained dozens of inhabited worlds. As for why most of these inhabitants were humanoid in shape, several theories sprung out immediately. An external force governing the evolution of intelligence was assumed in most of them, and many religions rose and fell in consonance with the latest exploration results.

When the inevitable finally happened and a civilization definitely categorized as unfriendly was met close enough to be a problem, humans had already adapted reasonably well to the technological, political and physical realities of space travel. Yet, hampered by her lack of military buildup, Earth alone would have been severely outclassed by any of the more experienced FTL-capable races living nearby. Again, circumstances conspired to ensure Earth a fighting chance by pitting her against the arrogant but similarly inexperienced Rihannsu, and by giving the humans time to form alliances with their less malevolent neighbors.

The threat of a war was the step needed for the near-Earth races and cultures to unite for common defense. At first, and to the great frustration of the Vulcans, technological aid for UESF was received from Andor; military and economic cooperation then followed in increasing amounts. By the time the first message of peace intents by Earth was transmitted and fell on deaf ears, Vulcan, Tellar, α Centauri and minor worlds including Axanar and Kaferia had also approved the first draft of the articles of a closely knit interstellar alliance. This coalition was to be formed for trade, cultural exchange, and for mutual protection. And not a moment too soon, as the end of year 2155 saw the eruption of the hostilities into a full-blown war. For a good while, this was simply known as The War, but historical perspective has forced the adoption of the definer 'Romulan' to separate it from the countless other interstellar military conflicts the Federation later plunged into.

The Romulan conflict is generally divided into three distinct parts: the initial clandestine Rihannsu attacks against Terran, Andorian, Tellarite and other shipping in 2132-55, the great offensive towards the heartspace of Earth and its allies in 2155-59, and the final desperate attrition battles of 2159-61. The 2155 attacks against Earth colonies are generally seen as the beginning of the actual Romulan War, even though undeclared hostilities had begun immediately after *USS Carrizal*'s visit, and the first offensive action had been taken against *USS Balboa* as early as 2132.

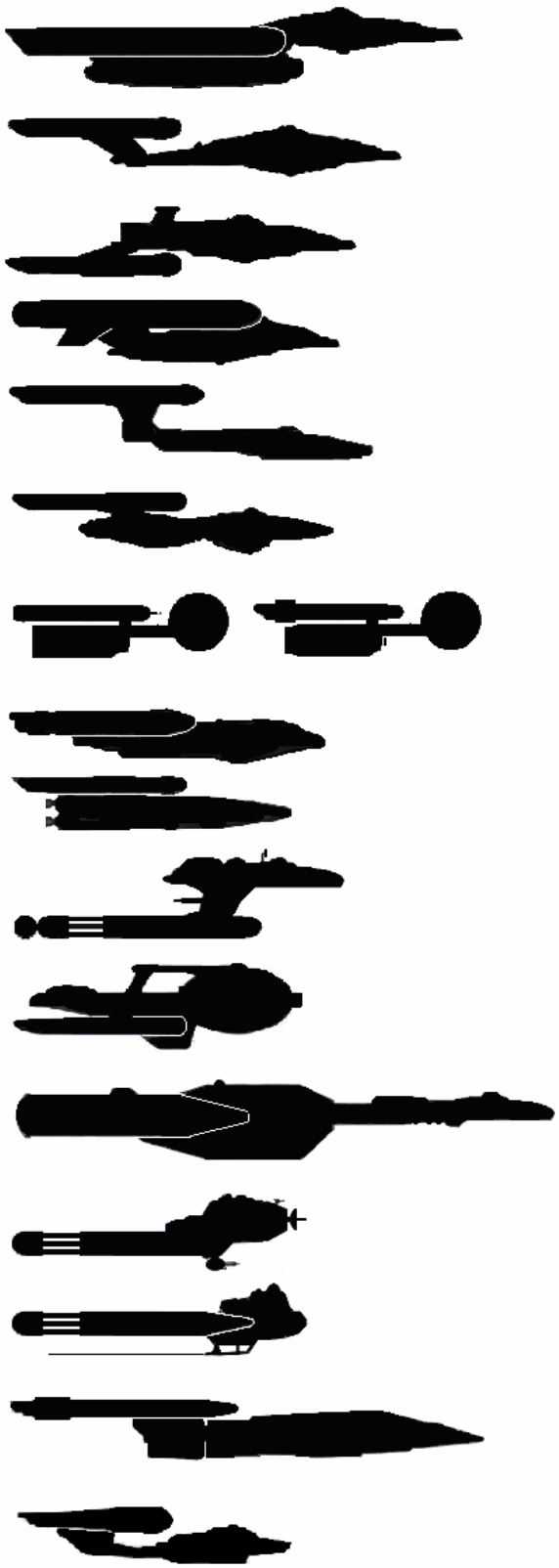
The first phase of the conflict was characterized by a lack of coordinated Earth response, and continued until the Romulans deemed it impossible to maintain the veil of secrecy any longer. As the conflict escalated to its second phase, Romulan forces gripped and held the initiative thanks to their superior numbers and preparedness, as well as their more detailed information on the opposing players.

In response, the Coalition of Planets (albeit initially sans Vulcan) mobilized all its forces in the direction of the war theater. But in battles great and small, it was proven that Romulan weaponry was superior to that of its opponents, in exotic quality and crushing quantity alike. In short notice, four *Enterprise*, four *Triton* and eleven *Messier* cruisers and fifteen assorted vessels of lesser design, along with many Andorian and Tellarite ships, were lost or rendered inoperational. The situation seemed hopeless for the far-flung Coalition forces, and many of the partners began to ponder withdrawing from the conflict.

But fate turned the tables on the Rihannsu. Overtly emboldened by their successes in frontier campaigns, they decided to divide their forces at the crucial hour of striking at enemy homeworlds. The invasions were repelled as a consequence. The Rihannsu losses suffered as the result of this tactical mistake were far from crippling, yet fanned the flames of a political upheaval on Romulus. The new leadership adopted a doctrine of greater deliberation and preparation. In 2159, one UESF battle group, consisting of the elderly Earthships *Halsey*, *Gorshkov* and *Yamamoto* and their escort destroyers and frigates, almost accidentally managed to locate a Romulan fleet stocking point at a distant and unnamed star system in the Triangulum Australe region. Wreaking havoc on dozens of dormant Romulan ships, the cruisers managed to halt the second Romulan offensive before it reached the fringes of Earth colonization zones or the worlds of its neighbors and possible future allies. However, the self-destruction of the Romulan base crippled many of the vessels. Later, the battle group was attacked several times, and only *USS Gorshkov* managed to limp home, along with one frigate. The war was far from being over.

The battles of 2159 drove home a bitter point: the Romulans would acknowledge no other form of combat than a fight to death, be it as individuals or as a species. Earth began to seek a way out of the insane conflict, with aims set not at victory, but at the most expedient way of ending hostilities. When a crippling hit was at last scored against the Romulan command outpost at Cheron in 2160, the enemy was amicable to a compromise that included few territorial gains or losses, and dictated no reparations whatsoever by either side. The war was ended by acknowledging the sovereignty of the Romulans within a carefully defined colume of space, and that of the humans outside that volume, with an impermeable and eternal barrier erected between.

A mere century would suffice to outdate all aspects of the compromise. Yet during this century, Earth and its interstellar allies would establish themselves as a political force in the firm belief that theirs had been the victory. Just as certainly, the Rihannsu would learn to view themselves as the defeated side, and would formulate the policies of their Star Empire accordingly. The memory of the Romulan War lived in politics far longer than in the technology and tactics of space combat. Still, many of the later Federation Starfleet conflicts must be seen in the strategic context of the one that began it all.



YORKTOWN
BATTLE CRUISER

ENTERPRISE
HEAVY CRUISER / EXPLORER

POSEIDON
HEAVY CRUISER

TRITON
HEAVY CRUISER

DAUNTLESS
CRUISER

CHRISTOPHER
LIGHT CRUISER

DAEDALUS
SURVEY CRUISER / CORVETTE

GANGES
DESTROYER

EMMETTE
DESTROYER

CAVALRY
DESTROYER

MINUTEMAN
DESTROYER

MARSHALL
HEAVY DESTROYER

DOPPLER
SCOUT

MERCURY
SCOUT

DISCOVERY
ASSAULT TRANSPORT / SCOUT

PIONEER
ASSAULT TRANSPORT

The principal ship classes of the Romulan War in comparison view. The lifting body hull is prominent on destroyers intended for planetary defense, absent from spatial combatants; the terraced, sometimes cut saucer is now common in cruisers. Warp engine types and configurations are legion, posing obvious logistics problems.

Stuart/Siebel/Neptune

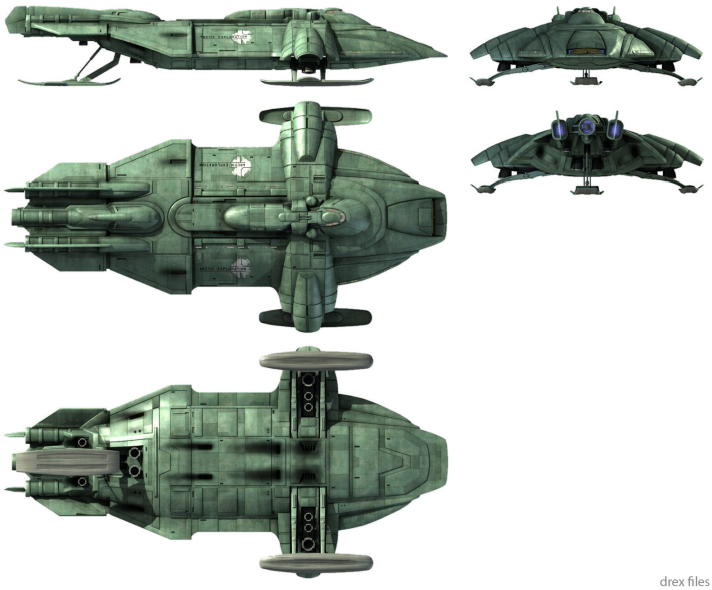
Transport / strike transport / surveyor
2118-2193

Completed:	73 total: 5 *Stuart* (FC-50) 8 *Neptune* (SV-50) 20 + 40 *Siebel* (FC-80, 100)
Length:	37.5 m (FC-50, SV-50) 42.1 m (FC-80, 100)
Beam:	25.2 m
Height:	7.9 m (landing gear retracted) 9.1 m (landing gear extended)
Mass:	12,100 tons (FC-50) 13,600 tons (FC-80) 14,200 tons (FC-100) 12,500 tons (SV-50)
Officers:	2 (FC-50, 80, 100) 6 (SV-50)
Crew:	8 (FC-50) 12 (FC-80, 100) 16 (SV-50)
Cargo:	2,200 tons (FC-50) 2,900 tons (FC-80) 3,500 tons (FC-100) 1,500 tons (SV-50)
Troops:	100
Cruise speed:	w 1
Max. speed:	w 1.4 (FC-50, SV-50) w 1.6 (FC-80, 100)
Endurance:	1.5 years (w/o passengers/troops; SV-50) 4 months (FC-50, w/ 100 passengers/troops) 10 months (FC-80, 100, w/ 100 passengers/troops)
Weapons:	2 plasma cannon (500 MW) on ventral fwd hull (FC-80, 100, select FC-50 and SV-50) 8 kinetic cannon (20 mm) on 4 twin turrets on dorsal port/stbd midhull (FC-80) 10 kinetic cannon (20 mm) on 5 twin turrets on dorsal port/stbd midhull and stern (FC-100) 4 kinetic cannon (20 mm) on 2 twin turrets on dorsal port/stbd midhull (select FC-50) 2 kinetic cannon (20 mm) on ventral stern (FC-80, 100)
Shields:	Electromagnetic shield (9 T) Polarizable armor on hull Navigational deflector on dorsal bow
Auxiliaries:	Normally none; various atmospheric, aquatic and surface vehicles carried as needed

Ships of historical interest:

USS Laing (FC-53)

SOURCES:	D ENT (N own) (H own)



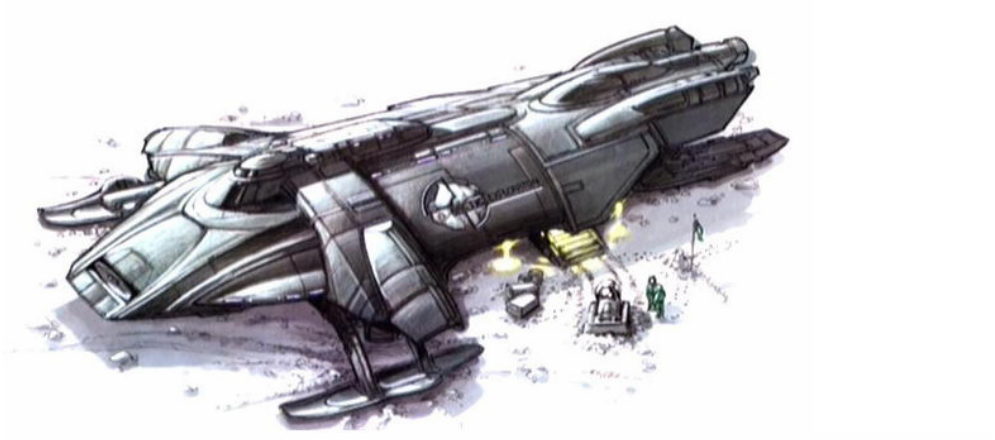
Despite the best efforts of Starfleet and the commercial interests of the slowly uniting planet, the interstellar transports of Earth suffered from an almost debilitating lack of speed. There was little point in competing against extraterrestrial freight operators on the swift delivery of high credit to mass ratio goods; Earth freighters would have to rely on ore hauling, or then seek their fortunes in the languid-paced long range commerce. However, commerce rights within Sol system were fiercely defended by the native operators, and they certainly possessed the full technological means for this.

The post-WWIII Earth network of spaceports had been built with robust, independent spacecraft in mind. Virtually all the vessels flying from the dusty tarmacs on the equator were aerodynamically stable multi-purpose designs that could take off from and land on unprepared areas if necessary – including those of Mars, Ganymede or Pluto. They consumed common hydrogen isotopes and had sufficient range to shuttle between the inner planets with ease. Addition of warp engines to these ships generally resulted in compromised productivity, though, and the corporations seldom tried to bridge the gap between insystem vessels and those capable of interstellar operations.

Yet the alien visitors to Sol often flaunted just such jack-of-all-trades vessels. While not commercially worrisome, they gave pause to Starfleet Command and Military Command, both of which saw the obvious offensive applications of such technology. In 2112, the first steps were taken in providing Earth's protectors with comparable means of rapid insystem and potential interstellar deployment of combat troops and equipment. A request for proposals was sent out for a 10,000-15,000 ton armored vessel capable of moving a fully equipped mechanized platoon at warp 1.4 or better. It was only to be expected that existing spaceframes be used as the starting point, but the novel polarizable armor surfaces and compact warp propulsion systems required so much customizing that the eventual General Space Corp. design could well be considered revolutionary.

When prototyping in 2113 began, toothing problems could thus be expected. Little was problematic about the forward two-thirds of the vessel. A conventional wedgelike bow would house the navigational sensors and deflectors, rapidly broadening to a constant cross section midhull that would serve as the main payload area. Control systems and crew accommodation were neatly clustered atop the hull and amply armored. Lifting engines placed on lateral sponsons and fantail were also of proven technology, and the main fusion reactor aft of the holds had seen sterling service aboard *Monticello* freight drones. However, mounting of the single GSC-1600 series nacelle

high astern gave endless headache to the engineers. Choosing the level of radiation shielding would endanger either the onboard troops or the center of gravity. A propulsion system of lesser performance was applied on the initial production keels, with the grudging intent of primarily using these vessels for insystem tasks.



A pair of Stuart *transports delivers a containment team to the crash site of a water and fissionables barge, high on the Kunlunshan plateau. Ballistic barges were once considered an efficient method of bulk delivery within the Sol system, but repeated mishaps like this 2129 magnetic drag anchor failure brought the practice to an end. The risky fissionables remained a key Earth industry, though, and rapidly deployable containment and cleanup teams were held at constant readiness at the Del Rey Fleet Station on Luna. Warp-capable* Stuarts *were an ideal means of deployment, reaching Earth, Mars, the Belt and Jovian moons with equal ease and speed. Note the gun turrets aft of the bridge, their 'flight mode' orientation concealing the presence or absence of actual weapons.*

The later units were modified to incorporate more extensive stern structures, and sported twin rather than single stern landing support. Their maximum sustainable speed was the originally intended warp 1.6, in contrast to the warp 1.4 of the initial production run. Additional benefits came out of

the change, including a rear gunnery control station. The *Siebel* assault transports were armed with twin multidirectional plasma cannon on the forward lift engine sponsons, and with numerous projectile guns in cylindrar turrets - powerful enough for close-in support of troops, although rather useless in space combat. The initial *Stuart* batch of lower performance usually omitted both kinds of armament, as they would have few applications in the insystem errands planned for the type. The projectile gun turrets themselves were still present, even if with limited or absent weaponry.

By 2120, Starfleet had in its possession ten fast *Siebel* transports to secure Sol against hostile takeover of outer planet assets; by 2125, a full twenty, enough to be spared for interstellar expeditions. Simultaneously, procurement of the *Stuart* for the odd insystem work continued, adding eight vessels of the special *Neptune* survey configuration by 2123. Significant commercial applications came in the wake of Starfleet operations, with three dozen slightly simplified *Stuart* units purchased to support mining operations on Luna and Mars and with numerous adapted versions sent to outer colonies. Starfleet frequently practiced Sol defense operations, and twice deployed *Siebels* to Alpha III and Ophiucus in exercises aimed at colony repossession. The latter mission type proved unrealistic, however: a transit time of up to a year put a great strain on the troops and gave far too much time for the invader to dig in. The maximum deployable force of a thousand soldiers would have been pitifully small in any case.

Exercise Deep Sentry underway to Alpha III. Two Ottawa *heavy transports accommodate the troops during transit, while the ten* Siebels *surround the formation at the minimum distance needed to avoid warp field overlap; the* Djartanna *outriders and the* Messier *class flagship* Resolute *maintain greater separation. Exceptional psychological duress during the course of the two-year exercise led to six cases of homicide, nine suicides and a dangerous riot and fire onboard the barracks ship* Ithaca*. Nevertheless, Starfleet proceeded with Exercise Deep Vigil to Ophiucus five years later, with very similar results.*

Far more practical were the 'tertiary' insystem operations, including rapid disaster relief, scientific expedition support and garrison supply. Two *Stuart* units, the *Livingstone* (VC-51) and the *Fawcett* (VC-54), were earmarked for support of the Terran Embassy on Vulcan; even though practical reasons usually dictated the use of Vulcan vessels for moving the ambassadorial staff, reasons of prestige necessitated the availability of Starfleet 'counterparts' (in a rather broad sense of the word).

By 2156, two of the vessels had been lost: *USS Laing* (SV-53) on an arctic assignment to an alien force only much later identified as the Borg, and *USS Kaiser* (FC-87) to structural failure during Exercise Deep Vigil. Production was once again underway, however. To better protect off-Sol human assets against the outbreak of piracy, Starfleet had decided to triple its strike transport force. The well-timed move put little strain on dockyards, as even the most austere facilities sufficed for construction of the robust type. The forty slightly uprated FC-100 transports produced under the *Siebel* name proved themselves in assorted support roles during the Romulan War. Still, they seldom saw the kind of action they had been designed for. Their slow speed proved a strategic

hindrance; their power output was insufficient for mounting advanced weaponry; and ground combat played a minimal role in the Romulan conflict in any case.

The immediate postwar decades saw the *Siebel* fleet divided evenly across the new, broad theater of UFP Starfleet operations. The vessels no longer plied the interstellar routes, concentrating instead on transatmospheric operations that the significantly faster modern supply ship designs no longer catered for. Numerous vessels were sold or donated to local civilian and government operators, which continued to employ them for SAR, disaster relief and expedition support. The regular insystem logistics role slowly wore through the sturdy spaceframes, though; since no Starfleet successor was forthcoming, civilian operators gave up the type as well. The last Starfleet liaison vessels of FC-100 type were withdrawn from service in the 2190s.

Emmette

Destroyer
2123-2169

Completed:	26
Length:	160.1 m
Beam:	166.4 m
Height:	36.0 m
Mass:	96,800 tons
Officers:	8
Crew:	50
Cruise speed:	w 1.4
Max. speed:	w 1.9
Endurance:	6 months
Weapons:	Original: 2 plasma cannon (4.0 GW) on dorsal midhull 2 plasma cannon (2.0 GW) on dorsal midhull 2 plasma cannon (4.0 GW) on ventral midhull 2 plasma cannon (2.0 GW) on ventral midhull 1 fwd missile tube w/ 35 fusion missiles on ventral bow
Shields:	Electromagnetic shield (22 T) Polarizable armor on hull Navigational deflector on bow Glass bead emitters (on select vessels between 2142 and 2152)
Auxiliaries:	None

Ships of historical interest:

USS Jacari (NDD-16)

SOURCES:	D ENT (N Rob Bonchune/ Foundation Imagining) (H own)

The main military obligations of the early UESF were in maintaining Sol system security and in protecting the ongoing exploration and exploitation efforts there. For this work, there were plenty of government spacecraft there that could traverse the intrasystem distances in a matter of days or weeks, ranging from lifting body interceptors based on Mars to vacuum-only patrol ships of DY descent. Yet timely defenses and disaster response called for insystem warpships as well. Due to technological challenges as well as the diverse operational requirements, it took a significant amount of time until UESF could standardize on a single ship type as its patrol mainstay.

The *Emmette* military warpships were early on classified as destroyers, despite not being intended to destroy too many things during normal operations. Their designation was derived from naval tradition: their role was foreseen as the medium spacegoing warship, between the point defense interceptors and corvettes and a hoped-for new generation of space cruisers. Their hulls were built to be sturdy and capacious, able to accommodate many new internal systems if technological development so warranted. Their propulsion system was also generously engineered, with a single massive fusion reaction engine feeding from the direct power loop and two boosters with their own fusion reactors, augmented by four more environmentally friendly nozzles for landings and takeoffs.

Atmospheric operations were further facilitated by the lifting body shape, which featured two massive main landing legs behind smoothly faired hatches beneath the aft hull, and a single centerline leg farther forward. The bow of the vessel was extensively armored with polarizable plating, forming a protective citadel for the crew. Lesser armoring was applied on the aft sections, the fuel tanks, reactors and engines; direct hits against that part of the ship would be unsurvivable in any case.

Weapons were largely carried in long fairings that ran from the forward hull to the four auxiliary engines. Near the forward ends were twin mounts for plasma cannon, each featuring a two-gigawatt Almaz rapid-fire gun forward, and a four-gigawatt Armscor gun with a longer recharge time aft, plus a fire-tracking sensor in between. Forward and aft of the gunports were the cooling units of the cannon. A single missile launcher was also carried, but buried inside the citadel for the necessary

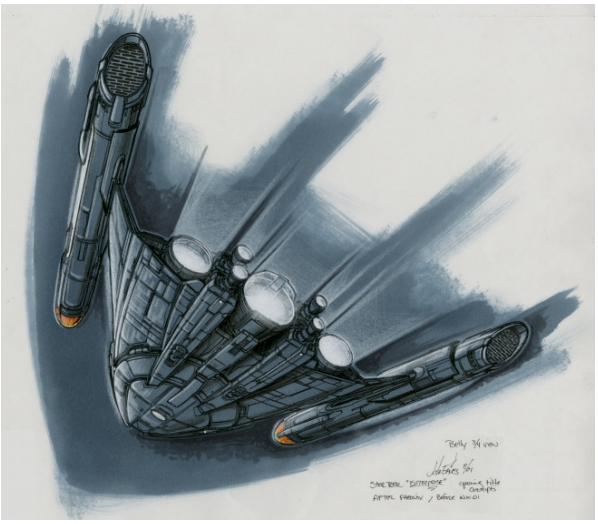
hands-on operation and maintenance. The armored port for the launcher muzzle was directly beneath the bow; the bow itself held a navigational deflection field projector, one of the first to be installed on a transatmospheric Earth vessel.

Yet transatmospheric operations were but a minor part of the mission profile of the vessels. The 4W1200 FTL engines could drive the vessel close to warp two, and theoretically enabled an interstellar scale of operations. In practice, top speed could not be sustained for more than a few hours, but there was enough endurance for a slow transfer flight to a nearby colony if need be. Primary combat and rescue operations alike called for a short warp jump to a location within a few lighthours at most, followed by precision sublight maneuvering. For the latter, RCS packages on all corners of the spaceframe were tied to control systems, but these would be covered by armored hatches for atmospheric ops and sometimes for combat as well. Gravitically augmented gyroscopes would take care of fine attitude control. Several cameras and radars were installed around the hull, but there were no structure-compromising portholes or other openings in the modern-looking armor; the only means of entry were airlocks in the landing pad bays, accessible from the surface via ladderways and their adjoining small lifts.

As an Emmette *touches down at a Luna starport, size comparison can be made with typical light warp-augmented interceptors of the 2100s.*

The 26 ships completed for UESF were perhaps not as numerous as certain previous UEDP acquisitions, but were expensive and demanding construction projects nevertheless. They thus had to become a mainstay of Sol defenses for the following five decades. Technology moved forward in leaps and bounds in most areas, warp drive being a frustrating exception. Yet new warships were not being built: the *Emmettes* could be equipped with newer models of plasma cannon or targeting sensor, or given better life support or navigational software, but no funds would be forthcoming for the construction of all-new spaceframes. There was little need, after all. The *Emmettes* were holding up well, largely thanks to seeing very little action in the first place.

It was only in the 2130s and the onset of serious investment in Earth's fledging interstellar colonies and alliances that the need arose for further defensive starships. The *Djartanna* class was a modest design optimized for mass production, yet essentially replaced the *Emmette* as the defender of Sol. A final few examples of the older type survived to fight in the Romulan War, and the last two units were not retired until 2169. At that time, they were simply relics of historical curiosity value only.



Discovery

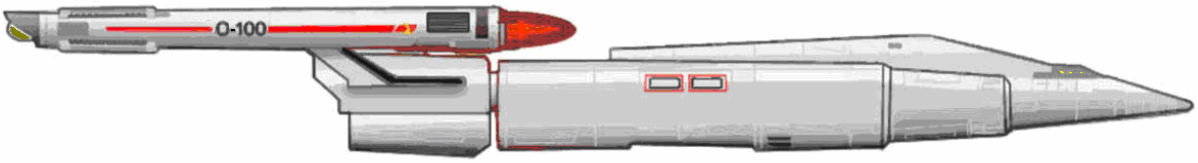
Assault transport / scout
2124-2160

Completed:	23 total: 5 converted from *Conestoga* colonizers 18 built in 2124-28
Length:	267.5 m
Beam:	108.0 m
Height:	36.3 m
Mass:	202,900 tons (original) 208,200 tons (refit)
Officers:	5
Crew:	22
Troops:	200 (cryosleep, original only) 80 (short missions, original only)
Cruise speed:	w 1.6 (original) w 3 (refit)
Max. speed:	w 2.0 (original) w 5.4 (refit)
Endurance:	1 year
Weapons:	<u>Original:</u> 4 plasma cannon (2.0 GW) in 2 twin mounts flanking forward hull <u>Refit 2153:</u> 2 Type B phased particle cannon (125 GJ / 200 GW) flanking forward hull 1 fwd missile tube w/40 fusion missiles on dorsal spine
Shields:	Electromagnetic shield (10 T) Polarizable hull armor (refit 2136) Gas envelope deflectors (removed in refit)
Laboratories:	1 planetary sciences (optional, original) 1 signals intelligence (refit)
Auxiliaries:	2 shuttlepods

Ships of historical interest:

USS Discovery (O-100), *USS Patton* (FL-101/O-101), *USS Nebraska* (O-103), *USS Niagara* (O-110)

SOURCES: (D ST:Legacy computer game)
(N ST:Legacy computer game)
(H own)



The original transport configuration, re-registered for the long range scouting mission for which the low-performing type was merely the least unsuited of the available vessels.

At the successful conclusion of the third *Conestoga* colonization mission, Earth's space exploration and exploitation agencies began to move on. Ships of higher capacity and lesser complexity were preferred for reinforcing the existing colonies. On the other hand, no settlements would be founded on new planets until one managed to find such planets, within acceptable range of Earth, without overlapping claims, and with the right sort of resources to justify the investment. As the result, commercial demand for *Conestogas* soon dropped to a flat zero.

However, the military arms of the government were still very much interested in a high speed method of delivering a considerable number of personnel and equipment to a planetary surface on a distant star system. The small *Siebel* transports lacked endurance, not so much in terms of propulsion as of passenger comfort. The obvious solution of suspending the combat teams in cryosleep for transit was dependent on further resources the *Siebels* were short on, such as secondary power, life support conduitry and trunkage, and sterile internal spaces. Like colonial enterprises, UEMC thus coveted larger transports – but their definition of large would be perfectly met by the *Conestoga*.

The five vessels that initially were procured were not pure-bred colonizers, of course. The drive system was the essentially cutting-edge Westinghouse 4W1200, but with larger fuel reserves than in the *Emmette* destroyers, with a secondary fusion reactor for life support, a smartly streamlined new command section protected with hull polarizing, and two weapons berths. The latter were to house either plasma cannon for space combat or rapid-fire electromagnetic cannon for suppression of surface fire. In practice, the former were invariably installed, whilst a largely theoretical option of a weapons swap in space was written into the manuals. Such an operation would require the help of a *Hercules* tender, a vessel type that in any case would necessarily accompany Earth's possible interstellar assault sorties - and drag them down with its cruise speed of warp 1.1, as opposed to the superb 1.6 for the new assault transports.

The operational reality of the vessels was radically different from the original intent. As no openings presented themselves for interstellar troop deployment, the class had to be reassigned. The first five vessels had been rather martially named. This was formally forgotten when both the sixth unit (built from keel up to the military standard) and the entire class were dubbed *Discovery*, and sent out to scout for resources in nearby uninhabited systems. The twin ventral doors with disembarking ramps and elevators leading straight into vehicle holds were just as practical in planetary survey as in assault operations, although rigging of survey sensors took some work. All the units retained the assault capacity nevertheless, and could quickly be fitted with the cryosleep stations of 200 troops.

In the 2150s, the now 23-strong *Discovery* class no longer enjoyed a leading propulsion system in the transport fleet: modern antimatter engines had been applied on the *Pioneer* class, proving yet another concept for bringing the UESF closer to interstellar parity. A massive refitting program was thus initiated on the *Discoveries* as well, as it promised immediate return for an investment that involved minimal R&D effort. The original fusion reactor was simply replaced by a dilithium-focus annihilation core built to the specs of the F2.2 reactor that awaited refitting into the *Enterprise*. The large holds of the *Discovery* also easily accommodated the complex antimatter tankage systems and four plasma rechargers; the latter would only be turned on for short dashes at warp 5.4, as the structure of the ship otherwise wasn't rated for sustaining high speeds. Troop capacity was lost altogether in this propulsive upgrade – but none was needed, as the UESF aim all along had been the fielding of further deep space combatants at the lowest possible cost.

The strategic scout refit is recognizable chiefly from changes to the forward ends of the engine nacelles and from the addition of plasma recharger vent caps on top and bottom of the former cargo compartment, now housing the high performance powerplant. Minor changes in the upper forward section reflect the installation of missile armament.

For this purpose, these vessels were also equipped with two Type B phased particle cannon banks and one stock missile tube liberated from the pathetically performing *Djartanna* light destroyers. They thus became a real combat asset, extensively utilized in fleet action. Despite their speed, they did not much accompany the high speed raiding flotillas of the later war years, though, preferring to scout out for desperately needed targets for such raids. As opposed to the *Mercury* and *Doppler* scouts, they were strategic assets, and sparingly used. Nevertheless, losses were severe, since the *Discovery* armor was very vulnerable by the standards of the day. Warp dashes saved many a vessel from an ambush – but such maneuvers were less effective deep insystem, leading to losses of no fewer than 14 fast scouts. The type was withdrawn from service on the day of armistice.

Durance

Transport
2130-2163

Completed:	92 total:
	15 *Durance* (FR-250) 38 *Redstone* (FR-300) 39 *Chryse* (FR-350)
Length:	98.7 m
Beam:	57.5 m
Height:	27.9 m
Mass:	42,100 tons (FR-250)

	42,650 tons (FR-300) 42,400 tons (FR-350)
Officers:	3
Crew:	37 (FR-250) 34 (FR-300) 41 (FR-350)
Passengers:	10 (standard)
Cargo:	12,400 tons (standard load) 14,800 tons (reduced-speed operations)
Cruise speed:	w 2
Max. speed:	w 2.2
Endurance:	4.5 years
Weapons:	<u>Original:</u> 1 plasma cannon (2.0 GW) on dorsal fwd hull 2 plasma cannon (2.0 GW) on engine nacelles <u>Alternate wartime fit (2157 onwards):</u> 1 laser emitter (230 nm / 300 MW) on dorsal fwd hull 2 laser emitter (230 nm / 300 MW) on engine nacelles <u>Escort cruiser:</u> 3 plasma cannon (2.0 GW) on dorsal fwd hull 4 plasma cannon (4.0 GW) on dorsal aft hull 2 plasma cannon (2.0 GW) on engine nacelles <u>Destroyer:</u> 1 plasma cannon (2.0 GW) on dorsal fwd hull 2 plasma cannon (2.0 GW) on engine nacelles 1 Type A phased particle cannon (500 GJ / 500 GW) on cargo grapple 1 aft missile tube w/ 20 fusion missiles (160 kT) on cargo grapple
Shields:	Electromagnetic shield (18 T) Polarizable armor on fwd hull and parts of engine section Twin navigational deflectors on ventral main hull bow, flanking fwd sensor array
Auxiliaries:	1 heavy atmospheric shuttle or 2 cargo handling pods (FR-250) 2 cargo handling pods (FR-300, 350)

Ships of historical interest:

USS Aberdeen (FR-257), *USS Avior* (FR-253), *USS Cay'Andera* (FR-259), *USS Chandeleur* (FR-263), *USS Cypress* (FR-256), *USS Durance* (FR-250), *USS Grevenmacher* (FR-264), *USS Gridley* (FR-255), *USS Halsey* (FR-261), *USS Heron Bay* (FR-251), *USS Manassa* (FR-254), *USS Manheim* (FR-260), *USS Remagen* (FR-252), *USS Rio Verde* (FR-258), *USS Sierra Vista* (FR-262)

SOURCES:	(D DCP) (N DCP) (H DCP)

The *Durance* class of military and later civilian transports was the final major UESF-backed program intended to boost interstellar commerce and cultural exchange, and a *tour de force* for the world that had risen from the ruins of WW III with the help of these very interstellar connections. The best warp engines Terran science and engineering could provide were installed on the ships, enabling operations in extreme deep space, in the direction of Rigel colonies, but also towards the distant Canopus. And that way lay the seeds for a bloody conflict, one that would intensify from an overacted self-preservation reaction to rampant privateering, and finally to a prolonged interstellar war.

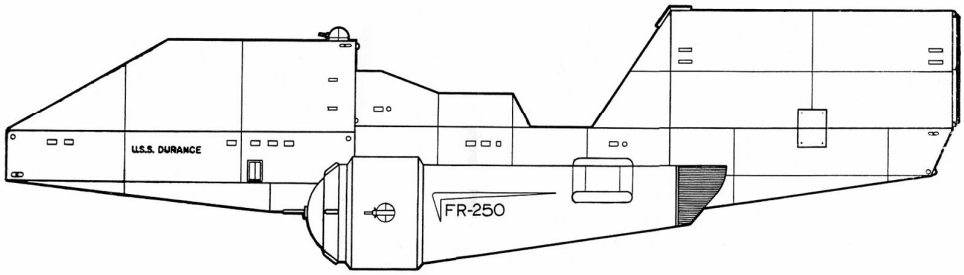
The *Durance* class ships sported an angular forward hull of seemingly simple construction, with cargo sections strapped on to the aft structural strongback, and with the two 15,000 ton TC-A warp nacelles outriggered in a sturdy and conservative manner. However, recent adventures in propulsive technology research had not been completely without practical benefits: standard fusion power now

sufficed for speeding the freighters to warp 2 and beyond. The command and navigation spaces plus medical facilities, officer accommodation and staterooms were on the three upper decks of the forward hull, protected by flat armor plates; there were no protrusions and almost no viewports in this part of the hull. The name and registry of the ship were displayed proudly on the uncluttered, angled bow surface, while blowaway panels hid rows of lifepods on the hull flanks.

Twin navigational deflectors and main airlock systems were located on the next two decks, which also provided primary accommodation for the ratings. This was originally of relatively spacious stateroom type, following Boomer tradition for cargo runs of extremely long duration. A later compacting of the arrangements allowed up to four platoons of troops to be shipped in tolerable conditions. Amidships, these decks housed support facilities such as the galley, gymnasium and fabrication center; at extreme stern was the engineering control room. In the fantail abaft, impulse engines provided sublight thrust, while repeater coils for the warp drive allowed the towing of container trains and outsize loads – an option rarely used, and requiring a strap-on cargo section specially configured for the task.

Small manned pods were available for maneuvering both the strap-on and trailing containers in place. Alternately, a capacious cargo shuttle could be shipped for delivering light cargo to planets not equipped with orbital spaceports. A hangar for the former or a docking berth for the latter would be installed aft of the habitat hull. The mid-hull, also straddled by an observation deck, mounted the warp engines on strong down-canted pylons. For defense needs, 2 GW plasma cannon were provided on the engine forward shrouds, while a single cannon also sat atop the forward hull. Field of fire was limited in the proximity of the vessel, though – a fact made bitterly obvious in the upcoming war.

The dorsal support structure aft of the mid-hull contained the main propellant tanks, the grapples for strap-on cargo sections, and a series of RCS engines. As the main reaction engines were located in the lower part of the aft support structure, the thrust line lay near the center of mass of an unloaded vessel. Variance in mass distribution due to the attaching of cargo containers was compensated for by a balancing system that moved propellant and ballast between tanks in the spine of the support structure, and within the large grapple cone above it. Service tunnels snaked through the structures, giving access also to the cargo sections if necessary. Mobile antigravs facilitated cargo movement through the various accessways.



A convoy of Durance, Roanoke *and* Anchorage *transports (FR, FJ and FG classes in the UESF registry scheme, respectively) highlights the strengths of the* Durance *design in military applications. While following the general 'tug and container train' philosophy, the* Durances *had a higher thrust/mass ratio at all drive modes, a sturdier way of mounting the cargo, stronger armor and more advanced deflectors. The militarized versions of the J and G classes could do some fighting as well, but only by jettisoning their cargo sections – an option against pirate raids, but not very useful when the enemy aimed at destroying instead of capturing the said cargo and its carrier.*

USS Durance (FR-250) set new standards to transport operations. Initially, she and her sister ships operated mainly in the wide swath of space between Lorillia and Bolarus, antispinward from Earth and its neighbors, and provided lifelines to Earth colonies in that direction. But the hastily and incompletely explored area of space held several cultures not contacted by Earthfleet ships – until the pirate raids began. *USS Chandeleur* (FR-263) was the first to fall to an attack by the forces of the Rihannsu people, expanding to meet the people who had intruded their space. After her, ships and outposts near the stars of Triangulum Australe went down in a steady succession without anybody on Earth noticing; subspace communications at that point were so slow that it would have taken decades for messages to return from these reaches of space. Furthermore, the shipborne transmitters of the time could not hope to transmit across distances much greater than five lightyears. After that point, the messages either had to be boosted forward by a network of relay buoys, or degenerated into EM radiation that faded into space at lightspeed.

Durance class freighters played another role in the war that soon escalated: two ships were modified as prototype 'escort cruisers' to protect commerce in the area, when it became obvious that the expected lifetime of unescorted vessels near Triangulum Australe was lower than the reaction time of nearby UESF forces. Featuring added plasma weapons and omitting the cargo pods, the ships had no true offensive capabilities. They proved to be insufficient in protecting convoys against vicious Rihannsu attacks after the beginning of open war.

Other conversions were tested: *USS Manheim* (FR-260) was converted to a destroyer by the addition of a missile tube and phased particle beam cannon into her cargo grapples, and *USS Heron Bay* (FR-251) soon followed suit. *USS Rio Verde* (FR-258) became a scientific survey vessel through the addition of a wide selection of sensors to the same position, plus instrumentation in spaces vacated by the omission of cargo handling equipment and some crew. These conversions serve as an example of the multitude of ship configurations and equipment standards used before and during the Romulan War – a logistics nightmare that only ended with the introduction of major ship lineages well after the founding of the Federation Starfleet.

Durance class transports never reached the numbers required to handle all Earth commerce or even all Starfleet supply needs. Nor had they been intended to. Their projected niche was that of extreme deep space logistics, in support of an effort to gradually establish an Earth presence hundreds of lightyears from the homeworld. Only 15 were built before the war, far too few to create functional outposts in the war theater in anything shorter than three years. No such outposts could even be planned in the Rigel or Sheliak directions, not until the war was over.

Wartime production was funded by nominally letting ECS procure the vessels as civilian transports, under the R class designation. The some 80 units built to the much lower standards of the *Redstone* and *Chryse* classes did little to alleviate the problems, since their cruise endurance was greatly limited. Further hampering UESF logistics efforts, the final *Silversides* class of 40 additional ships was cancelled due to lack of materials for the warp coils.

All the *Durances* and related designs were retired by 2163, some after 33 years of sterling service, to give way to the new classes of ships emerging for the use of UFP Starfleet. Civilian users eagerly adopted the now completely outdated transports, attaching longer container trains to them and thus reducing speed and all but removing maneuverability. In military service, the *Durances* had fought alongside such dissimilar sisters-in-arms as the fast and sleek *Pioneers*, the capacious ring-drive *Vanguards*, and the trusted old *Hercules* container haulers. When the time came for the nascent UFP Starfleet Logistics Command to opt for a line of design, the choice fell upon *Durance*: the

Murmansk class of heavy transports and the *Almeida* multimission ship both perpetuated the configuration of a twin-nacelled spaceframe of angular shapes mounting semi-integrated cargo sections. The other lineages would yet have their day, but the honor of finally establishing functional outposts and starbases in the deep Rigel direction befell the *Durance* legacy.

Sevaijen

Light cruiser
2138-2196

Completed:	162
Length:	140.2 m
Beam:	89.0 m
Height:	30.3 m
Mass:	180,000 tons
Officers:	6
Crew:	49
Cruise speed:	w 3
Max. speed:	w 6.4
Endurance:	1 year
Weapons:	2 phased particle beam emitters in wingtip mounts
Shields:	1-layer graviton/subspace globular forcefield Navigational deflectors on warp nacelle fwd ends
Transporters:	2 GP (3-pad) refitted to select vessels after 2154
Auxiliaries:	2 light shuttles, 8 assault pods

Ships of historical interest:

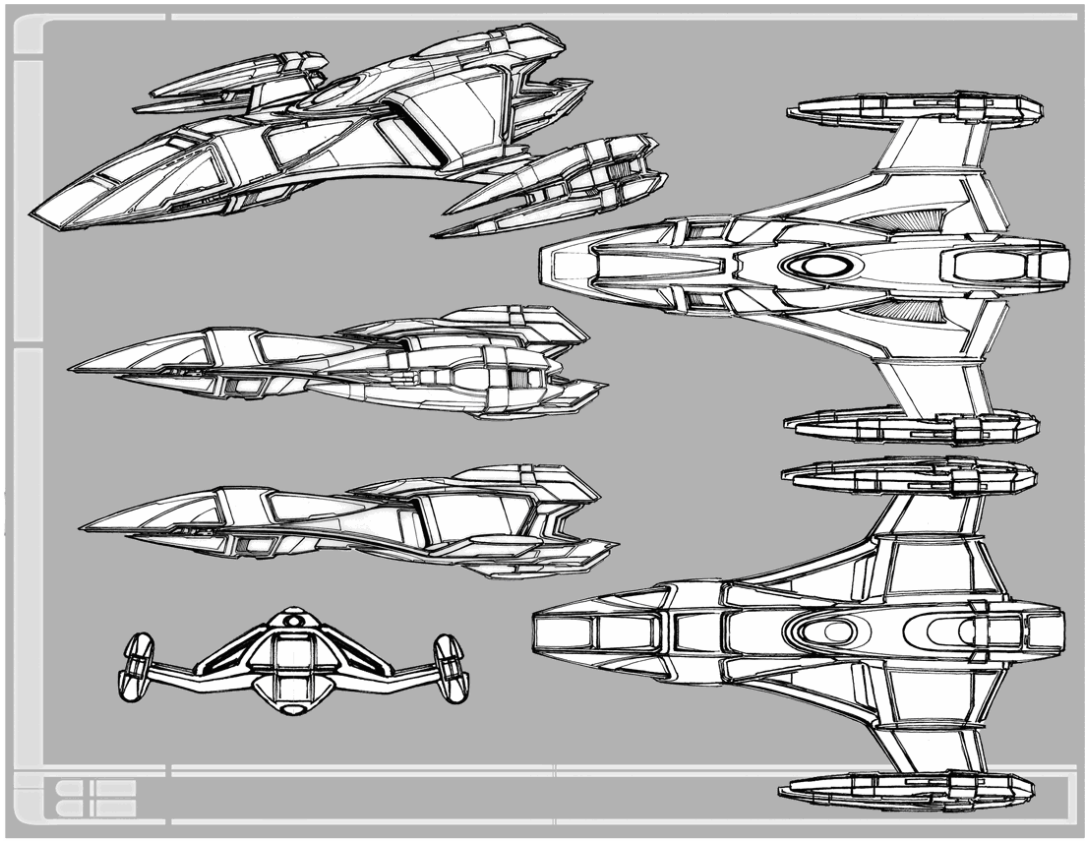
USS Thejal (AGC-6-38)

SOURCES: (D John Eaves STO concept art)
(N Bennett "A Choice of Futures")
(H Bennett "A Choice of Futures")

At a time when Earth engineers struggled with making 150 m warships move at warp two for brief dashes, the Andorian Self-Defense Force was re-equipping its deep space units with light cruisers capable of sustaining warp three till fuel exhaustion, and of pouncing on the enemy at warp six or better. Key to this superiority was the Andorian mastery of graviton/subspace forcefields, a versatile defense against kinetic or directed-energy attack but also a precision tool for containing antimatter annihilation reactions and regulating the flow of warp plasma.

The first-ever application of variable compression nozzle technology gave the *Sevaijen* class not only a performance edge over neighboring cultures, but also independence from dilithium. Competition for the scarce resource had been one of the many reasons straining the relationship between Andoria and Vulcania. That the ASDF now pursued this resource with slightly lesser ferocity was no reason to de-escalate: the *Sevaijen* was provided with two wingtip phased particle beam pods capable of piercing the defenses of any Vulcan combat vessel, and protected by forcefield deflectors. Navigational deflection beams fired from the forward ends of the two warp nacelles that were stacked at centerline, and there was a potent combat shield generator amidships,

just aft of the crew section. Typically for the species, a crew of just 55 operated the as such sizeable and potent combatant – a practice made easier by the equally typical low endurance of the *Sevaijen*.



Much like the earlier generations of antimatter-powered warships, the *Sevajien* was rather heavily dependent on support from tenders in deep space maneuvers. Their burden was slightly alleviated by the lack of physical ordnance aboard the light cruisers: there was no torpedo launcher, nor a bomb deployment system, and the phase guns had forcefield-based rather than solid-walled resonance chambers and heavy duty power cells capable of tens of thousands of firing-recharging cycles before replacement. For movement of supplies, there were two ventral shuttlebays and hangar space for two light shuttles, with additional space for eight breaching pods.

After contact with humans, ASDF began regretting its disinterest in deep space operations. The new species had surprising things to offer, among them a perfectly functional version of the Vulcan teleporting device, complete with the secret biocompatibility feature. Imperial Guard units started receiving their first transporters in the late 2140s, offering hints on the timing of the contact, still unrecorded by mainstream history. First installed aboard *Kumari* battle cruisers and then *Thofsin* cruisers, by 2154 they found their way aboard Guard *Sevajiens*, outdating overnight their breaching pods and operating doctrines.

When Andor entered the Romulan fray in earnest, *Sevajiens* soon took on the role of skirmishers – not because they would have been particularly well suited for the role, but because keeping them deployed alongside *Kumari* or *Thofsin* formations formed a deadly threat to the bigger ships in case of Romulan telecapture attack. Independent Andorian action in the war quickly waned. Prewar clandestine trade agreements with Earth, made primarily to spite the Vulcans, also were largely let

to expire. Transfer of key military technology continued nevertheless, in a quid pro quo of sorts for the teleportation secrets (which Earth never admitted to having sold). Acquisition of Andorian forcefield shielding technology played a crucial role in the later years of the UESF war effort, even though high power applications of the alien magic tended to wreak havoc with Terran warp fields.

At the conclusion of the conflict, Andor had learned how to better deal with Romulan information warfare, and was confident in deploying the *Sevajiens* as part of the UFP Starfleet, only retaining two dozen Guard units outside federal control. It had also gained a new appreciation of Terran warp technology, and realized that the *Sevajien* drive type would not remain superior for long. The advantages of dilithium foci might not have been obvious to UESPA, which was struggling with reliability issues and trying to integrate forcefield constriction to its own engines. Andor offered help in the latter effort, but also quietly began preparations for retiring the *Sevajien* generation of ships en masse around 2170 and replacing them with types developed jointly with the close partners in the United Federation of Planets. All survivors of the production run of 162 were decommissioned by 2196.

Djartanna

Light destroyer
2139-2189

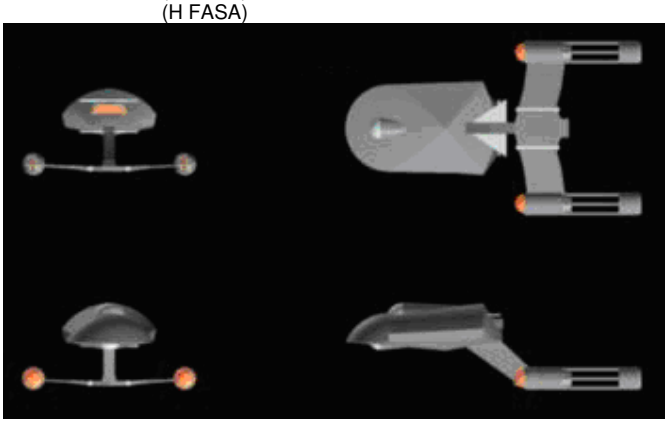
Completed:	316 total: 20 batch 1 / *Djartanna* 80 batches 2-5 / *Yetuf* 40 batches 6-7 / *Vigilance* 80 batches 8-11 / *Ledenna* 60 batches 12-14 / *Redoubt* 36 batches 15-16 / *Reliance*
Length:	93.0 m
Beam:	55.6 m
Height:	27.8 m (standard) 27.9 m (*Redoubt* and *Reliance*)
Mass:	26,800 tons (standard) 28,100 tons (*Redoubt* and *Reliance*, typical)
Officers:	6
Crew:	45
Cruise speed:	w 1.2
Max. speed:	w 1.9 (standard) w 2.2 (*Redoubt* and *Reliance*)
Endurance:	6 months
Weapons:	<u>Original:</u> 1 plasma cannon (4.0 GW) on ventral main hull 2 plasma cannon (1.0 GW) on dorsal main hull 2 plasma cannon (1.0 GW) on ventral main hull 1 fwd missile tube w/ 35 fusion missiles on engineering hull <u>Romulan War refit:</u> 1 Type B phased particle cannon (125 GJ / 200 GW) on ventral main hull 2 plasma cannon (4.0 GW) on dorsal main hull 2 plasma cannon (4.0 GW) on ventral main hull 1 fwd torpedo tube w/ 35 fusion torpedoes on engineering hull
Shields:	Electromagnetic shield (22 T) Polarizable armor on hull Navigational deflector on engineering hull bow Glass bead emitters (on select vessels between 2142 and 2152)

Auxiliaries: 1 spatial shuttlepod (optional)

Ships of historical interest:

USS Mendor (NDD-109)

SOURCES: (D FASA)
(N FASA)
(H FASA)



Coping with the expansion of colonized space was largely a theoretical exercise for the UESF of the early 22nd century. Out of the roughly 5,000 warp vessels built by Earth so far, some fifty were battleworthy interstellar combatants within range of colonial holdings, 'range' being generously defined as a response time of less than a year. A further hundred could be deployed for battle across 'short ranges', yet even the major off-Sol colonies at α Centauri lay outside these parameters. Rather than attempt to increase the strength or range of the interstellar response fleet, UESF found it theoretically more attractive to build large numbers of local action warp interceptors. As some two hundred of such destroyer-type vessels would be needed to protect Earth, Mars and Earth Colony One alone, though, practical execution was beyond Earthly means.

Yet these were not the only means available for the Terran colonists of the α Centauri system. There had already been extensive technology exchange between the first settlers and native (for a certain value of the term anyway) inhabitants, and the industrial potential of the Centaurans had surprised the Terrans over and over again. In the 2120s, joint ventures moved beyond basic colonial matters such as the construction of shelters, local transportation or water purifier plants. The first tentative deals were now signed between Earth and Centauri defense corporations to provide the system patrols with the necessary spaceships. Signatures by military authorities followed slightly thereafter.

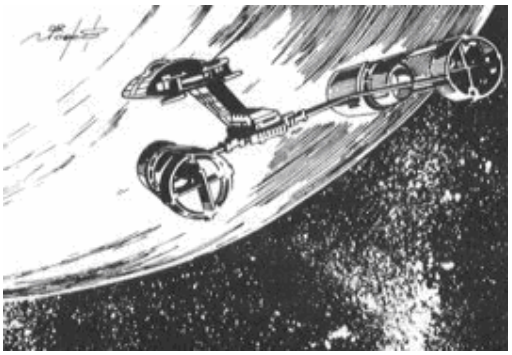
Interstellar cooperation did not come easily, what with millennia of differing engineering traditions, economic systems or even units of measurement separating the two cultures. But Centauri Overseers were just as interested as UESF Command in providing a credible defense against alien cultures, especially when the Vulcans were taking an 'actively passive' stance on the matter. A destroyer design with Earth-provided warp drive was created in a joint program between 2136 and 2139, and fielded in large enough numbers to provide defense for both human and Centauran home systems and their respective primary colonies.

The basic hull shape of the *Djartanna* destroyers was in theory a lifting body. Yet when attached to the two rather gargantuan S40 nacelles with integrated ramscoops, the *Djartanna* was largely consigned to vacuum, and to relatively pedestrian maneuverability and impulse performace as well. The main hull thus was to enter atmospheres in emergencies only, after a separation maneuver. As

completed for the *Djartanna* (DD-88 in Starfleet registry, although such pennant paint was only applied after fifteen years of operations, when the Concordium rejoined fates with the rest of humanity), the forward hull was jam-packed with combat systems, most of Earth origin. Atop was the bridge, topped by a sensor dome. Beneath the bow lay the main plasma cannon, in a turret mount that provided about half the firepower of the older, larger *Emmette* destroyers that had been able to bring two such cannon to bear on any enemy. Secondary 1 GW cannon were carried on both dorsal and ventral surfaces, and hull polarizer rotors mounted in between. There was a secondary impulse engine in the hull as well, with two tiny fusion reactors, each with twin nozzles of which the outboard one was fully vectoring – a layout to be repeated in the *Enterprise* class cruisers a few decades later. Between the external shrouds of the engines was an aft-facing docking bay for a fuel lighter, with a small airlock to the starboard side.

A T-shaped support pylon connected the primary hull to the warp engines, so that a diminutive powerplant block was left in between the S40 nacelles. These open-frame units could drive the vessel close to warp two for short jumps. Primary sublight propulsion came from a single-nozzle impulse engine at the stern of the power block, feeding directly from primary loop plasma. In the final models of the destroyer, a single plasma recharger was added under the power block for increased warp and impulse performance.

The RCS packages and gyroscopes were all packed in the power block as well, there being no more room in the main pressure section. From *Vigilance* subclass onwards, two further RCS units were added at the stems of the horizontal pylons supporting the warp engines, and several collision avoidance radars installed around the hull. Another late addition was a series of glass bead dispensers for fooling enemy lasers and for quickly mining regions of space with shrapnel dangerous to small vessels. These replaced the ventral berth for a Rutan 'Firefly' spatial pod, forcing the *Djartannas* so equipped to rely on external means of crew transfer. While the arcane defense system did not do much good against large spaceships, it was still very effective against light and unshielded Romulan fightercraft. The polarizable hull surface armor of the destroyers in turn was immune to such threats, and allowed UESF to ditch several outdated concepts on space combat maneuvering dating back from the previous century and a half.



A pitched battle between a Romulan fighter squadron and three Djartanna *destroyers of* Ledenna *subclass gives a good all-aspect view to the destroyer design. Lacking hangar facilities, the destroyers could not carry a fighter cover of their own. Their shields could not withstand prolonged pounding even by fighter lasers, nor were the destroyer sublight engines powerful enough to give them acceleration advantage over Romulan fighters. Thus, the two options left for the* Djartannas *if faced with a fighter attack were to engage warp, or to open up with plasma cannon. The triangle formation seen here was adopted to minimize the risk of blue-on-blue hits and still retain the freedom of maneuvering.*

As many as 316 of the small ships were built in all, in sixteen batches on five orbital dockyards in the α Centauri A and Sol systems. Each batch featured incremental structural improvements on the basic design, but the main reason for continued production was the ever-growing need for local defenses. Some fifty units deployed permanently at each major human system at roughly 50% availability was barely enough for credible deterrence against space piracy. Numbers compensated for lack of performance: the masses of destroyers were frequently paraded in front of visiting alien dignitaries for psychological effect, yet much less often deployed for actual defensive duties. True power projection was handled by the few available high warp cruisers. As those units were almost constantly on faraway assignments, the face of the Starfleet usually presented to the public was that of the idled rows of destroyers. The communications media were eager to report the *Mendor* as the first 'alien'-built ship to be officially incorporated into the UESF, even though off-Earth commercial designs had been in more or less regular use for half a century already.

Most of the destroyers operated nominally under shared command but in practice within either UESF or Centauri Guardian Forces. Optimized for local action and not for the long interstellar deployment runs necessary for war in the main fronts of the Romulan War, the destroyers held a defensive posture throughout that conflict. In 2158, when Romulan forces were feared to reach Earth, frantic measures were taken to step up local defenses, and numerous outdated *Djartannas* were summoned to act as shields for the Homeworld. They had served in this role with notorious indistinction during the Klingon and Xindi incursions, being far too slow to react or actually intercept anybody, and were eager to redeem their reputation now, patching up defensive holes through sheer numbers (and, for some vessels, with the help of a major upgunning). Several engagements with Romulan advance forces ended in Romulan retreat, but Starfleet now had to assume the enemy had accurate knowledge of the inner worlds and their defenses.

The initial successor to the *Djartanna* design was the upscaled *Cavalry* destroyer, with just a single warp engine but otherwise a similar layout. Yet both these light destroyer types were gradually replaced with far larger, somewhat more efficient designs that were better suited to the fast-moving offensives of the final war years. In 2162, the last *Djartannas* were idled as grossly outdated, and *Marshall* heavy destroyers were assigned to take their place in humble defense duties – a good indicator of the rapid pace of weapons development during the conflict. No *Djartannas* ever entered UFP Starfleet service, but several dozen continued in UESF arsenal until the late 2180s.

Few other warships of a single type have been built for Earth or the Federation in such large numbers. The current Federation industrial infrastructure would be quite capable of fielding hundreds of ships a year in the modern destroyer size range (or dozens of ships per year *and per star system* in the *Djartanna* size range!) yet the military dogma do not include such massed use of manned spacecraft, nor the maintaining of large reserves of military vessels. Whereas the technology of the Romulan War era dictated that ships be available in quantity in every starbase, outpost and strategic target, current warp technology allows for the warships to be normally deployed on exploration missions far away from the potential war theaters. It remains to be seen if this arrangement survives the continuing expansion of Starfleet-patrolled space and the increasing of distances. It is possible that Starfleet in the future will be forced to adopt the garrison strategy favored by most of the ancient empires, despite its obvious drawbacks.

Kumari

Battle cruiser
2142-2182

Completed: 58

Length:	360.2 m
Beam:	102.0 m
Height:	33.0 m
Mass:	215,200 tons
Officers:	16
Crew:	120 (standard) 70 (high endurance operations)
Troops:	200 (maximum, low endurance operations)
Cruise speed:	w 3
Max. speed:	w 7.4
Endurance:	2 years (standard) 4 years (reduced-crew operations)
Weapons:	1 phased particle beam emitter (400 GJ/12 GW) on bow 2 phased particle beam emitters (400 GJ/68 GW) in wingtip mounts 1 phased particle beam emitter (400 GJ/12 GW) on dorsal midhull 1 phased particle beam emitter (400 GJ/12 GW) on ventral midhull
Shields:	3-layer graviton/subspace globular forcefield Navigational deflectors on warp nacelle fwd ends Auxiliary navigational deflectors on dorsal and ventral bow
Transporters:	2 GP (7-pad), 2 cargo
Auxiliaries:	4 heavy and 2 light shuttles, 16 assault pods, 8 work pods

Ships of historical interest:

USS Atlirith (AGC-7-45), *USS Docana* (AGC-7-19), *USS Kumari* (AGC-7-1), *USS Thelasa-vei* (AGC-7-48), *USS Vol'Rala* (AGC-7-10), *USS Vinakhten* (AGC-7-22)

SOURCES: D ENT
(N Bennett "Uncertain logic")
(H Bennett "Uncertain logic", The Official Starships Collection magazine)

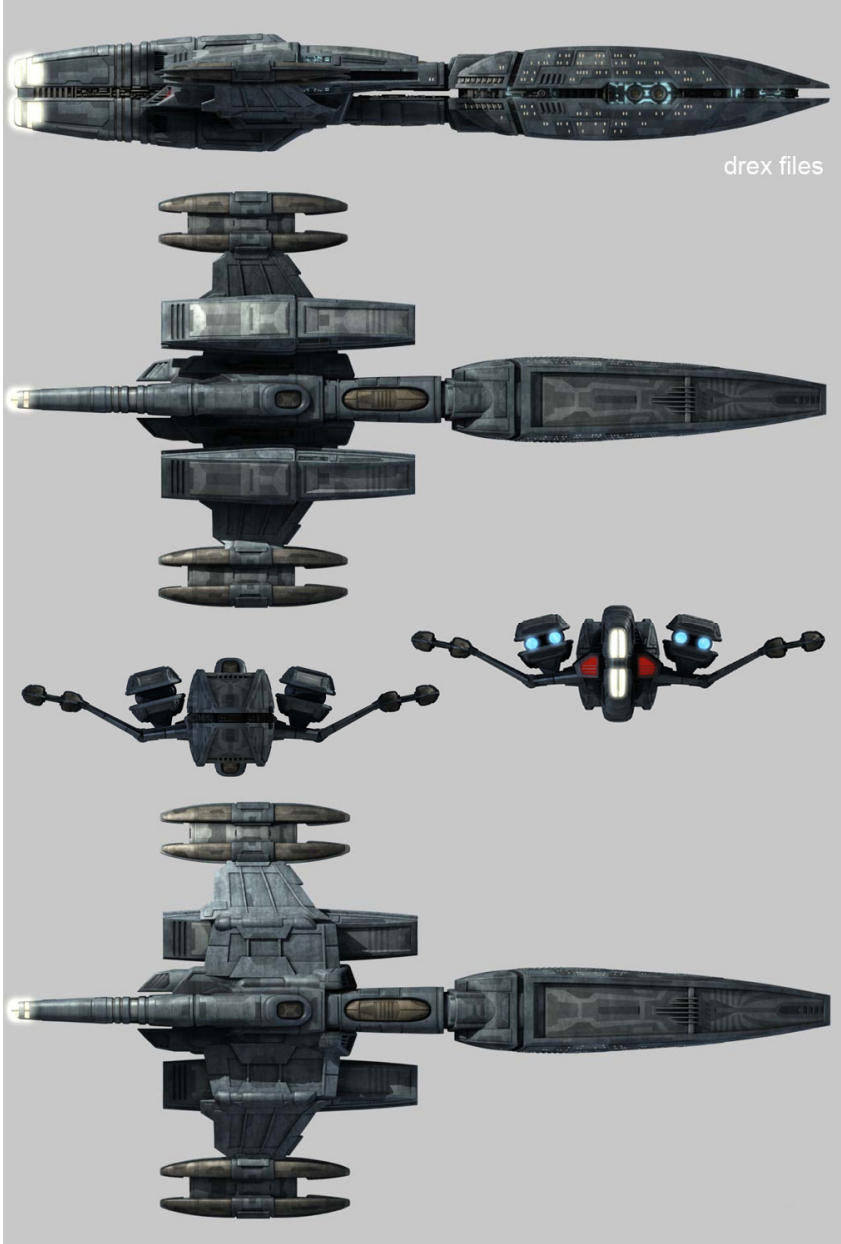
The propulsive revolution that swept through the ASDF in the 2140s was worrisome to all the neighbors of Andoria. While Vulcans would view replacement schedules and observed performance figures for each ship type with equal concern, there was one cause for disquiet over others for any less analytical culture. Heretofore constrained in their conquest ambitions by the short range of their vessels, Andorians were now making bold moves in deep space with a singularly impressive piece of technology – the *Kumari* class battle cruiser.

About half as large again as her predecessor, the *Zheusal* battle cruiser, the *Kumari* was an intimidating sight indeed, and heavily armed with multiple phase guns estimated by the Vulcans to be in the fifty-gigawatt range. Far more significantly, from her first appearance in 2142 on, she demonstrated true deep space operations capacity with multiple solo sorties to worlds well within the Vulcan sphere of influence. The most unnerving of all was the appearance of eight sister ships within the first five years of operations, bringing Andoria on par with Vulcania in terms of production capacity, if not yet parity in numbers.

There were observed weaknesses to the forcefield shielding of the new type, leading Vulcan analysts to settle on a designation later translated into 'battle cruiser' for the benefit of their human allies. What went unobserved was the equipping of the vessel with transporter technology in the late 2140s – and not just any primitive variant thereof, but the specific Vulcan model that V'Shar was

using for operative insertion and extraction tasks. Supposedly the best kept of the many secrets of the Vulcan intelligence organization, the technology had been let loose by the human allies who had inadvertently unlocked the bio-safe modes through their reckless experimentation with the device. It still remains unclear whether Andor came to possession of human transporters through espionage, privateering or clandestine bilateral agreement. Crucially, the battle cruisers attached to the Imperial Guard were among the possessors, and made good use of their seven-pad units in many an intelligence coup against V'Shar during the late 2140s.

By the 2150s, ASDF was operating at least fifty of the vessels and severely upsetting the local balance of power. The Guard sent its top-of-the-line ships to audacious mission after audacious mission, striking directly at Vulcan targets that supposedly were under the protection of Vulcan High Command warships but in practice were only covered by the deterrence effect of the severely overstretched fleet. Had circumstances allowed for the game of brinkmanship to go on, an interstellar war would have been inevitable within the decade. Yet the humans tripping first on the Xindi and then on the Romulans altered the circumstances, making Andor enter an unexpected and uneasy alliance with Vulcan and turning the potent yet still in many ways crude and primitive *Kumaris* into an asset complementing the human and Vulcan top-line vessels in joint action.



The *Kumari* is a cluster of Andorian idiosyncracies, from the layout of the habitat hull for the needs of a claustrophobic and territorial species to the overt caution of a newcomer to the art of building true deep space vessels. The overwing pods, standing in readiness to deploy Legions to planetary assault, would also see use as *Taholsin* destroyer primary hulls. In most deep space sorties undertaken with a reduced crew of just 86, the pods would remain empty, yet producing auxiliary power with their fusion reactors.

Most of the engineering solutions on the ships were traditional and telling: the stacked warp nacelles at centerline stern, the angular crew section conservatively separated from the drive section by cargo holds and other buffer spaces, and the well-distanced wingtip mounts for the powerful yet tricky heavy phase guns. Two large pods were docked on the dorsal surfaces of the wings, detaching to deliver troops and vehicles to planetary surfaces in the projected but never practiced assault mission. They were in many ways subscale repeats of the primary habitat hull.

The center deck of the nine-deck primary hull featured a trench for sensors and medium phase guns, with main bridge at the very heart of the deck. A further trench set apart the aft segment of the crew

hull, with a series of lifepods on Decks 4 and 6, and massive impulse engines for emergency hull separation maneuvers. While the flanks of the hull featured many portholes for the psychological needs of the crew, the top and bottom surfaces were armored with a moderate layer of duranium, with openings only for dorsal and ventral defensive cannon, tractor beams and auxiliary deflectors.

Main deflectors were at the bow ends of the warp nacelles. Forcefield technology in antimatter stream focusing allowed the engines to produce twenty-cochrane fields for a top speed of warp 7.4. Yet there were major risks associated with this technology, leading to at least one documented total loss (*IGS Yasakai* in November 12th, 2144) and possibly accounting for the disappearances of several units on deep space missions. Other reasons for loss may be found, though, as the vessels operated unescorted in hostile space. The *Thofsin* cruisers soon built to accompany the *Kumaris* incorporated many lessons learned, including a less high-strung version of the compression nozzle technology, some gravitic hull armor, and missile launch racks. They ended up taking the lead when Andoria rejoined the Romulan War for the final offensive stage, and most *Kumaris* were left behind to keep company to the preceding *Zheusal* battle cruisers in defensive tasks in case the human offensive backfired.

That the Andorian quest for parity with Vulcan did not lead to mutual annihilation but instead the bolstering of a joint fleet at a crucial hour was but half the story of the *Kumaris*. Their more significant contribution came in the 2160s, when the Guard battle cruisers, cruisers and frigates became the de facto striking force of the UFP Starfleet. Vulcan never rebuilt its power projection fleet, and Earth was heavily engaged in the intelligence gathering and covert influencing effort commonly known as exploration, tailoring its shipbuilding programs to match until the block obsolescence of the 2170s. Beyond this point, Terran engineering solutions dominated over Andorian ones in UFP warship construction. Yet the heritage of the *Kumari* and the 2140s revolution in Andorian warp design lived on in dedicated ASDF types such as the *Andor*, *Thufir* and *Lenthal*, all with closely spaced nacelle pairs and an inimitably Andorian doctrine of head-on attack.

Pioneer

Fast transport
2143-2166

Completed:	14
Length:	135.3 m (TC-D) 136.0 m (GFDM-04) 137.1 m (GFDM-06)
Beam:	82.0 m (TC-D) 84.6 m (GFDM-04) 85.6 m (GFDM-06)
Height:	32.9 m (TC-D) 34.2 m (GFDM-04) 35.4 m (GFDM-06)
Mass:	31,500 tons (TC-D) 33,000 tons (GFDM-04) 36,200 tons (GFDM-06)
Officers:	6
Crew:	32 (transport) 22 (warp testbed)
Cargo:	11,000 tons
Troops:	100 (optional)

Cruise speed: w 2 (TC-D)
w 3 (GFDM-04/06)

Max. speed: w 3.0 (TC-D)
w 4.2 (GFDM-04)
w 6.3 (GFDM-06, projected)

Endurance: 1 year

Weapons: Original:
2 plasma cannon (1.0 GW) on port/stbd dorsal hull
2 plasma cannon (1.0 GW) on port/stbd ventral hull
Romulan War refit:
2 Type C phased particle cannon (80 GJ / 100 GW) on port/stbd dorsal hull
2 Type C phased particle cannon (80 GJ / 100 GW) on port/stbd ventral hull
2 fwd missile tubes w/ 50 fusion missiles on ventral bow
Franklin refit:
2 Type B phased particle cannon (125 GJ / 200 GW) on port/stbd dorsal hull
2 Type B phased particle cannon (125 GJ / 200 GW) on port/stbd ventral hull
2 fwd missile tubes w/ 35 fusion missiles on ventral bow

Shields: Polarizable armor on hull

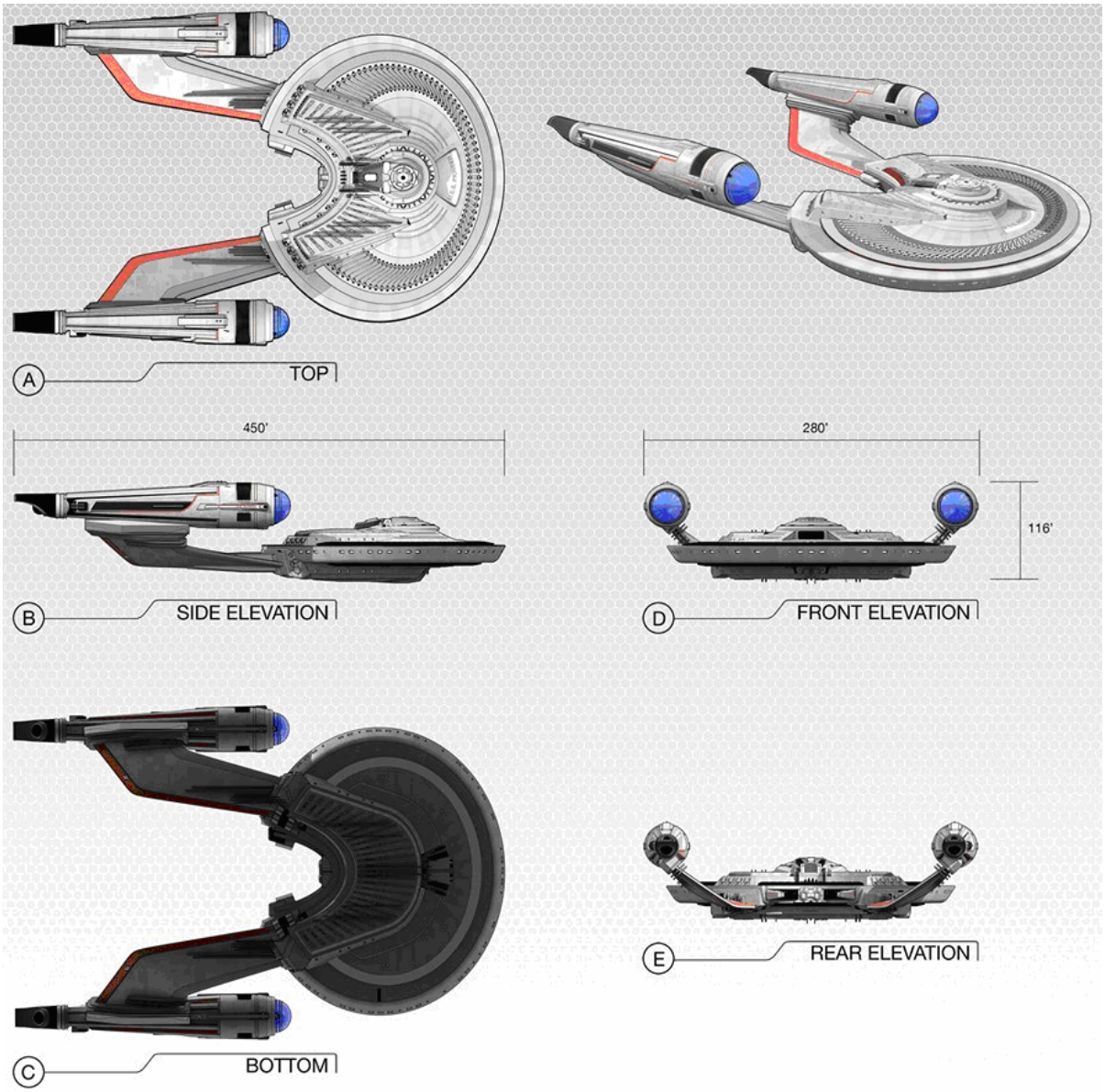
Transporters: 1 cargo; Mk I (cleared for GP in 2151)

Auxiliaries: 1-2 shuttlepods (optional)

Ships of historical interest:

USS Franklin (FT-47/NX-326)

SOURCES: D ST:B/Sean Hargreaves
(N Sean Hargreaves)
H ST:B



The fledging UESF Logistics Command had in the 2130s aquired a small fleet of advanced *Athens* couriers for priority shipments and high endurance *Durance* transports for long distance cargo hauling. Having to share the former assets with Defense Command for theater command tasks and the latter with assorted civilian enterprises, Logistics saw a very definite need for a no-frills type capable of basic cargo hauling off and onto planetary surfaces. The greatest need was for swift operations across the Sol system, calling for warp two performance or better combined with robust lift engines and reasonable atmospheric stability. Logistics Command did a poor job at hiding its ambitions on interstellar delivery of priority loads, though, asking for twelve-month independent endurance to be included in the design specifications. Military Command chimed in, requesting life support capacity for up to 100 troops as an alternative to cargo. Even UESPA expressed interest, suggesting sensor packages to be utilized in interstellar transit.

Astoundingly, all suggestions were met with full approval. The technology for combining appreciable top speed with sustained interstellar operations was finally there, thanks to work done

so far by Henry Archer's engine development team. As this technology dictated the use of standoff nacelles, there were issues of balance to be considered. Where to place the coil mass in relation to the cargo hold volume or the lift engines? How big a percentage of total volume to dedicate to power systems and fuel? Even crew size had to be carefully balanced against the conflicting requirements of the complex hypermodern drive system and the strain on the life support system from two very different concepts for mission length. Early on, the designers gave up on the limiting shape of the lifting hull, and proceeded with a simple and easily scalable saucer hull coupled to the warp nacelles with pylons of required size and shape.

The end result was revealed in November 2143 to very much resemble a modern combat or exploration starship. The saucer had ended up being 80 m on the long (transverse) and 70 m on the short (longitudal) axis, with a parabolic cut astern for cargo transfer. Twin auxiliary fusion reactors flanked the cut, directly feeding two separate impulse engines with vectoring nozzles. The powerplant spaces protruded above and below the surfaces of the saucer in horseshoe superstructures that joined in the middle to meet the main reactor. The warp pylons stems were mounted at the aft ends of the structures below the saucer centerplane, extending considerably aft before angling up to support the warp nacelles. The conically tapering TC-D2 was quite remniscent of the TC-A used in the *Durances*, just longer and slightly slimmer and loaded with promise that Starfleet could only satisfactorily test after installation.

The saucer was functionally divided into the cargo hold rim and the engineering core, with the bridge slightly ahead of the center axis and a large cargo transporter aft of it, and with engineering facilities beneath the former while the main reactor sat below the latter. The compact cabins for the 32 crew were at the very outer rim of the saucer, on the upper deck; each cabin was provided with portholes. Officers were accommodated atop the twin superstructures leading to the impulse engines. There were two upward-firing escape pods next to the bridge for officers, and four ventrally deployed ones for crew. In addition, two shuttlepods could be externally stowed docked next to the cargo doors. No cargo hauling auxiliaries were included in the complement – the space was put to better use by outsourcing that part of the logistics to spaceport assets.

Trial runs initially concentrated on verifying planetary landing and takeoff capabilities on airless bodies, testing the eight lift engines on the ventral hull and the two per nacelle. The two vessels completed, *Pioneer* and *Provider*, were soon cleared for atmospheric operations, but then moved on to warp tests, clocking warp 2 cruise and warp 3.0 top speed and warshiplike acceleration figures. Construction now proceeded on twelve further units, while the pathfinders were being fitted with a defensive armament of four plasma cannon.

By 2148, each vessel was a veteran of dozens of interstellar deployments but remarkably few transatmospheric sorties. The transporter platform was demonstrating great reliability in cargo operations, and there were even rumors of the crews abusing the system for giving themselves quicker access to and from planetary surfaces. Many of the *Pioneers* were already showing their age, though, and Logistics Command considered selling them forward to secondary, insystem users such as Military Command. Time was ripe for Archer's team to take charge of four ships for use as testbeds for the newest in warp technology.

The 2148 conversion of the *Franklin* saw the installation of cylindrar GFDM-04 engines for warp three cruising and a fantastic top speed of warp 4.2, a human record for the day. A year later, the *Bougainville* received the GFDM-05, gunning for warp five. Such was the confidence of the design team that on the crucial test flight, an insufficient number of chase ships and probes was provided,

and key stretches of the supposed warp 4.5 run went unobserved. On one of those, apparently somewhere past warp 4.3, the *Bougainville* disappeared, possibly disintegrating in a dimension inaccessible to the forensic examination that followed.

The remaining testbeds were put in mothballs as the engine project moved on to larger pieces of machinery. Retired, too, were most of the regular *Pioneers*. Yet the outbreak of unrest in deep space called for hasty reactivation and rearming of this sizeable segment of Starfleet's at least theoretically interstellar-capable force. It was somewhat more laborious to pull out the integrated plasma guns of the transports than it had been to perform the same operation to more modular destroyer guns, but nothing compared to the installation of Type C phase guns in the resulting cavities. Six of the ships took advantage of the downtime and a chance availability of additional resources by having paired missile launchers fitted in the lower bow, displacing some cargo spaces. Their ammunition magazines took up more space, still leaving some for the hauling of troops – a major projected role for the still at least theoretically landing-capable design.

Few conversions were completed by the time of the first Earth counteroffensives, but several *Pioneers* took part in later maneuvers. The warp engine testbeds did not. This was to their advantage, as by 2158, every single fighting *Pioneer* had been lost in action or rendered irrepairable. Their contributions to combat successes had been modest, but postwar analysis at least credited them with statistically significant drawing of Romulan fire away from more valuable assets in the high-warp task forces.

In the course of the fighting, all the fallen *Pioneers* had donated their names forward to ships of newer types. At the conclusion of the conflict, the reverse happened: when UFP Starfleet in 2161 decided to recommission the surviving warp testbeds for continuing their valuable work, the names *Franklin*, *Shackleton* and *Vancouver* were again free for use. Bearing appropriate new registries Iin the NX-325-327 range, the ships received their third set of warp engines. The *Franklin* and the *Shackleton* got the GFDM-06 'Garuda', combining a pair of again conically tapering nacelles with a 1:1 antimatter powerplant; the *Vancouver* was slated to receive the eventual GFDM-07. The ships were also provided with a modern missile launcher and pulsed-fire Type B phase guns, mainly because the weapons were in ample surplus supply. Remaining cargo spaces were released for habitation, with e.g. the upper half of the bow primary hold above the missile magazines becoming a spacious crew mess.

As was so often the case with the early pioneers of warp flight, the *Franklin*, too, was lost without a trace, while undergoing tests on the sustainability of warp six. Conspiracy theories immediately sprung up about the Romulans laying their dirty hands on the superengines, but to date no evidence has surfaced in support of this or any other theory over another. The Garuda saw no applications, although theoretical calculations support those who wish to believe that the ship that first exceeded warp four for mankind would soon also have been the first to surpass warp seven.

Prominent orange markings improve situational awareness as a fuel lighter approaches the stern loading hatches of the Shackleton*. The testbed ship had discontinued all cargo operations at conversion, there being no customer willing to put faith on the assorted Archer superengines not exploding. Much of the hold volume had been taken up by the new central powerplant and its antimatter storage bunkers in any case.*

Vanguard

Fast transport
2144-2180

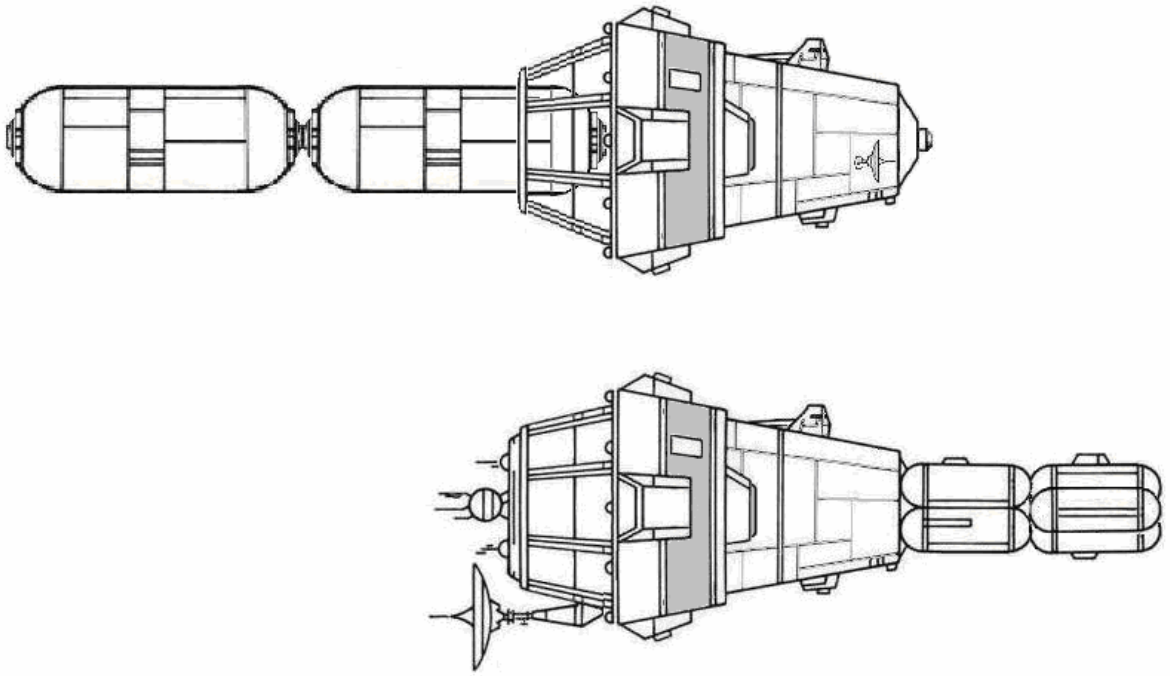
Completed:	32
Length:	141.1 m 260.0 m (w/ 1 Type IV container and bow fuel tanks) 320.0 m (w/ 2 Type IV containers)
Beam:	98.7 m
Height:	98.7 m
Mass:	50,000 tons
Officers:	6 (standard) None (drone conversion)
Crew:	88 (standard) None (drone conversion)
Cargo:	50,000 tons (fwd holds) 120,000 tons (two Type IV containers)
Passengers:	1,000 (optional)
Cruise speed:	w 2
Max. speed:	w 2.75 (unloaded) w 2.0 (loaded)
Endurance:	2 years
Weapons:	4 plasma cannon (2.0 GW) in 2 twin banks on dorsal and ventral impulse engine mounts
Shields:	Electromagnetic shield (21 T) Reflective armor over parts of forward hull Polarizable armor over command sail and midhull (refitted to select ships after 2153) Navigational deflectors to port and stbd inside warp ring

Auxiliaries: 2 spatial shuttlepods

Ships of historical interest:

USS Atlas (FV-304)

SOURCES: (D SFC)
(N SFC)
(H SFC)



To meet the heavy transportation needs created by the rampant expansion of Earth's sphere of influence, UESF needed something more substantive than the modular freighters so far built. In May 2142, the recently instated Fleet Logistics Division launched the acquisition of a large warp transport capable of warp three when empty and warp two when the specified 300,000 cubic meter cargo volume was loaded to capacity. To provide this cargo volume, the ship was to accommodate multiple containers of a new military standard, comprising a 65 m x 40 m cylinder midsection and hemispherical endcaps and featuring e.g. unpressurized, pressurized, fluid and general goods configurations.

Several terrestrial shipbuilders offered growth models of their cargo tugs. Grapples for the new type of container could easily be introduced, and the tonnage requirements could be met or exceeded as well. The desired warp performance remained elusive, though. To keep the load moving at such speeds, the tug would basically have to be all engine, rivaling in size and mass her fully laden cargo container burden. Highly tuned propulsion systems were proposed by CWD, Westinghouse and SEMP, but none could be guaranteed to withstand the rigors of a multi-month cruise to the frontier at the speeds involved. Finally, Starfleet turned to the Vulcans for obtaining the rights to a ring-element warp engine in the desired size and performance range.

The tug put together by Dalian GIS was not quite as elegant as a Vulcan engineer might have sculpted her, but got the job done. A conical midbody housed the mammoth reactor for generating power to the 25,000 ton warp ring, which in turn supported a quartet of impulse assemblies on its outer surface. The cargo containers were to be rigged immediately astern, the first held in a circular grappling ring mounted on an open trusswork. Instead of being provided with a grapple of its own,

the optional second container could be docked directly onto the aft end of the first, thanks to the exceptionally sturdy construction of the vessels and their docking adapters. Internal stowage was also available, though, in the form of plate-covered if unpressurized hold space in the forward part of the main hull. This volume could be flexibly configured for various cargo types, or provided with pressurized compartments for the carrying of passengers (or, in practice, troops; up to a thousand could also be towed in specialized containers in wartime discomfort). Finally, fuel tanks similar to those of a Y class rig could be clustered in the bow, eight being a possible load but just three to four being more usual. With a full fuel load, the tug had an admirable operational range of 100 ly.

The ring drive technology combined reliability with high energy throughput, and allowed for operations under heavy load. The main drawback was lack of maneuverability, with asymmetric loads posing a secondary cause for concern for the fine-tuned, highly axis-symmetric warp field. The new military container was the perfect mate for the design, as the cargo train concept imposed matching maneuverability limitations while ensuring symmetric loading. The sort of careful, inflexible scheduling that was required for successful shipping with these unprecedentedly large cylinder vessels was not the commercial sector's cup of tea, though, and the ECS placed no orders for tugs of this type. Thus, UESF Logistics Division could fine-tune its properties to exactly meet its frontier needs, and placed a series of orders for an eventual 32 deep space tugs of *Vanguard* class.

For the first decade of *Vanguard* operations, Earth's ambitions did not extend beyond 20 ly from the home system, and UESF ran very few operations on the outer rim. In the Romulan War, the ships in turn often traveled lightly loaded in order to maintain maximum warp. Quick hops from outpost to outpost were at times performed with internal cargo only, or with light cargo rigged onto the bow grapples next to fuel tanks. Traveling from Earth to war zone starbases at full load would still have taken several months or years. Yet trips like this were rare, as the cargo traffic between the battlefront and the large Earth colonies or Vulcan or Andorian holdings near it was strategically the most important task for the class.

The rather large military crew of 94 could thus ride in relative comfort despite the limited accommodation volume. Main berthing was beneath the command sail that jutted out of the side of the cone hull. Various other pressurized compartments and corridors snaked through the spaceframe, providing access to engineering and cargo handling functions, bow and stern docking tubes and auxiliary craft berths. The propulsion ring also held two defensive plasma cannon stations, one on the top impulse assembly, another on the bottom one. An often carried additional feature was a large subspace communications dish, often bolstered by a variety of realspace EM antennas, depending on the theater of operations and the role of the transports there. Extensive UESPA survey packages were also frequently carried, and a number of specialists dedicated to their operation. At times, the vessels were summoned to act as command posts in addition to their usual role as convoy flagships and tenders; a special module for this purpose, containing an antenna farm and a spherical pressurized command center, could be accommodated in the aft container grapple.

The freighter being loaded here, USS Titan *(FV-309), displays a typical paint scheme of the war years. Flat gray on the warp ring replaces the earlier light gray/blue patterns on titanium brown, and even the three fuel tanks held in the bow truss are in war paint. The only patches of color are provided by the red-glowing impulse engines, running hot as the ship remains on alert during loading. The shade of gray was a carefully weighed compromise between low albedo and low absorptivity, in an era when optical lasers and visual sighting systems still were important elements in space warfare. Tradition dictated that color for later Starfleet thermocoat paints as well, even when the tactical rationale was gone.*

Soon after the commissioning of the first *Vanguards*, the class also suffered its first losses, as *USS Atlas* (FV-304) fell prey to a covert Romulan attack, a possible test run of the remote capture techniques the enemy would later practice. Convoying the ships and adding cruiser protection allowed the continuation of operations beyond the outset of open war, but tied down interstellar-capable warships to escort duty. Still, the *Vanguards* were essential in providing supplies to the UESF elements operating a hundred lightyears away from home.

* * *

The class was withdrawn from duty two decades after the war, never receiving NCC registries, and several classes unrelated to the design were introduced to fulfill Starfleet heavy transportation requirements. The old tugs still had plenty of potential as cargo drones, however, thanks to their very stable and reliable engines and simple flight controls that could easily be slaved to onboard computers and external commands. Technologies and operating practices from the recently introduced dedicated *Boyden* drones were smoothly translated to the project, guaranteeing operational success and considerable service longevity. The drone conversions were considered a class of their own, were given Q series registries (later listed as G series), and generally referred to by the name of the first tug converted, *USS Ganymede* (formerly FV-310).

The *Vanguard* design lineage was continued in the civilian sector for a while, until the introduction of affordable medium load, high warp transports. These advances led to the transformation of transports in the *Vanguard* size range: the tug and container rig concept was abandoned for the time being, and heavy tugs changed from from primary cargo vessels to specialized long range carriers of oversize loads. There was no market for the obsolete *Vanguard* derivates, and all vessels of this type were scrapped before the 2280s. Structurally similar Vulcan types remain commercial successes throughout the quadrant, however.

Daedalus

Survey cruiser / corvette
2145-2196

Completed:	273 total: 1 *Daedalus* CID testbed 267 *Horizon* (later *Daedalus*) corvettes 5 *Daedalus* survey cruisers
Length:	103.0 m
Beam:	45.1 m
Height:	34.0 m
Mass:	47,300 tons (CID testbed) 48,800 tons (original survey configuration) 49,900 tons (Romulan War corvette configuration) 54,500 tons (final survey configuration)

Officers:	12
Crew:	62 + up to 25 research staff
Cruise speed:	w 3
Max. speed:	w 5 (CID testbed) w 3.25 (wartime standard) w 4 (final survey standard)
Endurance:	4 years
Weapons:	<u>CID testbed:</u> None <u>Original survey and support configuration:</u> 4 berths for laser emitters (250 nm / 300 MW) or plasma cannon (2.0 GW) on primary hull <u>Romulan War corvette configuration, in addition to above:</u> 4 laser emitters (250 nm / 300 MW) on primary hull 1 to 3 Type C phased particle cannon (80 GJ / 100 GW) on fwd secondary hull 1 to 3 Type C phased particle cannon (80 GJ / 100 GW) on aft secondary hull 1 fwd missile tube w/ 50-200 fusion or penetration missiles or mines 1 aft missile tube w/ 50-200 fusion or penetration missiles or mines <u>Final survey configuration:</u> 1 or 2 Type C phased particle cannon (80 GJ / 100 GW) on fwd secondary hull 2 laser emitters (250 nm / 400 MW) on primary hull
Shields:	Electromagnetic shield (29 T) 4-layer graviton/subspace globular shield later upgraded to all vessels Polarizable armor over primary and secondary hull, later removed Navigational deflector on secondary hull bow
Laboratories:	2 GP, 1 planetary sciences, 1 life sciences/chemistry
Transporters:	1 GP (1-pad); Mk I (final survey configuration)
Auxiliaries:	2 atmospheric shuttlepods

Ships of historical interest:

USS Archon (NCC-71/NCC-189), *USS Essex* (NCC-73/NCC-173), *USS Horizon* (NCC-70/NCC-176), *USS Lovell* (NCC-189/NCC-470), *USS Yeager* (NCC-76)

SOURCES: D DS9, (Omnipedia, Legacy computer game, SFC/FASA *Horizon* specs)
N TNG, (Omnipedia, SFC/FASA *Horizon*, Dave Stern 'Daedalus')
H TNG, (Dave Stern 'Daedalus', A Mangels and M Martin 'Last Full Measure' et al., D Ward and K Dilmore 'Foundations', SFC/FASA *Horizon*, MJ Friedman 'Starfleet: Year One', own)

By the beginning of the 22nd century, it had become painfully clear that there never could be a Dominion of Earth in the immediate vicinity of Sol. The seeming power vacuum in the region was but an illusion, as long as the powerful Vulcans refused to let anybody fill it. Yet humans had ventured to the stars when the fierce interstellar competition of Vulcans and Andorians was reaching its peak. Moreover, the Klingons were recovering from their bitter defeats, and once again heading for conquest, this time driven by a new, dangerously fanatic warrior mythos.

This was not just a threat but an opportunity for Earth. In place of old nationalism, humanity now experienced its first bout of specieism, as it strove to explore and exploit space as independently as humanly possible. To increase the reach of human survey ships beyond the space already explored by Vulcans, the team led by the venerable Zephram Cochrane initiated in 2115 the development of a new series of warp engines. These would be necessary for warp four or five cruising, a feat far beyond the capabilities of clumsy Earth spacecraft so far. Even though this speed range was already available to the more refined Vulcan ships, the Vulcan spacecraft of which Earth designers had data available met none of the basic requirements of UESF – foremost of these the requirement of being reproducible using Earth technology.

Basic research on warp dynamics was funded by Earth government, soon to be followed by joint research efforts with leading Vulcan scientists. Slow progress gave ammunition to the specieist factions, however, as it was argued that the Vulcans were not volunteering sufficient data and expertise. Cochrane himself denied the charges, as did most of his closest associates. Yet subdivisions emerged within the project, and by 2136, there were four parallel lines of warp engine development underway. Two of them were to lead to actual spacecraft applications, and have later generally been associated with the names of the resulting classes. Project *Enterprise* was headed by Henry Archer in close cooperation with Vulcans. Project *Daedalus*, under the lead of Victor Brodesser, took a different approach altogether, and shared no data whatsoever with interstellar allies.

Common to both projects was a new warp concept of two-lobed distorted fields, created by rapidly modulating the plasma streams feeding the engine coils. The field would no longer be symmetrical in the plane of the nacelles; the bow and stern portions of the field would be off-centerline by roughly equal amounts. This field configuration did not immediately promise any quantum leaps in speed or endurance, but warp theorists were convinced that the asymmetry would some day be harnessed to produce significantly more effective drives.

Even the marginal advantages gained by the new system were worth exploiting, so when UESF in 2134 decided it was time for a new survey ship type, the surveyor was ordered built with pronounced asymmetry. As could be guessed, UESF had its sights set farther than just survey missions. Propulsive technology downselection quickly ruled out traditional approaches, leaving Archer's antimatter-spiced superengine and Brodesser's cascading ion drive system. Although the former had a greater number of test rig flights under its belt, the latter fit better with the political aims of the project.

Henry Archer and Victor Brodesser standing next to a portrait of Zephram Cochrane. The iconic 'ABC' photograph idealizes Earth's innovative spirit, yet belies the fact that most of the improvements in Cochranean warp technology and theory were the result of dialogue with more experienced cultures.

Operational experience was to be gathered as quickly as possible, so that the technology could be applied on sorely needed modern combat vessels. Thus, the *Daedalus* design was cut down in size thrice within four years, ending up as a modest proof-of-concept demonstrator. Characteristic of the downscaled but updated design was the application of classic Earth hull forms in an innovative configuration. A cylindrar hull outwardly similar to the old Earth designs but arranged into longitudal decks was to be attached to a command sphere by a strong tubular keel. Due to the new

field configuration, the keel was off-center of both the cylinder and the sphere, providing a structural challenge to UESF engineers.

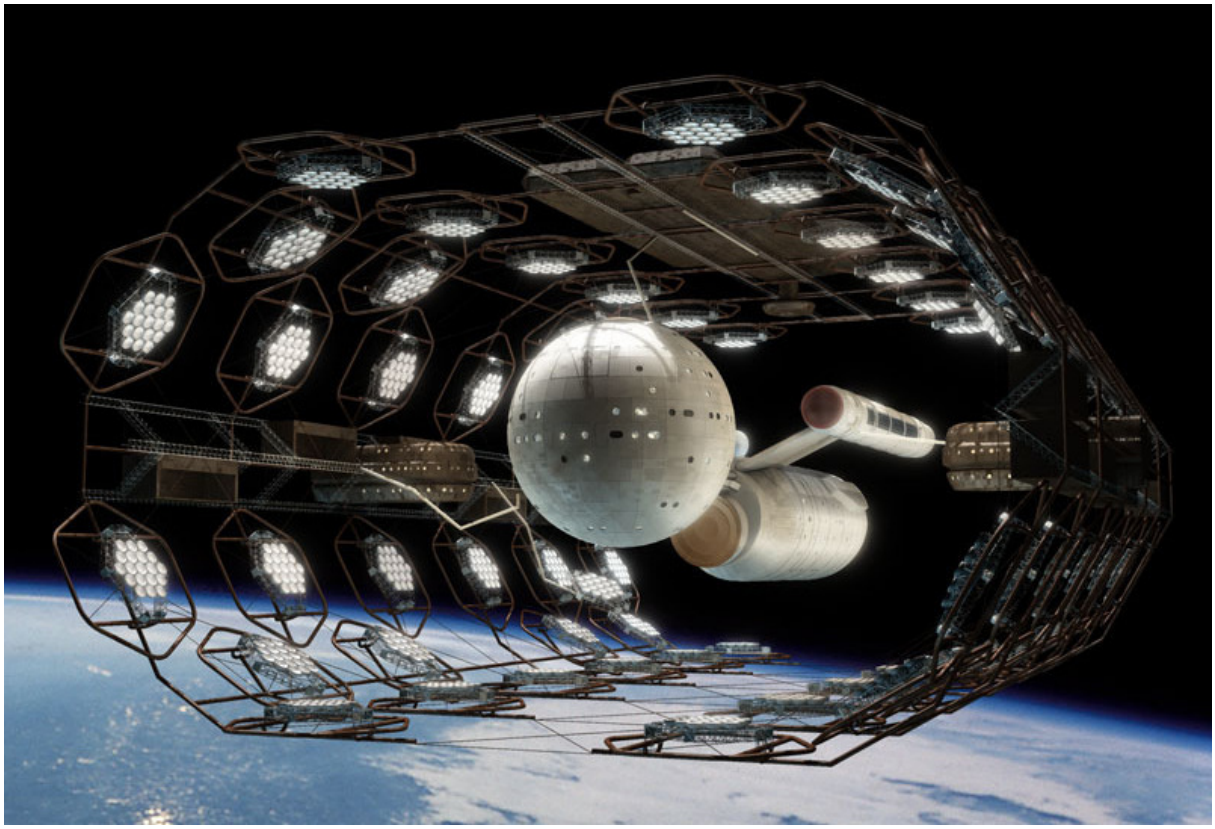
The ultra-compact, 70 m, barely 22,000 ton nacelles were also mounted out of the mass distribution centerplane. The engines, the first of the highly successful series by Cochrane Warp Dynamics to be put to operational use, and designated PB-2 in the new military propulsion block coding scheme, held the promise of providing warp three cruising. With Brodesser's revolutionary CID powerplant, warp five could be reached for a few hours, and the wildest projections suggested a dash speed well beyond warp seven. This first dividend of the warp development project was eagerly awaited both in UESF defense and exploratory arms. The effort would finally be moving beyond test rig stage and into operational testing; production of true cruisers and destroyers would immediately follow, were the *Daedalus* to succeed.

Another test article shouldered on the humble survey ship was a radically compacted and improved reaction drive. Gravitics-augmented reaction engines were installed on the aft ends of the nacelles, taking the form of rings or plates perforated by tiny engine nozzles. Principal sublight engines were housed semi-externally in cowlings flanking the stern of the secondary hull. Accelerations up to 400 gravities were promised; more importantly, fuel consumption in normal operations would be halved from the semi-Newtonian requirements of classic Singh-type rockets.

Despite the downscaling, the secondary hull was to house three major mission elements. The forward compartment consisted of the main ion cascade powerplant, producing energy densities far in excess of fusion designs. Its radiators covered much of the dorsal outer surface of the hull. The second major compartment in the auxiliary hull was the shuttle hangar with stern sliding doors 20 m wide and 3 m high. Inside, pressurized corridors and locks enabled direct boarding of the two shuttlepods with the hangar unpressurized. Above the doors was an approach control room. Below, holds for storage of equipment, consumables and samples, as well as laboratories and workshops, could be directly accessed from the shuttlebay. Together with an array of probe deployment tubes, these facilities provided the actual survey muscle of the vessel, and formed the third major partition of the hull.

In the command sphere lay cramped accommodation for most of the proposed 74 crew, plus command, control and communications equipment. Also to be mounted here were self-defense plasma cannon or lasers as well as advanced sensors capable of scanning ahead 1.5 ly in realtime in ideal conditions – rather respectable combat systems for a ship officially intended for peaceful survey duty. The 300 MW lasers were the preferred fit, as they would at least serve a secondary scientific purpose as precision spectroscopy tools. In an extreme emergency, the sphere could be severed from the rest of the ship, maneuvering to safety with RCS engines and possibly even making planetfall with the help of gigantic parachutes stowed around the bridge at the top level of the sphere. Actual introduction of weaponry or planetfall gear was to wait for the completion of the test program, however.

Neither jettison systems nor defensive weapons could have saved the *Daedalus* from disaster when in October 5th, 2140, the entire drive chain blew up at the warp four threshold. Lost with the vessel were professor Brodesser and chief test pilot Duvall. Lost, too, was UESF confidence in the ion cascade system, and all funding was diverted to the 'Archer drive'.



The CID testbed ship Daedalus *undergoing final preparations above Earth. Unique to the experimental vessel are the large portholes, the slightly curved shapes of the forward engineering hull, the dorsal and lateral radiators and the protruding cowlings of the impulse units.*

The basic design of the surveyors was still quite sound, and a more conventional powerplant choice and a slight revamping of the impulse propulsion system to conform to the new power arrangements allowed continuation of the program. The ambitious little vessel was first fielded operationally in 2145. The first regular unit completed, *USS Horizon*, was equipped with a fairly conventional spiked-fusion powerplant and eighteen impulse engines in a ring surrounding the stern, and entered a long period of trials at α Centauri, away from the prying eyes of the Vulcans, to verify operational safety. In 2146, the PB-2 engines were given an official clearance for warp 3 cruising to afford the *Horizon* and her somewhat prematurely procured sisters *Archon*, *Kon-Tiki*, *Essex* and *Yeager* active status in the UESF. Further production was also allocated for the following decade. Between 2145 and 2155, the five surveyors still comprised some 15% of Earth's high warp fleet, and were frequently called to arms, typically hauling troops to exercises or to limited interstellar military action.

Koziumi's neo-cubistic 'Wings of Infinity', adorning the offices of Advanced Starship Design Bureau. Interestingly enough, the color scheme is completely realistic for the early 2150s, from the golden forward deflector to the blue-gray hull armor and transverse tricolor stripes. Generally thought to have been painted in situ *on high Martian orbit, the work in fact dates to 2159, when Koziumi no longer served aboard the* Horizon.

The outbreak of open war against the Romulans revealed that Earth did not enjoy a qualitative superiority against the new enemy. Heavy starships sent to individually defend UE frontier interests were easily destroyed in detail, throwing the entire UESF defense strategy to chaos and endangering Earth itself. Compensating for the losses quantitatively was a matter of utmost urgency; the *Horizons*, simple to build in terms of size and complexity alike, were placed on top of the procurement list. As reports on the exact nature of the early losses started coming in, it was realized that another facet of simplicity might provide a defensive edge as well: the somewhat primitive computing systems of the *Horizons* would be inherently less vulnerable to Romulan cyberattacks.

The newbuilds were hastily endowed with no less than six Type C phased particle cannon, and a battery of four lasers was added to the artillery. The stern was modified to accommodate a new, more compact and capable impulse propulsion system. A final step in turning the surveyors into combat vessels was the adding of missile magazines and a twin launcher at the bow of the secondary hull, under a navigational deflector dish that also boosted tactical scanning with its subspace fields. Pennants were repainted to match the new combat corvette status, with NCC replacing NSV as the mission class identifier.

The wartime guise. The 2158 action shot of USS Pilgrim *(NCC-82 in the UESF scheme) demonstrates the gunmetal color scheme, the PB-2A4 engines with their quadruple intercoolers, domed plasma diffusers and reinforced pylons, and the new 'combat bow' of the secondary hull. Absent are the original radiators of the ion cascade drive and the impulse engine cowlings; the new impulse drive is wholly contained in the lower part of the cylindrar add-on to the stern.*

The *Yeager* (now NCC-76) was lost at the Deneva ambush, yet production of sister keels was well underway already. Meanwhile, the *Archon* (NCC-71) and *Essex* (NCC-73) served as wargame adversaries, while the *Horizon* (NCC-70) and *Kon-Tiki* (NCC-72) sat idle at Sol, making only short patrol runs 'around the block' as engineers struggled to make the ships behave as planned. The warp engines were finally accepted in their PB-2A4 form, so radically different from the miserable PB-2 that the designation was called 'deliberately and dangerously misleading' by the UE Senate experts who had been fooled to support the funding of the deadline-busting project. In a symbolically opposite move, UESF wholeheartedly endorsed the decision to refer to the vessels as the *Daedalus* class once again.

No fewer than two hundred and sixty-seven *Daedalus* corvettes were eventually completed, thirty-four of them in time for the April 2156 Berengarian counteroffensive that denied Romulans a swift and categorical victory. The stopgap nature of these vessels was painfully evidenced by the fact that seven were lost at Berengaria already, and twenty-six more during the following year of fighting. The vessels were relegated to secondary roles soon thereafter.

* * *

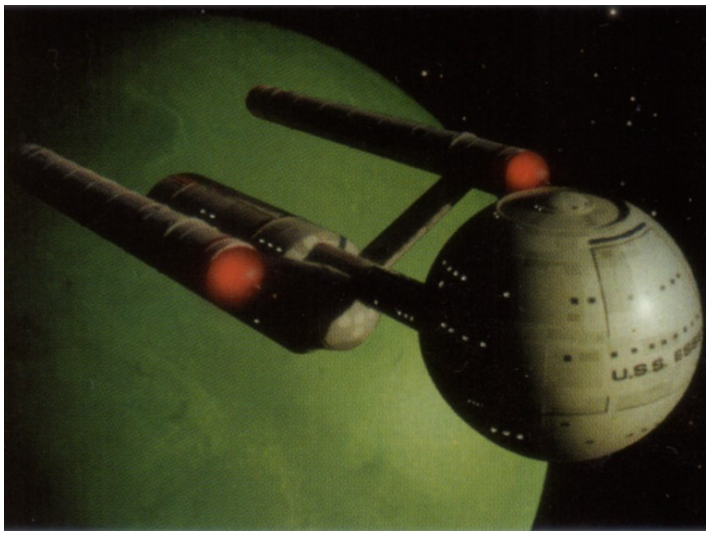
By 2161, the role of desperation in Earth's starflight programs was greatly reduced, and specieism was receding as well. The survey cruiser project was back on full speed, now benefiting from an endless supply of surplus spaceframes, and expert opinions from war veterans and civilian researchers alike were being collected by the newly formed Committee for Starfleet. Several modifications were made to the equipment suite of the *Daedalus* class, such as removal of at least four of the phase cannon as too massive and redundant, further removal of the rather ridiculous twin missile system and the lightspeed defense lasers, and installation of two warp-accelerated laser banks in their stead. Rationalizing of the armament was followed by adoption of modern mission gear, including an improved suite of short range sensors and transporters as well as tractor beams. A new generation of shipboard subspace transmitters was introduced to allow unboosted communication across twenty lightyears (although in practice, the ships often operated beyond this distance from UFP outposts). Also, multilayer subspace shielding was introduced. With this

protective capacity, hull armor was rendered superfluous, and various sensor and weapon ports and even the top of the main bridge were peeled out from beneath the layers of cumbersome plating.

Specieism or not, the postwar recommissioning of the *Daedalus* vessels as deep space surveyors can be seen as the first baby step in Earth's policy of taking a leading role within the UFP. Operationally, survey projects would surely have been better served by adoption of existing Vulcan or Andorian vessels, yet few existed and none were available. Politically, it was important for Earth to show that it could build things besides hard-striking warships and intrusive tramps. The move yielded unexpected political dividends as well. The voyages of the *Daedalus* ships, from the first three-year sortie by the *Horizon* (now NCC-176) on, first truly revealed the extent of humanlike cultures in the sectors bordering on UFP space. The potential for a Dominion of Earth had indeed waited just beyond the rim of explored space.

Time for that was now irrevocably past, yet ambitions of influence remained. The technological standard represented by Earth's interstellar messengers was not yet formidable enough to cement alliances with any but the least advanced worlds, but the precedent was set for Earth policy to be followed when more capable ships would be promoting it. Indeed, Earth's contribution to Starfleet, even if initially only under the innocuous umbrella of UESPA, did emerge as a political force of note, not as a tool of protection against the Romulan threat, but as a peacekeeper force to settle the differences within the UFP – between the arrogantly self-conscious Tellarites, proud and reclusive Andorians, still largely enigmatic Vulcans, and the wildly multicultural peoples of the ancient Rigel colonies. Later these alliances would lead to the new members participating in exploration aboard vessels operated by the joint Federation Starfleet.

It is perhaps just a stroke of incredible luck that the second interstellar expansion of humans began in a time and place not occupied by any other expansion-driven race or alliance. Major local conflicts like the Erselrope wars raged thousands of lightyears away, but UFP had little or no knowledge of them at the time. Nor did humans have the slightest idea of the powers they had unleashed when unwittingly challenging the Klingon Empire. The *Daedalus* ships encountered little resistance in their journeys, letting the war-weary veterans of the Romulan conflict commanding them to establish the network of alliances in the spirit of peace and cooperation. Still, their trusting and easygoing attitude in encounters with near-human cultures led to varying degrees of cultural contamination and in fact proved near-disastrous in later contacts with more alien mindsets.



Shuttlecraft on approach to USS Essex. *The ship is seen in UFP Starfleet duty in 2163, in the new light beige paint scheme with high-visibility NCC registries, sporting PB-13 deep space warp nacelles. Visually identifiable gunports are gone now, replaced by a range of sensor orifices. The 'combat bow' is cut off and the stump faired over, restoring the looks of the* Essex *close to those of her late sister from quarter a century before. The cramped little design would continue service for another quarter, but fate would not be so kind to the* Essex *herself.*

While the first application of the asymmetric field configuration had not resulted in a revolution in warp technology, it had at least proved that warp three cruising was attainable without the miracle powerplants of Archer or Brodesser. Some engineers said this meant that the winning formula had been found, that all that stood between Starfleet and warp ten now was the lack of a power source potent and reliable enough. Others still claimed that there had to be a good reason why none of the neighboring cultures had managed to develop ships capable of speeds exceeding warp seven, and that further breakthroughs in warp coil design and field manipulation would be needed as well. But this was still in far future when Starfleet in 2196 retired the last of the *Daedalus* ships from exploration use.

Most of the surveyors were scrapped, but there were so many to go around that a few were modified to serve as support vessels for UESPA, FAS and SCE activities, and some were even sold as light cargo ships for civilian applications. *USS Archon* (NCC-189), *USS Horizon* (NCC-176) and *USS Essex* (NCC-173) had been lost in exploration action, while *USS Lindbergh* (NCC-177) had in 2188 succumbed to a Klingon raid in military picket duty, for which she was ill equipped.

Triton

Heavy cruiser
2146-2167

Completed:	21 total: 8 *Triton* built in 2146-50 9 *Intrepid* built in 2153-60
Length:	165.0 m
Beam:	126.9 m
Height:	32.6 m
Mass:	245,500 tons (*Triton*) 250,200 tons (*Intrepid*)
Officers:	15
Crew:	99
Cruise speed:	w 3
Max.speed:	w 3.6 (*Triton*) w 4.0 (*Intrepid*) w 5.6 (refit 2161-64)
Endurance:	4 years
Weapons:	<u>Original:</u> 2 laser emitters (280nm / 800 MW) on dorsal fwd hull 2 laser emitters (280nm / 800 MW) on ventral fwd hull 4 laser emitters (390nm / 200 MW) on aft hull 4 plasma cannon (6.0 GW) on dorsal fwd hull 4 plasma cannon (6.0 GW) on ventral fwd hull 2 missile tubes w/ 20 fusion missiles on fwd hull <u>Refit 2151-53, *Intrepid*:</u> 2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral fwd hull

6 Type B phased particle cannon (125 GJ / 200 GW) on ventral aft hull
2 plasma cannon (6.0 GW) on dorsal fwd hull (NCH-400, NCH-403-405)
2 missile tubes w/ 20 fusion missiles on fwd hull
1 torpedo tube w/ 20 photonic torpedoes on fwd hull (NCH-408-416)

Shields: Navigational deflector on fwd hull bow
Electromagnetic shields (max. 20 T)
Polarizable armor on fwd hull and parts of aft hull
Mass-repelling graviton shields around fwd hull (NCH-401-402, 406-416)
1 –ayer forcefields refitted on surviving ships in 2161-64

Laboratories: 1 GP, 1 astrophysics/planetary sciences

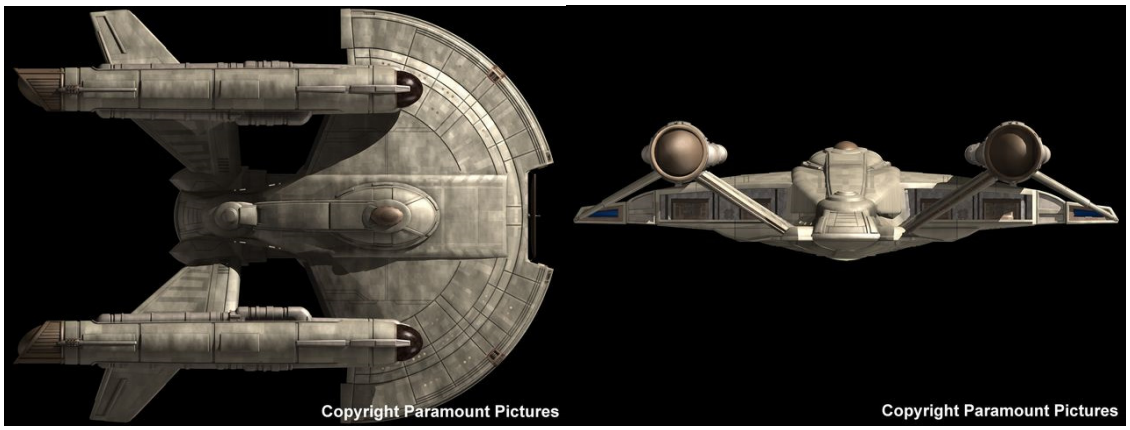
Transporters: 1 GP (1-pad); Mk I (*Intrepid*; refitted to select *Triton* in 2153-54)

Auxiliaries: 2 shuttlepods, 2-4 work pods

Ships of historical interest:

USS Intrepid (NCH-408/NCC-02)

SOURCES: D ENT
N ENT 'Minefield' (*Intrepid* Michael A. Martin, Christopher L. Bennett)
(H own, Christopher L. Bennett 'A Choice of Futures', 'Tower of Babel')



As work on Henry Archer's antimatter drive proceeded at a snail's pace, UESF command became exceedingly worried about defending Earth's extrasolar assets. Visiting or resident Vulcan voidships were more than sufficient deterrent against an invasion by the known adversaries, that much even the Starfleet admirals had to grudgingly admit. Yet Vulcans had no interest in sending their ships out to support the mad human dash to deep space. A *Messier* cruiser would take years to arrive at a distant battlefield, onlye to bring largely outdated, FTL-incapable and self-defense-oriented weaponry to bear. The cruiser would also be virtually unmaneuverable in impulse combat, a martial art Earth's known opponents were disturbingly good at.

By the 2140s, the whole *Messier* design philosophy was recognized as a dead end. There was lots of excess bulk in ships originally designed as huge flying fuel tanks, and the placing of their reaction engines at the very stern was far from ideal for maneuvering. After studying a number of adversary designs, Earth experts decided to aim for a hull with low frontal and side profile but wide horizontal decks. Comments were muttered about an irrational need to design something completely unlike the spindly, all-aspect-minimized Vulcan ships. Yet the almost aerodynamic shape of flat, ray-like hulls was a logical extension of Earth's vast engineering experience with lifting body spacecraft and of the research done on wide area cylindrar gravity fields.

While the researchers at Warp Five Complex were busy trying out their propulsive and power-generation innovations, work began in early 2142 on the hulls that would mount the new warp three-plus engines. A semicircular hull 126.6 m across would form the bow of the new combat cruiser. Compared to this section, the boxy aft extension housing fuel and main powerplant was truly minuscule. Attached astern would be a warp field stabilizer, manipulating the main propulsive subspace field for reduction of inertial mass. Several options were open for nacelle placement, depending on the size and shape of the final engine choice.

The two sublight propulsion systems were mounted at the outer corners of the hull. Each unit was capable of producing auxiliary power for ship's systems via MHD exhaust tapping, in addition to providing vectorable thrust. Placed well ahead of the center of mass no matter what kind of warp engines would be attached, but dead center in case of a nacelle jettison, the engines would be ideal both for spatial and atmospheric propulsion. Furthermore, nearly every piece of instrumentation was carefully faired over to aerodynamic smoothness. Thus, the hull would be perfectly controllable in atmospheric entry, even though UESF insistence on such capacity no longer corresponded to tactical reality. As an emergency procedure, atmospheric ditching of course remained practical. Indeed, Earth vessels would be uniquely protected by this ability in many scenarios that would lead to massive casualties aboard other designs.

Main berthing was arranged on the outer rim of the hull, just inboard of RCS systems. Further inward on the widest deck were sensor control rooms and two laboratory complexes, then the main computer area and a fire control room. On the deck above was further berthing. Closer to centerline were supply and cargo holds, accessible also via two aft-facing entry locks that doubled as hangars for the ship's work pods; there were no other auxiliaries aboard on standard missions initially. The deck above this had high bays for these facilities, as well as berths for heavy lasers port and starboard. Corresponding weapon berths on the deck below the widest one were accompanied by a centrally mounted short range scientific sensor cluster in the middle, assorted partial-gravity utility spaces to the sides, and two single-tube missile launchers forward. Long range sensors were grouped next to a navigational deflector system at the bow. Topmost ran a rectangular superstructure that covered tactical sensors, a defensive suite of either four plasma cannon or an experimental gravitic shielding system, and conventional EM shield generators. On this structure also lay the main bridge.

The Intrepid *banks away from a Klingon Bird of Prey, in the first major human-Klingon naval confrontation in April 24th, 2153. Decisive to the outcome of the battle were the Type A phased particle beam cannon installed on the cruiser. Recharge times were relatively long, and the hastily introduced overcharging mode rapidly wore down the weapons, yet*

the primitive phase weapons for the very first time made it possible for a UESF vessel to challenge and defeat a shielded opponent.

Construction on the first four hulls was completed in late 2145. Work on engine systems had proceeded on schedule as well, and two pairs of 117 m, 100,000 ton GFDM-03 warp nacelles were ready for installation. These big brothers to the *Daedalus* PB-2 were at the upper end of the size range suited for the hulls, and protruded slightly ahead of forward hull trailing edge; internal rearrangements were made to ensure the crew did not get excess exposure to the scooping fields. The engine support pylons inboard and downcanted fins outboard of the nacelles held thermal exchangers and plasma vents, along with field guides. Primary drive plasma exhausts were shuttered with hemispherical diffuser electrodes for greater stealth in deep space operations, as well as for additional energy recovery.

What was lacking was the antimatter powerplant initially projected for the class. Yet such projections had never been considered completely realistic by UESF, and a more conventional fusion backup was readily available. The inaugural pair of vessels, *USS Triton* and *USS Redoubtable*, sailed out of their box docks in February 2146, and the other two unnamed hulls were also floated away so that construction on the next set of four could begin. Centuries of naval history weighed upon UESF when it decided to dub the new combat vessels 'heavy cruisers', separating them from the preceding generations of less combat-ready survey spacecraft in the most inoffensive way possible.

A shakedown period of two years saw the ships try out their weapons and sensors against a number of simulated threats near Earth, stretch their legs at warp three cruises to α Centauri, Sirius and Draylax, and reach a dash speed of warp 3.6. The *Trafalgar* and *Lepanto* received their engines in 2147, and the next four vessels were completed in 2149-50. Orders were placed for a third batch of four as well, bringing total financial expenditure to about 50% that spent on *Messier* cruisers. This did not go down well in the UE Senate, which after the 2150 gradualist party victory began to question the investment in warships that seldom left Sol and did virtually nothing to curtail piracy.

Yet the twelve *Tritons* proved elemental in Earth's upcoming military challenges. They were more than mere technology demonstrators or propaganda pieces: when rearmed with phase cannon (and, in case of the *Intrepid*-led batch of five very welcome newbuilds, with a warp torpedo launcher) in 2151-54, and cleared for a tooth-rattling flank speed of warp 4.0, they became combat platforms capable of challenging local adversaries on basically even footing. Twelve ships mostly lacking long range FTL weapons couldn't hope to intercept warp-speed invaders until at the very doorstep of human systems, and couldn't be spared to hunt down elusive pirates – but they could strike hard when needed.

When the *Triton* dockyards were freed again in 2153, the political atmosphere might have been ripe for the construction of another dozen. Instead, the UESF concentrated on acquiring the more advanced and significantly faster *Enterprise* class vessels, which brought the credibility of Earth's cry of challenge up one more level. A *Triton* could never rival the humblest Vulcan combat vessels one on one, but an *Enterprise* just might. The older cruisers were deployed on theaters of greatest threat, while the *Enterprises* took the battle to enemy territory, first in the Xindi conflict, then in the Romulan one.

A less fortunate encounter pits the Intrepid *against Birds of Prey of a different allegiance and forces her into an impulse flight through the atmosphere of α Mensae IIb. The evasion worked in buying time for a single-nacelle getaway.*

Early triumphs and disasters in the Romulan War almost invariably involved the presence of a *Triton* cruiser. Yet once the action moved outside old Earth territory, the *Tritons* disappeared from headlines. This was partially due to the inability of the vessels to accompany the slashing strikes of fast *Enterprise*, *Achilles* or *Christopher* formations. A more concrete reason for the diminishing role came from the heavy combat losses suffered by the class. By the time of the battle of Cheron, only four *Tritons* remained spaceworthy; a frantic wartime construction program had turned spare parts into a final four extra keels, but none of these were completed before armistice.

The new UFP Starfleet adopted the surviving vessels under the light cruiser designation. The *Intrepid* and the *Fearless* were allotted NCC registries (-08 and -09, respectively) but never actually commissioned to the UFP Starfleet before being stricken in 2161. The new defensive organization proceeded to drive the *Dauntless* (NCC-01) and the *Valiant* (NCC-04) past their limits in the Tarn confrontation, retiring the vessels in nonserviceable condition in 2167 and expending them as targets. Out of the four semi-modern units, only the *Pioneer* (NCC-63) attained fame in warp drive experiments and a groundbreaking diplomatic mission to Rigel.

Ganges

Destroyer
2146-2179

Completed:	49
Length:	168.3 m
Beam:	159.5 m
Height:	28.0 m
Mass:	198,800 tons
Officers:	9
Crew:	55
Cruise speed:	w 2
Max. speed:	w 3.0

Endurance: 1 year

Weapons: Original:
2 laser emitters (150 nm / 600 MW) on ventral forward hull
1 laser emitter (250 nm / 450 MW) or plasma cannon (2.0 GW) on dorsal midhull
2 laser emitters (250 nm / 450 MW) or plasma cannon (2.0 GW) on ventral aft hull
6 mine tubes w/ up to 150 fusion mines on stern
2152 refit:
2 Type A phased particle cannon (500 GJ / 500 GW) on ventral forward hull
1 Type B phased particle cannon (125 GJ / 200 GW) on dorsal midhull
2 plasma cannon (2.0 GW) on ventral aft hull

Shields: Four navigational deflectors on dorsal bow
Polarizable armor on hull
1-layer graviton/subspace globular forcefield (2157 refit)

Transporters: 1 GP (1-pad); Mk I (refitted to select ships in 2153-54)

Auxiliaries: 1 atmospheric shuttle (original)
None (typical, 2153 onwards)

Ships of historical interest:

USS Erie (NDD-1053), *USS Keflov* (NDD-1032), *USS Tanganyika* (NDD-1047)

SOURCES: D ENT
(N Christopher Bennett)
(H own)

In the 2140s, the enemy stalking Earth's transports and lone patrol vessels remained as faceless as ever, yet was beyond any doubt a formidable one. A military confrontation was a distinct possibility, yet few measures were taken to prepare for a full-scale war this early on – for a good practical reason. From the viewpoint of the 24th century, it is easy to forget that a 22nd century ship built for

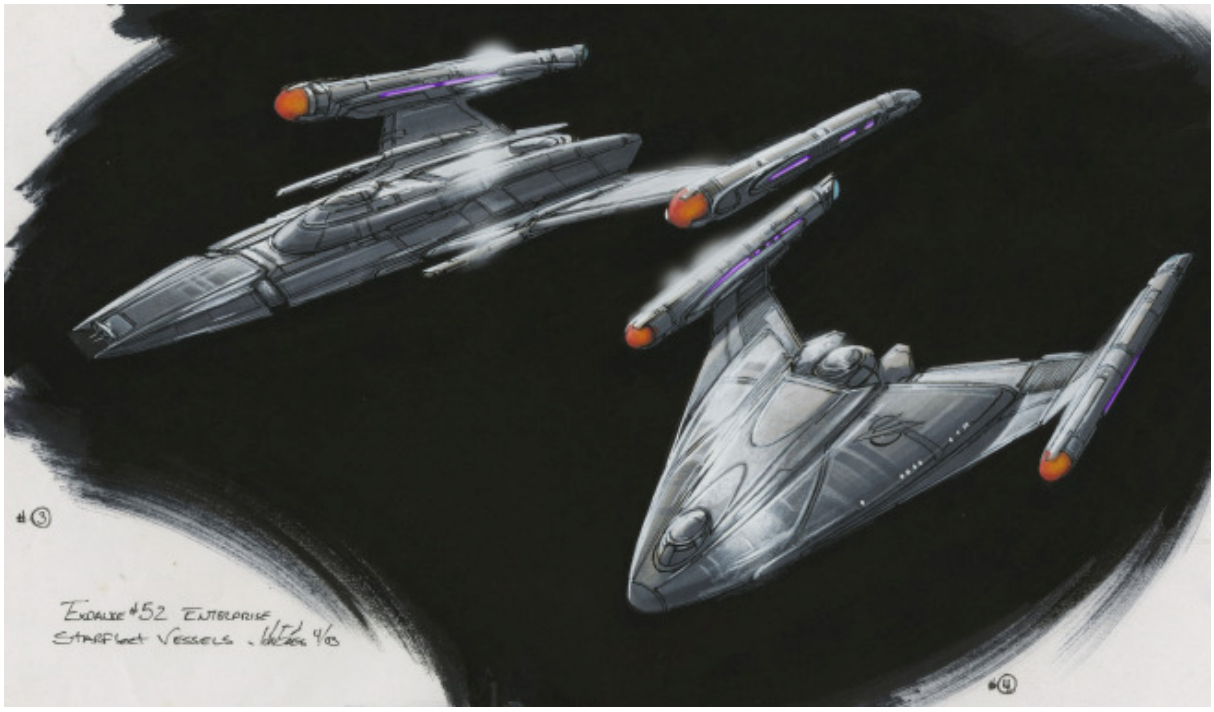
offensive military action would be unsuited for hunting pirates or protecting colonies, let alone performing missions of exploration or diplomacy. Harsh choices thus had to be made concerning Earth's limited resources; certain mission categories had to be ignored to allow others to receive equipment. Instead of a generic warfleet, UESF desired at least a dozen high profile cruisers to bluff its way to interstellar respect. What little remained had to be allocated to defensive rather than offensive forces – and the defenders would have to be able to cover both the star system and deep space battlefields.

The first type of combat theater was familiar enough to UESF. The aerodynamically shaped *Emmette* destroyers provided a sturdy template for a system defender. Adding of recent innovations in armaments and defenses would result in a capable insystem combatant with minimal expenses. Outsystem duties would be a wholly different challenge, though. The *Emmettes* could be considered 'warp-augmented' at best; the new destroyer would have to mount practical deep space engines of full warp three performance. This would be a major investment in R&D, construction and systems integration alike.

There was one final 'border condition' defining the new destroyer. Military tradition suggested organizing the harassed transports into convoys protected by escorting spacecraft – yet as space was vast and the number of transport runs needed to support interstellar colonies quite staggering, hundreds of escort vessels would be needed to effectively secure Earth's commerce. UESF thus was forced to specify an austere design that could be fitted with various sensor and weapon combinations as situation warranted. This decision was truly serendipitous, considering that any fixed equipment standard initially considered for the escort mission would have been quite useless in the actual wars that followed.

Experimental modifications on available *Emmette* spaceframes began almost immediately after the 2141 issuing of the relevant Fleet Requirement. Based on these, Empress and Vickers yards at Earth and Mars began construction of actual flight articles, somewhat larger in overall size and generally streamlined and simplified to facilitate modern armoring. The after half of the hull was expected to see the greatest changes, as outdated power and propulsion systems would be supplanted by completely differently dimensioned modern counterparts. The two competing entries were presented by the end of the year, with Empress offering a narrow-hulled design with a swappable combat bow, and Vickers going for a more conventional flying delta.

Certain key features were dictated to appear on both entrants. Two twin reaction engine nozzle assemblies were to be mounted astern on extended, swiveling structures that allowed their use in lifting as well as forward propulsion tasks. Between them was the main reactor, ejectable in extreme emergencies but mainly mounted this far abaft due to center-of-mass considerations. Atop the reactor assembly would sit an IMRF stabilizer serving the two broadly outriggered, 80,000 ton warp nacelles. In combination, the propulsion system would provide full access to and from terrestrial planets, linear accelerations up to 800 gravities, warp two sustained and warp three flank speeds, and sufficient maneuverability in all three operational realms.



The original destroyer proposal and its competition. Both proposals were designed around the same propulsion system, with the more conventional Vickers destroyer ultimately winning on aerodynamic merits of arguably low relevance.

The Vickers design was selected in February 2142, its conservatism the obvious winning point. Internally, the ship was divided into ten decks, most of which were taken up by massive fuel tanks and power generation subsystems. The bridge dome at the bow, mere six meters across, was equipped with armor-shuttered windows opening directly into space for situational awareness in the close-quarters fights expected in convoy service. The level below housed a quartet of navigational deflectors and a sensor array forward, and main command and control facilities beneath the navigation bridge. Crew quarters and various support systems were clustered within the lifting body hull in a manner that paid little heed to ergonomy or safety. Major systems breaching the polarizable hull armor included aft ventral semi-recessed berthing for one twenty-person atmospheric shuttle, six ventrally mounted twin lifting engines and four landing gear bays, a centralized computer system, and a ventral domed array of medium range sensors.

Primary armament in two ventral banks just below the bridge structures was clustered with the associated targeting sensors, resulting in two rectangular points of weakness. All-new 600 MW main lasers were developed by Lockheed; these were intended to be carried only on select missions due to their complexity and power requirements. Normally, the stations were to be fitted with 45 MW laser emitters and/or plasma guns. Secondary ventral weapons stations were crammed in next to the aftmost lift engine pairs, each capable of holding one plasma cannon or light laser turret. A single dorsal station was available aft of the bridge. In addition, two sets of three mine tubes astern could spew up to 150 thermonuclear mines for system defense, or for discouraging pursuit in convoy escort duty.

USS Ganges *(NDD-1000) flies in formation with two Tellarite frigates of* Degbaxis *class in the Fleet review of 2161. A survivor of countless defensive and offensive battles, the* Ganges *has both combat wounds and upgrades to show for her years of service – both rather carefully hidden, however.*

The first six *Ganges* units were launched in 2146 and equipped with four 450 MW lasers and two 2 GW plasma cannon turrets. After barely two months of validation trials, operational testing was initiated: *USS Erie* and *USS Keflov* were sent to escort a group of medium freighters carrying weapons components, including orbital fortress and space tank modules and much-needed excitator coils for system defense vessel laser emitters, to Earth Colony Six. The results were nothing short of tragic. Somehow, Romulans had found out about the delivery, and mounted a raiding party that penetrated into nominally Earth-patrolled space and engaged the convoy. The lasers of the destroyers worked as planned, cutting to pieces one alien missile boat per minute – but in less than three minutes, the ships had been overrun and their relatively light armor peeled open by superior numbers of attackers. There were no survivors aboard the destroyers, and only one of the freighters managed to escape into high warp. Until 2164, the raid was labeled the work of Nausicaans, until sensor data from the surviving *SS Tupac Amaru* was properly reanalyzed to reveal classic Romulan duplicity.

Even the initial post-mission analysis called for a stepping up of response, though. Not only had the rate of fire of the destroyers been found insufficient, but the range of engagement with the secondary lasers was too close for the safety of the convoy. The heavy 600 MW laser was clearly needed even against adversaries as puny-looking as pirate missile boats.

Subsequent deployments of *Ganges* escorts eventually resulted in all ships carrying the maximum weapons load, with a 50/50 balance of lasers and plasma turrets on the secondary mounts. Still, the first truly efficient combat fit had to wait until 2152 and the introduction of phased particle beam weaponry. A pair of Type A phase cannon at the bow was the initial fit, followed by a Type B cannon on the dorsal mount; mines and most plasma cannon were omitted. The shuttlecraft was disembarked, as in its exposed position it presented an explosion hazard for little practical return. A Mk I transporter was soon added in compensation, its emitter array positioned in the shuttle berth.

A total of 49 *Gangeses* were built during the period when random Romulan raids changed into systematic interception of transports in preparation for a major attack. Several of the destroyers saw initial service in anti-Xindi and anti-Klingon operations in the Sol system, based off Mars where the ships could operate from surface bases. Moving of operations out to deep space began after the delivery of the tenth unit, gradually, haltingly: the 2149 Nausicaan scare and again the 2151 Klingon incidents made Starfleet hesitate, but shipping protection ultimately received the majority of the *Ganges* force.

Homogeneous spreading of the destroyers to interstellar space would have been folly. On the most endangered shipping lanes, convoying was in 2156 changed from constant escort to relay tactics. A group of destroyers followed a convoy for two to three lightyears, then handed it over to the next

destroyer group; random links of the relay chain were watched over by a cruiser, but most were left completely unprotected. The tactical aim was to keep the Romulans guessing, and to be able to confront them with decisive force when they guessed wrong. This enormously demanding system taxed the *Ganges* fleet to the extreme, but at least kept the forward colonies and outposts from becoming totally isolated. A downside was the complete unavailability of escort vessels for any of the secondary trade routes.

As the Romulans began their main attack, the front lines nevertheless faced a siege of overwhelming force. The low warp speeds of the *Gangeses* no longer mattered, as they were pressed to system defense service and began to fight their battles under impulse power. While the cruiser and modern destroyer fleets fought in deep space hunting Romulan carriers, *Ganges* teams were used to ambush raiding parties and to wear down assault forces before they entered planetary bombardment range. Starfleet's efforts to boost planetary defenses were still hampered by Romulans constantly intercepting shipments of material intended for this purpose, and there no longer were destroyers to spare for convoy escort; *Ganges* production was terminated in favor of the more affordable *Daedalus* corvettes.

The wreckage of USS Tripoli *being surveyed by the destroyers* Cooper *and* Maryland*. The battle at Altair VI was the first in the Romulan War where Starfleet managed to send modern destroyers to augment the deep space cruiser force. Compensating for each other's severe deficiencies, the jointly operating elements managed to reduce casualties, making Altair VI the first engagement in which no stopgap* Daedalus *vessels were lost. Planetary defense and assault remained a* Ganges *forte throughout the war.*

Desperate tactics of providing lone freighters or small convoys with single-pilot escort fighters had no practical effect. Popularly called 'cochranes', the dartlike fighters usually consisted of nothing more than a cockpit and a handful of laser or plasma cannon scabbed onto a bulky warp sustainer feeding from the warp field of the freighter. Some four hundred were produced between 2147 and 2159, but a stupefying 289 lost during the first year of operation. While a 1940s CAM pilot might have felt close kinship to a 'cochrane jockey', the majority of UESF personnel considered this suicidal method of fighting fit only for saints or fools. It well reflects the desperation of the times that the line of people waiting for their chance to climb into a cochrane cockpit only grew longer with each incoming casualty report.

Two Galliant *and two* Arrow *class cochranes travel in the wake of* USS Baikal *of* Ganges *class, in protection of convoy XR-72 to Earth Colony Six. The destroyer was somewhat ill fitted to serve as a battle control center, lacking in sensors and command and communications facilities. It was therefore typical for one of the transports to be rigged for command duty, with a ranking UESF officer aboard to liaison with the civilian Convoy Commodore, leaving the destroyers and cochranes to concentrate on actual fighting. Such a team could be a deadly opponent to raiders, but usually the cochranes had to make do with partners lesser than* Gangeses.

Despite such bravery, by 2158 it began to seem that almost a hundred of the forward colonies and outposts would have to be abandoned and new defense lines formed closer to Earth. Clearly, a purely defensive strategy would finally lead to complete destruction.

* * *

When Earth's long-awaited move to the offensive came, it was not merely system- or theaterwide, but simultaneously affected every single UESF unit involved in the fighting. As is typical of fledging interstellar powers, both combatants still thought in terms of lines of battle, and the Romulans thus could not conceive of the kind of free-roaming operations that would retain the initiative on the defending force. Instead, they mirrored Earth's desperation from the preceding years and withdrew from their challenged forward positions to what they considered a defensible line. By classic Earth doctrines, this called for the uprooting of all UESF defenses and their utilization for ceaseless assaults that would prevent the Romulans from 'digging in'. Thus, the *Ganges* destroyers were mainly used as perimeter guards for battle fleets in the final phase of the war.

Still, even in retreat, the Romulans were a threat to colonies and mining outposts: a Romulan unit cut away from a main force was likely to perform a suicide run at an enemy planet rather than try and fight its way back to Romulan-controlled space. Local defense missions could thus still be of essence, and for example the mining colony of Lalande 8 can thank *USS Tanganyika* (NDD-1047) for its continued existence. The *Tanganyika* was used as a decoy, luring a suicidal Romulan auxiliary carrier into ramming an abandoned mining station instead of an inhabited one, as well as for rendering harmless twelve fightercraft launched by the carrier. *USS San Esteban* (NDD-1021) was the only UESF ship lost with all hands in the final Romulan plunge at α Omega B in 2161, taking with her two Romulan stormwings but unable to prevent the massacre of more than 20,000 people on the planetary settlement.

In the shadow of the cruisers that dictated the outcome of the war, the story of the *Gangeses* was one of forgotten glory. Dull patrol duty along the newly established Neutral Zone awaited Starfleet combat forces after the signing of the peace. The compact destroyers were less than ideal for standing the long vigil far away from planetary surfaces or other fixed assets. A handful were pressed to intra-Federation traffic protection duties, another few kept for system protection – but as with many ship types of the Romulan War, no specimen were preserved for posterity. Instead, the last *Gangeses* serving under the Federation Starfleet flag were in 2179 grounded at colonial starports, never to be reactivated. As the main threat changed from Romulans back to Klingons in the 2220s, even the best preserved *Gangeses* were only fit for swift recycling into construction material.

Taholsin

Destroyer
2148-2172

Completed:	103
Length:	131.2 m
Beam:	76.0 m
Height:	23.0 m
Mass:	85,200 tons
Officers:	3
Crew:	22
Cruise speed:	w 3
Max. speed:	w 5.4
Endurance:	6 months
Weapons:	2 phased particle beam emitters (400 GJ / 2.0 GW) in wingtip mounts
Shields:	1-layer graviton/subspace globular forcefield Navigational deflector on ventral midhull Auxiliary navigational deflector on ventral bow
Transporters:	None
Auxiliaries:	2 work pods

Ships of historical interest:

USS (AGC-8-44)

SOURCES: (D own)
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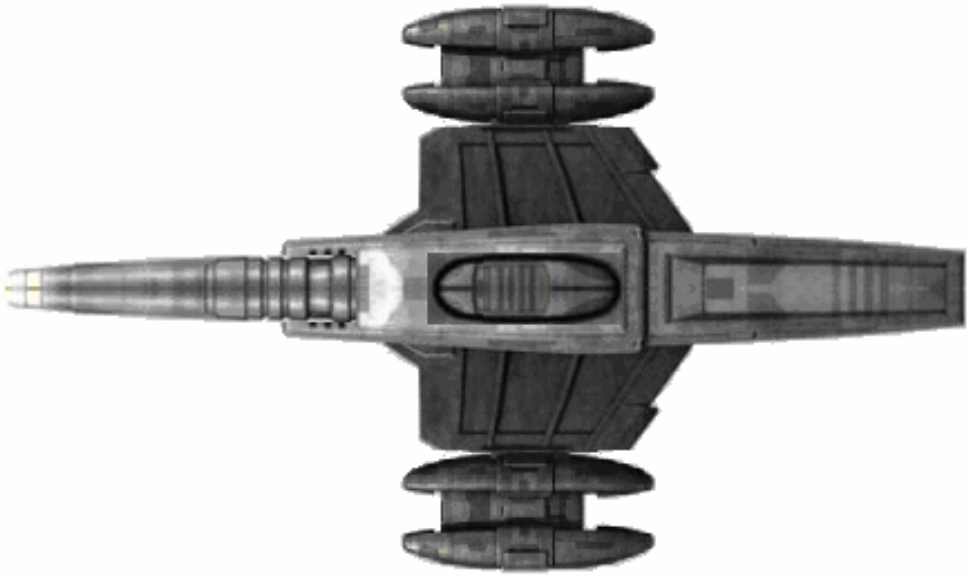
(H FASA)



The final element in the propulsive modernization of the ASDF fleet was a fighting vessel for attrition purposes, a destroyer about twice the size of the *Tanathooef* frigates. Reliant on the same warp engine that propelled the *Kumari* battle cruiser, even if carrying shortened sets of coils and a much humbler powerplant, and featuring shared hull components and armaments, the *Taholsin* was built only partially out of a perceived strategic need; mostly, it was built because it could.

The apparently inevitable large scale war between Vulcania and Andoria was already well catered for in terms of cruisers and their escorts, and the ASDF could press civilian freighters to service in sufficient numbers to support the conquest of Vulcan colonial planets and satellites, perhaps even an invasion of the hated Vulcan homeworld itself. Yet the war would need its heroic casualties, and those should not include the expensive battle cruisers. The Empire was gambling big time, constructing a masterpiece of a war plan before even knowing the true dimensions of the playing board or the pawns of the opponent: the very hardware being built for the plan was a game strategy unto itself. The *Kumari* was designed with modularity in mind, so that once the dockyards had produced the required number of battle cruisers, they could smoothly shift to producing destroyers out of much the same components.

A formation of *Taholsin* destroyers maneuvers near Indarax, home to ultraconservative Andorian colonists and, not coincidentally, the celebrated martial arts training hub of all Andoria. After the formal withdrawal of Andoria from the Romulan conflict in early 2156, Earth attempted direct talks with Indarax; this image is in fact from the mission of *USS Fomalhaut* to carry Admiral Palmieri to such discussions. While little came of the talks, the UFP Starfleet currently maintains a liaison and training center on the planet.

The battle cruisers had featured impulse-powered sub-hulls for planetary assault – potentially quite useful in attacks against Vulcan colonial holdings where speed and surprise would be key to victory, and the total volume of troops a secondary concern, never mind sustainable logistics. Each 94 m hull would now form the main body of a destroyer, with a warp coil nacelle grafted above and below the aft end and a new m/am reactor installed forward of the original fusion system. Lateral wings would support the heavy phase gun armament.

The *Taholsin* destroyers had a typically minimal crew of 25, and omitted all extraneous gear such as multipurpose auxiliary craft, transporters or drone deployment systems. This left room for up-to-date shield generators and fuel and consumables reserves that helped boost the endurance of the vessels. A strictly defensive role in protection of the thirteen Andorian colonies was intended, though, not a deep space one – even though few on Andor believed Vulcans capable of an offensive as audacious as the one planned against Vulcanian outer holdings. Old *Zheusal* battle cruisers would also remain in reserve at the colonies, just in case.

The monomaniacal focus of the Andorians on their plan of aggression might have placed them at a strategic disadvantage. There was nary a thought spared for protecting shipping lanes, and the gathering of intelligence was at the whim of Guard units monopolizing deep space combat vessels.

In retrospect, though, the fleet constructed by the Empire represented the perfect balance for the needs of the late 2150s and early 2160s: high speed cruisers were Andor's fitting contribution to the final year of the Romulan War and to the UFP Starfleet, while a wholly separate rear guard could be dedicated to the local needs of the Andorian realm in both situations.

Starfleet nevertheless obtained a wing of *Taholsins* for defending the Romulan Neutral Zone, a rare non-Guard Andorian contribution to the interstellar defense effort. These vessels were retired in 2172 when Andor committed to new warp propulsion technology; no replacement was ever deployed, as Starfleet interest in the quiet border quickly waned. On the other hand, the *Taholsins* remained in production for eighteen years, and supported the Andorian Self-Defense Force through years of transition to the use of more or less commonalized hardware.

Hopkins

Hospital ship
2149-2173

Completed:	8
Length:	238.0 m
Beam:	150.1 m
Height:	150.1 m
Mass:	90,000 tons
Officers:	5 ship operations 8 medical operations
Crew:	18 ship operations 97 medical operations
Capacity:	300 long-term patients; up to 600 patients total; 11 first aid cases per minute
Cruise speed:	w 2
Max. speed:	w 2.75
Endurance:	2 years
Weapons:	4 plasma cannon (1.6 GW) on bow 4 plasma cannon (1.6 GW) on stern
Shields:	1-layer graviton/subspace globular forcefield Annular navigational deflector on bow
Laboratories:	2 medical
Auxiliaries:	2 to 5 medevac shuttles, 4 shuttlepods

Ships of historical interest:

USS Hopkins (HS 101)

SOURCES:	(D SFC) (N SFC) (H SFC)

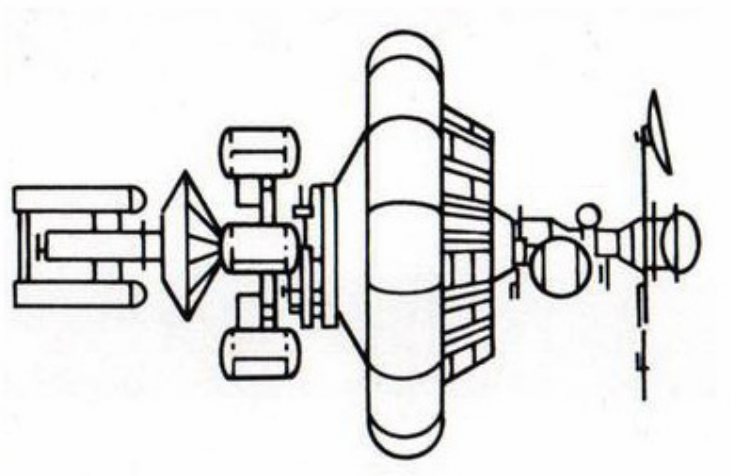
Since Starfleet in the 2140s operated in an area far away from established support bases, relying mainly on what the local colonies and their often irregular supply convoys could offer, numerous tender ships had to be fielded to support the operations. Among these were tankers and repair ships converted from commercial freighters, mainly of types Y and W. Also included in UESF plans were hospital ships, traditionally converted from passenger liners in Earth's previous military conflicts.

However, few of the spaceliners in operation in the early 22nd century would have met UESF requirements of high endurance and speed. When the fledging interstellar cooperation in the late forties needed a tangible symbol, resources from Earth, Denobula Triaxa, α Centauri and Altair were pooled to create a practical hospital ship class.

The design constructed in Earth shipyards was christened *Hopkins* class after the Nobel-winning Earth biochemist of the 20th century. Featuring starliner and military components in a curious mixture, the ships paid little attention to aesthetics or warp dynamics and concentrated on adding accessibility and habitable volume to a military-standard propulsive core. The propulsion system was lifted from J-750 class freighters almost unmodified, yet the overall spaceframe was drastically altered. A new toroidal waist section housed the major medical functions, including operating rooms, patient wards and cryocontainers. Crew quarters for the operating crew of 23 and up to 105 medical personnel rimmed each deck, while patient wards were located further inside the ship for added protection.

Four shuttle hangars for casevac craft were mounted aft of the toroid on separate support arms. Atop or at the bow of the ship was the main bridge, surrounded by various antennas and an annular navigational deflector assembly. This was in turn surrounded by quadruple Almaz plasma cannon mountings. Another plasma cannon quad was installed on the stern, where twin warp nacelles and their fusion reactor powerplant also resided.

It may seem odd that a hospital ship on a mercy mission would be armed. But with the loss of *USS Hopkins* (HS-101) shortly after her deployment in 2149, it was realized that the prominent Aesculapius symbols on the hull and other, more universal signs of nonaggression provided no protection whatsoever against deep space aggressor forces. Defensive armament was therefore carried on subsequent vessels.



Incoming casualties: heavy cruiser Valiant *transfers her wounded to* USS Hellenbach *(HS-104), while two frigates prowl to secure the area against surprise Romulan attacks. The Rihannsu were actually among the more 'civilized' Starfleet opponents, sharing with humans many concepts about the treatment of the wounded. True to their opportunist nature, however, they seldom passed a chance to eliminate enemy medical support facilities along with other key logistical elements. Yet for example the Tarn, Tzenkethi or Jem'hadar would have scorned chance and actively hunted for hospital ships, a brutal fact that has driven Starfleet mercy ship design and doctrine for two centuries now.*

In addition to the hangars, which could handle eight casevac shuttles simultaneously, the ships featured berths for four shuttlepods on the hull exterior. The manipulator-equipped pods were

mainly employed for the purpose of retrieving derelict small vessels and lifepods, but were also capable of transatmospheric liaison operations. The large casevac shuttles, two to five of which were typically carried, were fully capable of atmospheric operations as well, and could carry some twenty litters each.

Seven more ships of this class were fielded after 2150, and two of these soon lost – the significant amount of advanced technology aboard attracted the attention of several players, from Romulan reconnaissance teams to Nausicaan raiders. The frantic efforts to build forward bases for spaceship maintenance and medical support had finally resulted in Starbase One being declared operational in sector 003A in 2147, and various light and medium transport classes were converted to medical roles, since patients could now be carried to this forward base in a reasonable time by such vessels. This eased the pressure on the *Hopkins* class ships, until SB 1 was lost in a long-reaching Romulan attack in 2155. In the following major battles, the hospital ships were operated in the front lines, recovering crews from crippled Earthships but having no places to offload them. The situation continued until the end of the war, as Starbases Two and Three came on-line only months before the battle of Cheron.

* * *

One heritage of the desperate ending moments of the war was the extent of medical expertise incorporated in the design of Starbase Two. The base has since been a center of UFP medical excellence for over two centuries, and has largely given up its military and exploration support roles as its piers and hangar facilities have become outdated. New starbases have been erected in its vicinity to watch over the still tightly closed Romulan border.

After the war, the surviving *Hopkins* ships were converted to peaceful use with the removal of the (in any case obsolete) weapons and installation of more specialized and diverse equipment in place of massive first aid facilities. Acting as emissaries of Federation medical and economic aid, the ships achieved fame in the war-ravaged colonization zones and among the new UFP member cultures.

Technically soon outdated, the last ships of *Hopkins* class were retired in 2173. After the successor *Byrne* class ended service, the specialized military hospital ship mission also returned to the pages of history books. Advancing Federation medical technology made it possible for smaller facilities aboard spaceships of other types to provide equal or superior care, its quality and timeliness compensating for the lack of volume. Starliner conversions were planned for dealing with casualties in a potential Klingon war on several occasions throughout the 23rd century, and numerous liners earmarked for Activation Class Seven duties, but very little actual conversion or construction was undertaken. In good and bad, the Klingon conflict took place close enough to the UFP support infrastructure that hospital ships were deemed an unnecessary investment.

Enterprise

Explorer
2151-2161

Completed:	16
Length:	225.1 m
Height:	33.1 m
Beam:	132.6 m

Mass: 262,700 tons (original)
263,400 tons (weapon upgrade 2153)
263,100 tons (NX-02 onwards)

Officers: 23

Crew: 57 (original)
73 (NX-02 onwards)
182 (Romulan War standard)

Cruise speed: w 3

Max.speed: w 5.0

Endurance: 4 years

Weapons: <u>NX-01 launch configuration:</u>
2 plasma cannon (6.0 GW) on dorsal hull
2 plasma cannon (6.0 GW) on ventral hull
2 plasma cannon (6.0 GW) on dorsal booms
2 plasma cannon (6.0 GW) on ventral booms
2 plasma cannon (4.0 GW) on fwd primary hull (w/ dorsal and ventral gunports)
4 fwd missile tubes w/ 80 fusion, KE or antimatter missiles on ventral hull
2 aft missile tubes w/ 40 fusion, KE or antimatter missiles on ventral hull
<u>NX-01 refit 2153:</u>
2 plasma cannon (6.0 GW) on dorsal primary hull
2 Type A phased particle cannon (500 GJ / 500 GW) on ventral hull
2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal booms
2 Type A phased particle cannon (500 GJ / 500 GW) on ventral booms
2 Type B phased particle cannon (125 GJ / 200 GW) on fwd primary hull (w/ dorsal and ventral gunports)
4 fwd missile tubes w/ 40 fusion missiles on ventral hull
2 fwd torpedo tubes w/ 30 photonic torpedoes on ventral hull
2 aft missile tubes w/ 20 fusion missiles on ventral primary hull
1 aft torpedo tube w/ 5 photonic torpedoes in field stabilizer pod
<u>NX-02 onwards:</u>
2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal hull
2 Type A phased particle cannon (500 GJ / 500 GW) on ventral hull
2 Type A phased particle cannon (500 GJ / 500 GW) on ventral booms
4 Type B phased particle cannon (125 GJ / 200 GW) on fwd hull (w/ dorsal and ventral gunports)
2 fwd torpedo tubes w/ 40 photonic torpedoes on dorsal hull
2 fwd torpedo tubes w/ 40 photonic torpedoes on ventral hull
1 aft torpedo tube w/ 10 photonic torpedoes on ventral hull

Shields: Polarizable armor on hull and nacelles (original)
1-layer subspace/graviton forcefield bubble (refit 2156)
Navigational deflector at bow

Laboratories: 2 GP, 1 astrophysics, 1 planetary sciences, 1 medical

Transporters: 1 GP (1-pad); Mk I (original)
1 GP (3-pad); Mk I (refit 2154)

Auxiliaries: 2 to 4 transatmospheric shuttlepods, 4 spatial pods

Ships of historical interest:

USS Columbia (NX-02), *USS Endeavor* (NX-06), *USS Enterprise* (NX-01)

SOURCES: D ENT
N ENT
H ENT (Christopher Bennett, Michael A. Martin, 'ST:ENT Romulan War series)

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At the end of the 2140s, Earth's escalation program was fully geared towards reaching what engineers and politicians alike called 'escape velocity'. Scenarios of pirate hunts or interstellar war were concerns of the distant future, not attainable until a crucial prerequisite had been met: Earth had to have a presentable force of deep space cruisers. Only a vessel capable of challenging the Vulcan voidships in terms of speed, range, protection and firepower would allow Earth to pursue an independent foreign policy. The *Tritons* inched towards parity in the latter two respects, assisted by frantic work on hull armor and phased particle beam weaponry. Sheer stubbornless would give them the required range as well, just as it had allowed the primitive Boomer vessels to take to the stars. Yet speed remained the master key to interstellar power projection.

The *Daedalus* ion drive disaster was a major blow to Earthly hopes. Amidst all the specieist sentiments of the era, it was humbling to be reminded that Earth's bid for interstellar independence now hinged on Vulcan assistance. For three decades now, Henry Archer's team had been 'close' to finding the formula to 'escape velocity'. The first testbeds had a checkered record, verifying some engineering solutions while proving that others were a danger to life and limb. Full-scale testing was frustratingly delayed, forcing the *Tritons* to sail out with warp three rather than warp five engines. It was only in 2147 that the final elements were falling in place. With the first successful simulation of the warp five engine design completed, go-ahead was at last given for the construction of an experimental deep space explorer, the *Enterprise* (NX-01).

The experimental status of the ship was both a harsh fact and a deliberate misnomer. Certainly there was no guarantee that the plasma rechargers intended to boost power output and thus increase field strength would work as planned. The ability of the external field stabilizer to cope with the boosted fields was also in justifiable doubt, as was the rest of the innovative geometry of the propulsive arrangement. Warp propulsion was to be pronouncedly asymmetric, with the 100,000 ton, 98 m PA-1A nacelles riding on support pylons canted up at 30 degrees. Sublight thrust was to be divided in two: main exhaust nozzles tied to the primary power loop fired at the ends of the longitudal booms that also housed the rechargers and supported the nacelles, but fusion reactors on the primary hull

trailing edge next to the booms also had small vectorable exhaust ports of their own, adding to the thrust and maneuverability, and preserving mobility when main drive plasma was de-energized.

As for the novel dilithium regulators inside the raw annihilation reactor, even Captain Jonathan Archer, son of the late designer and an active participant in the program, could but cross his fingers. Fortunately, power generation seemed to work just like simulations predicted. As test flights began in October, 2150, low to medium warp was achieved relatively easily. Impulse thrust resulted in hull buckling and overheating, however, and half a year was spent on getting the dilithium focus to perform at warp 4.0. To facilitate the inevitable modification and upgrade work, the entire power generation assembly was designed to be easily exchangeable: the reaction chamber could be pulled out through the stern and a new one installed in a matter of days. The initial F1.0 flight article gave way to F1.1 before the ship was cleared for operational testing, and F2.0 was already under construction.

Yet there was more to the ship than mere propulsive experimentation. Although initially armed with ten plasma cannon, the ship was from the very beginning hardwired for phased particle beam armament. Her missile arsenal was formidable, with four bow and two stern tubes on the ventral primary hull. Four basic types of missile were available, including two fusion warheads, a KE penetrator and even an experimental antimatter device; a total of 120 shots catered for virtually every contingency. New FTL deflector and sensor systems were under development, even though NX-01 would sail out with a minimally modified *Triton* package.

In addition to being a competent combatant, the *Enterprise* was being prepared for the daunting task of deep space exploration. Gear that on the *Messiers* or *Cosmoses* had occupied most of the available volume had to be miniaturized so as not to compromise the combat mission – and with shrinking size had to come an increase in capabilities. Earth sensor technology remained as unremarkable as ever, but refinements were made on virtually every other type of exploration gear. Some of these were foolhardy, such as the use of the Erickson one-terminal transporter system for teleporting of live subjects. Others, like the experimental procedures for biohazard containment, were merely bizarre and largely ineffective.

The auxiliary craft docking bay and hangar of NX-01 were the most advanced ever devised. Precision approach aids, rapid recovery booms, air curtains across the ventral doors and between sections of the single-volume hangar plus high capacity air pumps ensured recovery, securing and bay repressurization within 80 seconds of matching of velocities. Single-point refueling and purging systems, *in situ* debaryonizers, advanced molecular fabricators and an onboard gamma-welding unit kept the craft in top condition despite a limited cache of spares. While standard Varioflight shuttlepods were still the preferred auxiliary type, the bays could accommodate highly nonstandard vehicles, including alien visitors, as long as they conformed to the limiting doorway dimensions of 6.5 x 3.2 x 3.0 meters. Mechanical grappler guns could retrieve velocity-matched objects at a distance of one kilometer; at closer ranges, induction brakes on the multi-monofilament cables allowed the halting of uncooperative targets up to a ΔV of 1 km/s.

Fuel and propulsive stores could be admitted onboard via two stern interfaces compatible with the same standard lighters that served the *Triton* fleet. Two loading shafts piercing the primary hull provided direct access to main cargo holds, generously sized for whatever items future missions might require. Initially slated to be stocked aboard were field repair items such as hull plates and impulse coils, some surface excursion vehicles and habitats, four spatial pods and a classified selection of 'special ordnance'.

Loading was still incomplete when, on April 16th, 2151, a Klingon courier crashed on Earth while running from the enemies of the Empire. Against Vulcan warnings, Starfleet chose to promote a contact mission, hoping that returning the crash survivor would break the ice and allow Earth to forge ties with an interstellar force on par with the Vulcans. The only Earth vessel capable of delivering the survivor in a reasonable amount of time was the *Enterprise*. Launched with just 80 people onboard, the cruiser hit warp 4.4 sixteen hours into the mission – and a complete power failure at the 18 hour mark, when hostile boarding threatened to scuttle the entire mission. A desperate race to relocate and repossess the Klingon survivor was successful, yet yielded very little in terms of cooperation with the Klingon Empire. What it did result in was an exploration mission of far greater scope than intended: sailing out from Qo'noS, the *Enterprise* eventually loitered some 130 ly away from Earth before returning to Sol two years later.

The Enterprise *in combat with Klingon forces, April 24th, 2153. The ship already had successful engagements against shielded opponents under her belt, and gave UESF new confidence for the conflicts to come. On the other hand, her sorties to deep space established the inevitability of such conflicts: all unarmed exploration vessels were hastily recalled in 2152-54, leaving the mission of finding new worlds and civilizations solely to the cruisers of Starfleet.*

Meanwhile, the original construction dock was processing NX-02, the *Columbia*. Again the irony of Earth's bid for independence was highlighted: for the first time, Earth shipwrights were truly paying heed to lessons taught by alien entities. The *Enterprise*, Earth's lone deep space ambassador, kept sending back mission updates and suggestions on improvements, most of them dealing with tactical

systems. In the many combat engagements along the mission, the sublight missiles and the heavy Almaz plasma cannon had proven virtually useless, while an innovative overcharge mode had been discovered for the 500 GJ phase cannon, and the transporter platform had been adopted as a landing or boarding party insertion and extraction tool. Also, intelligence had been gathered on foreign shielding devices, stealth technologies and weapons, as well as on alien political systems, physiology and psychology.

Yet the return of the *Enterprise* in early 2153 was not in triumph of her mission and its significant achievements. Instead, that mission was completely brushed aside for another, more pressing one. Once again, a fact-finding sortie of extreme range was burdened on the vessel. For locating, assessing and hopefully negating the Xindi threat, the *Enterprise* was stocked with a year's worth of supplies, equipped with a full battery of phase cannon, and fitted to carry three warp accelerators for antimatter-powered, antimatter-tipped FTL missile weapons dubbed photonic torpedoes. Two of these could be installed within the confines of the hull, with their gunports between the forward sublight launch tubes (which were also made compatible with the new munitions). The third, aft-facing warp launcher had to be squeezed into the field stabilizer pod, and could only be given minimal reloads. Nevertheless, the weapons offered devastating firepower and unprecedented range, and were elemental in realizing the combat potential of the cruisers. A sensor and deflector upgrade had to be delayed to the next overhaul, however – assuming there would be one. Scientists were disembarked in favor of a reinforced platoon of surface combat specialists.

Against all odds, the mission succeeded in thwarting the Xindi designs on Earth. Victory was secured by the very method that Vulcans had so feared when humans first sailed out: by invoking forces beyond human or Vulcan comprehension. The Xindi hostilities were exposed as minor elements of a grander interstellar, intertemporal and even interdimensional conflict. Leaving that battle to the godlike forces capable of waging it, the *Enterprise* team satisfied itself with worldlier acts, such as dispersing the vast Delphic Expanse. Removal of the major navigation obstacle rearranged important interstellar borders overnight. Most of the political upheavals that followed were also beyond human comprehension and control – but the more concretely observable local balance of power had also irrevocably been changed, bringing humans to the bright limelights. The primary aim of Project *Enterprise* had been met.

By the time matters of local politics again began to spin out of control, four additional *Enterprises* had been completed. Despite their full cruiser capabilities and military assignments, all still bore the NX mission class designation, denoting not so much their research abilities as their exceptionally potent warp drive systems. In the Romulan conflict, they were to be used as a silver bullet force, still among the fastest in Starfleet, and still among the most expensive. Operating with their only true peers, the new cruisers of *Achilles* and *Christopher* classes, the *Enterprises* were expected to score significant victories in daring offensive maneuvers, compensating for their shortcomings in defensive operations. Andorian shield generators would offset the limited impulse maneuverability, Vulcan long range sensors the warp speed disadvantage against highest-performing Romulan vessels. Multispecies crews were to be the norm, for Starfleet concentrated the cream of its volunteer allies on ships of this type.

Few of the *Enterprises* made it into the second year of the war. Heroism in the war resulted in many a posthumous decoration, considered by some to be mere consolation prizes: the *Challenger*, *Discovery* and *Atlantis* all perished without achieving a single one of their tactical goals, co-opted as they were by vicious Romulan software attacks to serve on the side of the enemy for the last minutes of their existence. The *Endeavour* had better defenses against intrusive AIs and went on to

fight a great number of more physical battles; further units were completed as well, quickly compensating for the early losses. Yet even those vessels that survived combat were often in a severe state of disrepair after having spent years far away from maintenance docks.

When severe battle wounds were in November 2158 added to the woes of the aging and compromise-ridden *Enterprise*, the veteran vessel was pulled in for an experimental refit. A large podded mounting in practice amounting to a second hull had been devised for the F4.0 improved main reactor, with the idea of quickly coupling the fully outfitted power hull to a ship in need of a boost. Three attaching points were used: a sturdy neck with assorted logistics trunks would secure the bow of the power hull to the former landing bay door area, and two pylons would take drive plasma from the reactor up to the aft ends of the booms, bypassing the original leads and rechargers. The IMRF unit would be severed from its pylons and lowered to rest on the stern of the power hull. The proof-of-concept installation was a great success, taking only 180 days. It fell somewhat short of an operational mounting, however, with the *Enterprise* still retaining her original warp core alongside the new unit and largely reliant on her rechargers for the remainder of the action she would see. Further power hulls were being prepared nevertheless, and would have seen action in early 2160 had not armistice intervened.

With the standing down of the Coalition fighting forces, all five *Enterprise* survivors were decommissioned, their future refurbishment or refitting depending on the shaping of the projected postwar joint fleet. Warp seven –capable Vulcan designs were fully expected to take the lead, and the initiative to provide the reasonably well-preserved *Endeavour* with an improved secondary hull was considered but a vanity project to keep Earth formally in the deep space exploration business. The Vulcan decision to de-escalate came as a stunning surprise, forcing UESF to consider retaining the *Union*, *Florida* and even the ailing *Democracy* in Earth service.

Ultimately, only the *Endeavour* would keep on serving, in UFP Starfleet colors and with a complete overhaul and refit including the full installation of the secondary hull. The *Enterprise* was not just deactivated, but cut up, restored to her original looks internally and externally, and preserved as a museum specimen.

As seen from her tender Cumberland Bay*, the* Union *(NX-08) accelerates into the Paulson nebula for one more charting mission shortly after receiving her final recall orders. The unmodified* Enterprise *cruisers were never entered to Starfleet registry before retirement. While some might see fitting symbolism there for the champions of 'escape velocity', the banal truth was that there simply was no fight left in the veteran ships.*

Thofsin

Cruiser
2151-2179

Completed:	42
Length:	280.0 m
Height:	33.1 m
Beam:	102.2 m
Mass:	280,000 tons
Officers:	13
Crew:	53
Cruise speed:	w 3
Max.speed:	w 6.2
Endurance:	2 years
Weapons:	2 phased particle beam emitters (50 GW) on primary hull bow 2 phased particle beam emitters (30 GW) on engine booms 2 drone racks w/ 600 combat drones in lateral mounts
Shields:	2-layer subspace/graviton forcefield bubble Navigational deflector at bow
Laboratories:	None
Transporters:	1 GP (7-pad)
Auxiliaries:	2 light shuttles

Ships of historical interest:

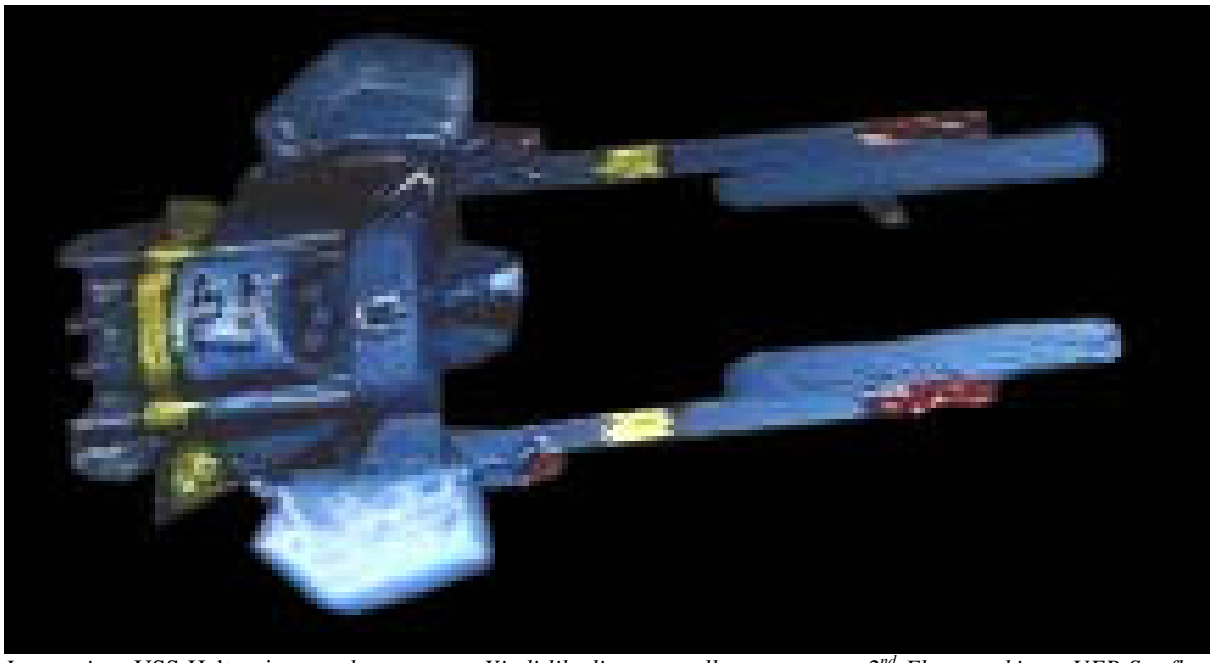
USS Haltonsin (AGC-9-12)

SOURCES: (D SFB)
(N FASA)
(H FASA)

With the fielding of the *Taholsin* destroyers, the propulsive updating of the Andorian warfleet came to a close. As usual in such situations, though, the ASDF wanted to go one step further. In 2151, the first four of the advanced *Thofsin* class cruisers were launched, capitalizing on lessons learned from early *Kumari* operations. Surprisingly enough, there was nothing wrong with the groundbreaking battle cruiser as such, and production of new hulls continued on schedule. Nor was there a strategic need to introduce a competing or complementary type of smaller dimensions purely for bolstering the numbers. Instead, the new cruiser, albeit indeed more compact and affordable than the *Kumari*, was introduced to fill an all-new niche of operations.

The *Kumari* sorties had given the Imperial Guard a taste of the riches available to the audacious taker in deep space. The fledging space power had no preexisting doctrine of exploration; nor had a culture raised in oases separated by icy wastes found strategic value in controlling the seemingly useless emptiness between its recently acquired interstellar assets. Encounters with Earth adventurers had revealed the worth of cruiser warfare, though – a lesson the Andorians felt they had

learned better and sooner than their Vulcan rivals, similarly hobbled by the psychogeography of their native environment. The *Thofsin* would follow the lead of Earth's seagoing fighting forces by sacrificing protection and firepower for endurance and reach, and emphasizing the scouting role heretofore neglected. To this end, she also left ashore the heavy wingtip phase guns and instead mounted lateral racks of sublight combat drones, applicable for a variety of reconnaissance roles in addition to delivering explosive payloads. A new type of shuttlecraft was also embarked for more versatile independent scouting tasks, and an aft-facing centerline hangar devised for efficiently operating the type.



In top view, USS Haltonsin *reveals some very Xindi-like lines as well as temporary 2nd Fleet markings. UFP Starfleet enjoyed access to the* Haltonsin *for just three years, embarking UESPA survey teams and Tellarite prospectors on two-month cruises to the unknown, and making several peaceful first contacts.*

The latter feature prompted the engineers to split the aft hull into port and starboard instead of more traditional top and bottom propulsive segments, providing the shuttles with a clear stern approach path between the segments. While the primary hull remained a traditional clumsy wedge, the silhouette of the vessel was thus drastically altered.

There were unexpected consequences to these pragmatic engineering and doctrinal decisions. When the battle cruiser *Kumari* in 2153 engaged in the hunt for the Xindi civilization and its apparent superweapons, Vulcan analysts primarily worried about the interference this would cause with the competing human and Vulcan sorties to the Delphic Expanse. With the unexpected success of the overall mission, though, a deep suspicion emerged on Vulcan that Andoria now possessed the secrets of Xindi weapons technology. As there were clear design similarities to the primary reptilian Xindi warship type, and an unsettlingly familiar emphasis on combat drone warfare, the baseless suspicions gained in credibility when Vulcans first observed the *Thofsins*.

The Vulcan distrust came to a peak with the launching of fleet action against Andorian outer holdings, a surprise move mirroring the Empire's own designs. When the role of Romulan information warfare in the heightening of the crisis was revealed, though, Vulcan backed off. With Romulan attentions now again directed at commerce warfare and attacks in deep space, ASDF's

new cruisers found themselves constantly employed. Their respectable top speed of warp 6.2 allowed them to react to commerce raiding with reasonable timeliness, even if the *Kumaris* still enjoyed an edge here. They also proved durable and maneuverable, their actions severely weakening the effect of the Romulan antebellum offensive.

Joint fleet action with *Sevajien* light cruisers early on in the open conflict was far less successful, due to superior Romulan intelligence that allowed their attacks to be targeted against locations defended either poorly or then by forces vulnerable to telecapture attacks. With defenses crumbling, ASDF wanted to go on the offensive, assigning *Thofsins* to escort Legion shipments against recent Romulan conquests such as Denobula. Politicians decided otherwise, withdrawing the Empire from the conflict altogether. Covert aid to Earth continued until the time came to rejoin the action; in 2159-60, *Thofsins* operated successfully alongside Earth's high speed strike assets of *Enterprise*, *Christopher* or *Achilles* classes and Tellarite *Phindas*, bombarding key targets as soon as such could be located, and forcing Romulans into a strategic retreat. This culminated on the raid against Cheron, although *Thofsins* played a greater role in the simultaneous strikes against Barradas and Draken.

Having found an appetite for cruiser action, Andor assigned few of the surviving *Thofsins* to Starfleet use after the war. These mainly saw stopgap action until UESPA heavy cruisers could be deployed for frontier troubleshooting and deep space exploration, missions of diminished interest to Andor. Its own *Thofsins* secured Andorian colonial expansion in directions where the threat of the unknown was the least concrete. Continuing success in all aspects of the operations gave longevity to the configuration: in the late 23rd century, ASDF would still be building cruisers with the familiar silhouette.

Cavalry

Light destroyer
2151-2193

Completed:	33 total: 12 *Cavalry* 17 *Mars* 4 *Turing*
Length:	189.3 m
Beam:	38.2 m
Height:	50.0 m (sensor dish retracted) 55.1 m (sensor dish extended)
Mass:	132,800 tons (*Cavalry*, *Mars*) 137,200 tons (*Turing*)
Officers:	9
Crew:	75 (*Cavalry*, *Mars*) 89 (*Turing*)
Cruise speed:	w 2
Max. speed:	w 3.1
Endurance:	2 years
Weapons:	*Cavalry*: 2 plasma cannon (6.0 GW) on dorsal fwd hull 2 plasma cannon (6.0 GW) on ventral fwd hull 1 Type A phased particle cannon (500 GJ / 500 GW) at bow (NDD-600 to NDD-609)

2 torpedo tubes w/ 12 photonic torpedoes each at bow (NDD-610, NDD-611)
Mars:
2 laser emitters (150 nm / 800 MW) on dorsal fwd hull
2 laser emitters (150 nm / 800 MW) on ventral fwd hull
1 Type A phased particle cannon (500 GJ / 500 GW) at bow
1 torpedo tube w/ 12 photonic torpedoes at bow
Turing:
1 laser emitter (150 nm / 800 MW) on dorsal fwd hull
1 laser emitter (150 nm / 800 MW) on ventral fwd hull
1 Type A phased particle cannon (500 GJ / 500 GW) at bow

Shields: Polarizable armor on forward hull and nacelles
1-layer graviton shield (*Turing* only)
Navigational deflector on main hull dorsal bow

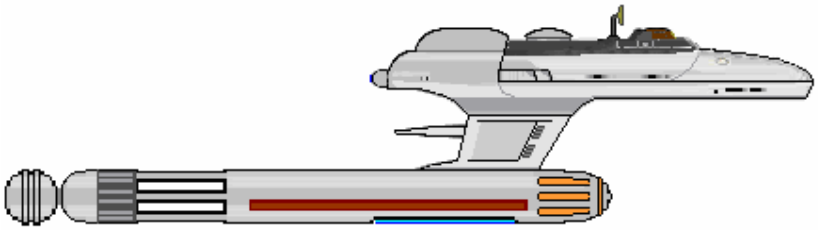
Transporters: None (*Cavalry* original)
1 GP (1-pad); Mk I (*Cavalry* refit, *Mars*, *Turing*)

Auxiliaries: 2 atmospheric shuttlepods

Ships of historical interest:

USS Carronade (NDD-601), *USS Cavalier* (NDD-628), *USS Poisson* (NDD-630/NCC-47), *USS Procope* (NDD-611)

SOURCES: (D FASA)
(N FASA, SFC, own)
(H FASA, SFC, own)



The UESF military doctrines of the 2140s were still based on the experiences of the rather lopsided battles against unorganized feline Xindi forces in what were actually just peacetime police operations. The blind faith in 'heavily' armed and armored cruisers was badly misplaced in the actual conflicts of the era, as was the idea of operating without major front line supply and repair bases. Yet UESF was still very much limited to operating in or near the Sol system and the major human settlements elsewhere, in terms of technology, politics and tradition alike.

Even when these triple barriers began to crumble, a fatal conservatism prevailed in strategic thinking. When Earth in 2151 fielded a series of new destroyers, they were not propelled by the revolutionary deep space engine of the *Enterprise* class, but by the much humbler fusion-powered S66-D capable only of warp 3.1 at very best. In face of the recent experiences of the exploratory cruiser *Enterprise* (NX-01) with deep space threats, UESF should have immediately discontinued the light destroyer program and diverted the funds to longer-ranging combatants. Instead, the Admiralty deemed the design ideal for system defense and proceeded with full production.

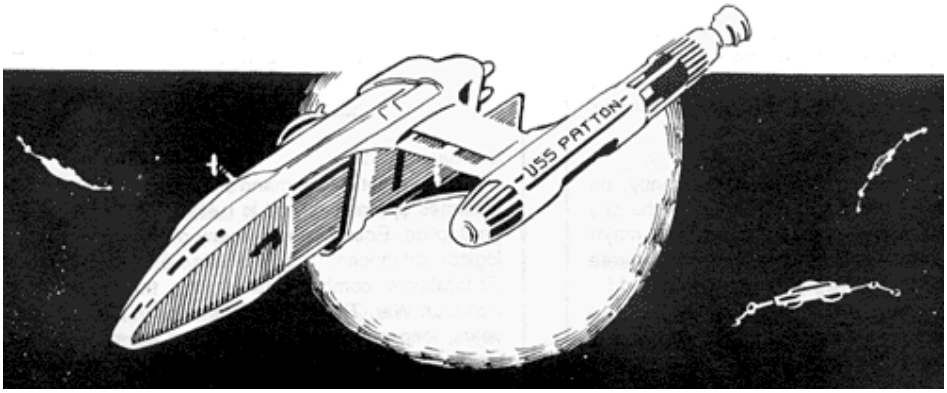
Tactical scenarios were based on unrealistic extrapolations of a limited dataset: it was predicted that invaders would utilize large starships conceptually similar to the Vulcan voidships, and such an adversary would best be fought with short-ranged strike vessels possessing great offensive firepower. The anti-fighter defense role, factually more important against the continuing pirate threat, would be left to the already existing, heavily armored cruisers bristling with defensive plasma cannon. Thus, the *Cavalry* (DD-600) class of destroyers featured only four 6 GW plasma turrets and dedicated significant room to twin missile tubes or a single hypermodern phased particle

cannon. Also, heavy armor was concentrated on the bow of the hull, and frontal profile was minimized by reducing beam, for once overriding the doctrinal call for aerodynamic performance.

The narrow hull gave unwelcome commonality with the preceding *Djartanna* destroyers: internal volume was at a premium. The utilitarian hull featured just four decks, of which the lowermost was essentially divided in two by the ventral radiator assemblies of the heavily armored compression fusion reactor amidships. The forward part of the bifurcated deck housed ventral plasma cannon banks, while the aft one held power transfer systems. The two middle decks housed the missile launchers or the alternately carried Type A phase cannon forward, engineering spaces abaft, and crew berthing amidships. Deepest within, just forward of the reactor core, were the sickbay on upper and the mainframes of the Yoshimitsu combat management system on lower middeck. The top deck was actually numbered Deck 2, as atop its fire control spaces and bow plasma cannon banks lay a series of crew-accessible superstructures, including the navigation bridge, a retractable sensor dish, the top of the reactor core and a lifepod station. The upper level of a stern shuttlebay also extended above Deck 2, giving enough internal volume for carrying of two 'Monarch' or 'Skeet' atmospheric shuttlepods. Two airlocks/docking ports on Deck 3 rim facilitated intership access, and a single GP transporter was added in a series of refits between 2156 and 2159.

The multiple means of disembarkation were quite necessary as, despite the hull itself having rudimentary atmospheric maneuverability, the *Cavalry* as a whole possessed no operational landing and takeoff capability. The single, 120,000 ton set of fourteen-spool warp coils was packed into an open frame, standoff nacelle well below the stern, on a sturdy twin pylon mounting. Since the coils were somewhat less modern than the powerplant, much of the reactor output was left unused by the warp drive system. This benefited the high performance impulse engines, whose twin nozzles in the aft corners of the hull could fire past the nacelle for violent maneuvering. Linear acceleration was also commendable, surpassing that of both the lighter *Gangeses* and the heavier cruisers. An emergency nacelle separation maneuver would provide even greater agility, yet leave the ship hopelessly crippled afterwards.

Operating a single-engined combat vessel was a novel experience for UESF, and many civilian specialists more familiar with the configuration were employed in training the crews. Two *Dnestr* class commercial transports were purchased for training duty, and modified internally to provide a more destroyerlike service environment. In return, it was customary for a while to paint the destroyers with false viewports and cargo pod seams to reinforce the illusion of a freighterlike silhouette, although few adversaries could be fooled by this. It was not the intended job of the destroyers to protect convoys or lure in pirates in any case. The standard mode of system defense operations was reactive rather than proactive: to pounce at approaching enemy fleets from several directions with slashing attacks, then retreat as a single formation towards an ambush set up by a heavy contingent of cruisers. The fatefully misguided Xindi bombardment of the Caribbean in 2153 and its follow-up actions involving Klingon and further Xindi penetrations seemed to justify the doctrine, in which intrusions by a low number of heavily shielded point targets would be deterred by decisive counteroffensives of similarly few UESF units.



A formation of Emmettes *in the company of a* Christopher *light cruiser and two outrider* Ganges *destroyers displays one school of traditional Earth shipbuilding, that relying on the wedgelike aerodynamic hull form. The two* Cavalries*,* USS Phalanx *(DD-614) and* USS Patton *(DD-627), round out the family with their somewhat narrower main bodies.*

Other operational experiences showed that the concept required some fine-tuning, however. *USS Carronade* (NDD-601) was lucky to survive a Romulan raid on Defense Outpost 4 in January 1st, 2152 – the first attack truly verifiable as the doings of the Rihannsu, although the evidence was initially mistranslated just as badly as in the earlier *Intrepid* and *Enterprise* encounters, thanks to extreme Romulan prowess in information warfare. The plasma cannon armament was found to be singularly ineffective against the Romulan shields, and later destroyers received an updated secondary armament – but not of the phase cannon type, which had also performed poorly in the engagement. Instead, advanced warp-accelerated lasers, developed and tested using the *Cavalry* testbed *USS Poisson*, were soon substituted for the obsolete plasma cannon mounts. Torpedo tubes were installed on the last two units of the original production run (twin tubes replacing the main phase cannon), as well as on seventeen second-batch vessels (single tube supplementing the particle beam armament). The armor grid was reconfigured no less than seven times to produce optimal shielding to match the latest Romulan firing patterns. Throughout the Romulan conflict, the *Cavalries* still remained much more vulnerable to enemy retaliation than the *Messier*, *Triton* or *Enterprise* cruiser modernizations, *Achilles* or *Christopher* newbuilds, or the almost equally massive modern *Marshall* heavy destroyers, all of which now mounted Andorian shield generators.

Still, the *Cavalries* proved to be formidable warcraft and matched in the elegant balance of martial skills what they could not achieve through simple strength in shielding, weaponry or numbers. The last of the original 29 ships were completed in 2156. The *Marshall* class had recently been introduced to meet the new tactical requirements, combining deep space range and endurance with heavy armament – the latter concentrated in a fighting section derived from the *Cavalry* hull. The early first loss of this new class made it possible for the older destroyer type to extend continuity in another fashion as well: the penultimate *Cavalry*, DD-627, would perpetuate the name *Patton* in the upcoming years of conflict. *USS Cavalier* (DD-628) in turn was the last *Cavalry* loss in the Romulan War, shot to pieces well after the official declaration of ceasefire and limping to a crash landing onto an unexplored, barely M-class world on May 24th, 2161. Seven months later, on January 21st, 2162, rescuers found all the survivors of the crash, led by Lt. Lawrence D. Baker, alive and in good health. Their recovery was a long-awaited positive media event in the middle of the postwar atmosphere of disillusionment, ambiguity and anxiety.

* * *

Four unfinished late-standard *Cavalry* (aka *Mars* subclass) hulls were completed in 2160 with shield generators and two single 80 MW warp lasers, and equipped with advanced sensors for long range armed reconnaissance, to serve UFP Starfleet as the *Turing* subclass. Their sorties in the Tarn conflict of 2162-64 were success stories that overshadowed the early UFP defeats and helped secure the UFP Starfleet reputation, even when yet another military conflict ended in an apparent draw. These vessels proved useful in later exploration duty as well, whereas most of the 21 surviving original *Cavalries* and *Marses* were sold forward to other UFP navies (chiefly the UESF) in 2161-68 pending the formation of an operational common fleet.

Mercury

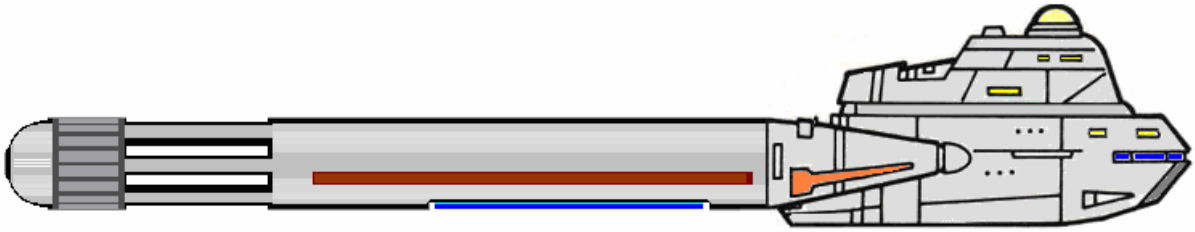
Scout
2154-2181

Completed:	72
Length:	162.2 m
Beam:	59.7 m
Height:	25.9 m 32.8 m (w/ trailing sensor array)
Mass:	186,800 tons
Officers:	14
Crew:	48
Cruise speed:	w 3
Max. speed:	w 4.2
Endurance:	6 months
Weapons:	2 plasma cannon (2.0 GW) on forward hull 1 plasma cannon (4.5 GW) aft of bridge
Shields:	Polarizable armor over main hull (original) 2-layer graviton/subspace globular forcefield (refit 2164-66, select ships) Navigational deflector on ventral bow
Transporters:	None
Auxiliaries:	None

Ships of historical interest:

USS Candace (NS-5665)

SOURCES:	(D own, using SFC ship as forward pod) (N SFC) (H SFC)



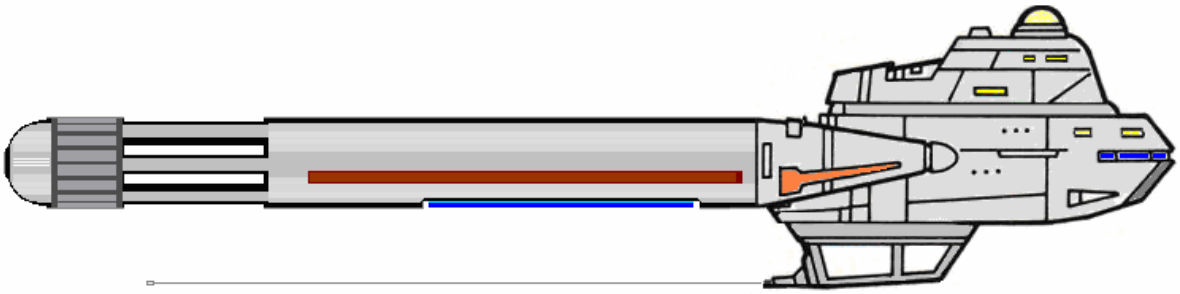
Despite repeated attempts at establishing diplomatic communications with the reclusive Romulans, military build-up in preparation for the upcoming open war was continued. Development of new long range scoutships was initiated just prior to the first explicit overtures to the Romulan War. The

aim of the *Mercury* project was to create lower-cost alternatives to the cruiser forces in the mission of scouting enemy positions or performing minimal-resolution evaluations of potential colony or mining worlds. The *Mercury* scoutships were not intended to carry the sophisticated gear of slow short range research vessels like the *Edison* class, nor were they equipped with any kind of heavy armament. Instead of being miniature cruisers, they essentially consisted of an outsized power and propulsion system and a minimal crew and sensor compartment.

The *Mercuries* were based on a twinned power and drive chain of the *Cavalry* class – a relatively advanced yet already proven warp propulsion system now referred to as a second-generation drive, to tell it apart from both the clumsy contraptions of the preceding century and the high-strung superengines of the modern cruisers. A compression fusion reactor sat between the conical forward ends of the slim trailing S70 warp nacelles. The monocylindrar warp field of the closely spaced 90,000 ton engines was a tricky beast to manage, the impulse engine squeezed in between them an insufficient means of maneuvering; the crews generally compared the handling qualities of their ships to quicksilver, although apparently the origins of the class name were more pompously rooted in Roman mythology and the 20th century US space program.

The pressure hull some eight decks high was of typical Earth commercial shipbuilding lineage. It featured a bridge dome atop, accompanied by a defensive 4.5 GW plasma cannon; then three decks of sensors and their monitoring facilities, as well as officers' accommodation and a cluster of four lifeboats; then four broad decks of crew accommodation and utility and storage spaces, as well as a deflector system and twin forward-facing medium-power plasma guns. On select ships, a ventral scaffolding kept the deployment reel of a trailing sensor array clear of the engines.

Some 72 ships of the class were completed for reconnaissance duty either near Earth or at forward staging area dockyards that were being built to support the deployed fleets. All were deployed in deep space on missions of as long as six months, despite the cramped conditions of the compact hulls. Starfleet soon began to enjoy the profits of their investment as the new vessels brought in data on Romulan fleet movements. It was not as widely announced that six vessels were lost between June 2156 and June 2157 alone, with more casualties to follow. The locations of major Romulan planetary bases were not established, either, despite many risky deployments of single or three-ship *Mercury* scout units behind enemy 'lines'.



Scoutship USS Candace *(NS-5665) being towed to Starbase Two for repairs after an encounter with Romulan forces in 2157. The ship was relaunched three months later, only to fall prey to a Romulan fighter wing stranded by the destruction of their carrier. The* Candace *was boarded and commandeered by the Romulans seeking a warp-drive ship that could take them home, but met the* Cavalry *destroyer* USS Jackson *in deep space. The* Jackson *decompressed the crew compartments and managed to tow the rest of the vessel back for repairs. The* Candace *finally met her fate when the repair dock was suicide-bombed by Romulan missile boats in 2158.*

* * *

About 50 scouts did survive the war, and 20 of them were recommissioned as UFP Starfleet vessels, enjoying twenty years of service in the patrol forces in the Romulan Neutral Zone. The ships were unsuited to the science scout role, however, suffering from poor endurance and the inability to carry new instrumentation for survey missions. None were upgraded during their UFP Starfleet service, save for the installation of modern subspace radios and navigation beacons.

Currently, two *Mercuries* survive in the Fleet Museum, albeit deprived of their warp nacelles. A dozen were converted into civilian couriers after their final decommissioning, featuring more modern commercially available navigational deflectors and omitting the weaponry and most of the sensors. Automation further reduced the crew numbers, but the challenges of the closely spaced trailing nacelles required expert spacemanship from the remaining crew. This only served to attract and encourage starship enthusiasts, some of whom still keep *Mercuries* in sailing condition for annual regattas in the Bolian system.

Marshall

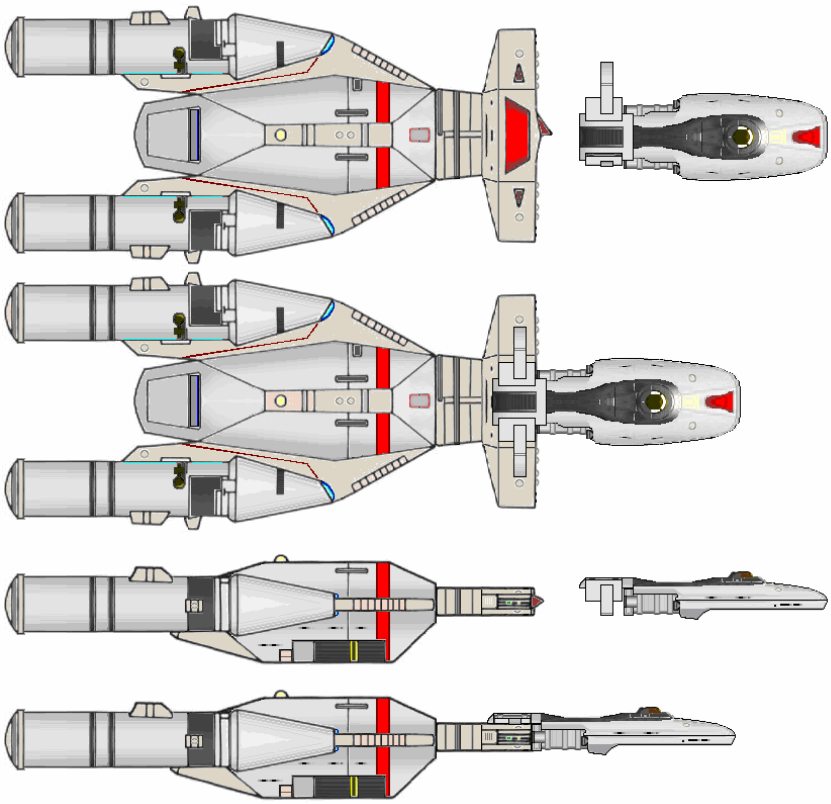
Heavy destroyer
2156-2207

Completed:	36
Length:	310.0 m (combined ship) 225.0 m (main hull, docking prongs retracted) 104.0 m (command/attack hull)
Beam:	117.0 m (combined ship, main hull) 37.7 m (command/attack hull)
Height:	45.5 m (combined ship, main hull) 20.8 m (command/attack hull)
Mass:	222,700 tons
Officers:	12
Crew:	145
Cruise speed:	w 3
Max. speed:	w 3.8
Endurance:	6.2 years (standard) 7.5 years (reduced-crew operations)
Weapons:	2 laser emitters (150 nm / 900 MW) on command hull 4 laser emitters (250 nm / 600 MW) on command hull, 2 port and 2 stbd 4 Type B phased particle cannon (125 GJ / 200 GW) on command hull, 2 port and 2 stbd 4 laser emitters (150 nm / 900 MW) on main hull bow, 2 port and 2 stbd 4 fwd Type A phased particle cannon (500 GJ / 500 GW) on main hull bow, 2 port and 2 stbd 2 aft Type B phased particle cannon (125 GJ / 200 GW) on ventral main hull 4 fwd torpedo tubes w/ 400 fusion and photonic torpedoes on main hull bow, 2 port and 2 stbd 4 laser emitters (250 nm / 600 MW) on engine pylons 2 laser emitters (250 nm / 500 MW) on dorsal main hull 2 laser emitters (250 nm / 500 MW) on ventral main hull
Shields:	1-layer graviton/subspace globular forcefield Polarizable armor over command and main hulls and engine nacelle forward parts
Transporters:	1 GP (4-pad); Mk I
Auxiliaries:	2 atmospheric and 2 spatial shuttlepods or 6 tactical craft

Ships of historical interest:

USS Patton (NDH-2201), *USS Hannibal* (NDH-2216/NCC-31)

SOURCES: (D SFC, matching art and specifications rather than schematics)
(N SFC)
(H SFC)



Just before the outbreak of the Romulan War, Earth government had agreed on the futility of the ongoing attempts at peace overtures with the brutal pirates and other space menaces. Instead, it decided to add an incredibly heavily armed ship based on emerging engine technology to Starfleet's arsenal. The finesse of the *Triton* cruisers would be replaced by brute force, the optimized positioning of components by sturdy structures and heavy bracings. Four prototypes for the class were under construction when the *Intrepid* first reported on the Romulan raids. When the true extent of the Romulan threat was revealed, these ships had just been declared operational, and the UE government immediately mounted an effort to complete ships of this class in greater numbers. In this effort, Andorian and later Tellarite economic help was important, a factor that led to strong popular approval on Earth of the proposed interstellar coalition with these.

The *Marshall* class destroyers relied on a Westinghouse twin-chamber, antimatter-spiced fusion reactor, rather drastically different from the unit used aboard the *Enterprises*. A matter-antimatter ratio of 10:1 at cruise meant huge energy expenditure compared with the *Enterprise* ratio of 227:1. The SEMT 'Everest' coils were of conventional make, similar to the *Triton* units at 100,000 tons apiece, and offered a cruise speed of warp 3 and a dash speed of warp 3.8. For this dedicated combat application, they were housed in heavily armored nacelles of considerable diameter, and the ramscoops were split in two by the robust pylons and canted inwards for whatever stealth and protection this would afford the delicate machinery. Cooling fins were an option soon found detrimental to medium range stealth.

While these systems represented a brute force approach and were soon outdated, the reaction drive was developed to such perfection that no further technical innovations would be needed for some

200 years. Its very narrow reaction engine nozzles were mounted in the fantail between the warp nacelles, and combined unprecedented thrust with an emission profile smaller than in any prior design. Ahead of them, the twin powerplant, fuel tank and adjoining machinery were housed inside a citadel of slanted, polarizable armor plates. In the lower part of the armored hull, a general storage area also featured a shuttle docking hangar, with large ventral entry doors rolling to the sides. The four shuttlepods sometimes gave way to up to six sublight fightercraft, found useful against certain types of Romulan threat.

Four aft-firing defense laser emitters were mounted at the stems of the nacelle struts, one up and one down per side, and four more in pairs on the main hull top and bottom vertices amidships, all neatly behind standard circular gunports. Two phased particle cannon at the bottom of the aft hull, astern of the shuttle hangar, completed the defensive deterrent. But the main weaponry of the ships was directed forward. At the very bow was a hammerhead shape some 95 meters wide, with groupings of laser emitters, phase cannon and torpedo tubes to the sides and a docking mechanism in the middle.

The modern command hull of the vessel was sturdily attached to this mechanism, yet was an independent spacecraft on its own right nevertheless, at 104.0 meters long and 37.7 meters wide very similar to the business end of a *Cavalry*. In the event of catastrophic failure to the ship, the crew could be protected by jettisoning the nacelles, ejecting the antimatter ammunition and fuel, and finally by severing the command hull from the rest of the ship. In theory, the gradual sequence would give the crew time to move into the separable section from their duties in the main hull, although more probably it would doom everybody in case of a rapidly spreading calamity. The main hull was therefore also provided with two rows of lifepods at the leading edges of the pylons and a further row down below, aft of the hangar doors.

Emergency escape or retreat was not the only purpose of the forward section, nor the most important one. Also going by the name ‘attack section’, this unit could engage in atmospheric combat for which the rest of the giant vessel was particularly unsuited. Unlike the *Cavalry*, it was not burdened with warp coils of its own. Also, its sublight engines were mounted amidships for great agility and liftoff balance, and it packed both phase cannon and lasers in abundance. There was an armored bridge atop and a series of folding fins astern. Landing legs and a planetfall ramp contributed to the tactical suite, as disembarking of surface combat teams was a very real option; although exercised at first, it tended to result in 100% casualties and was discouraged for most of the war. The *Marshalls* seldom embarked MACO teams in any case, any surface sortie thus bleeding the operating crew of the destroyer.

Photographed from a viewport of her command section against an asteroid backdrop, the main hull of USS Montgomery *(NDH-2219) begins her fatal spiral down into the turbulent atmosphere of Galorndon Core. Fierce battles were fought in this system of seemingly zero strategic value, as both sides tried to perform wide flanking maneuvers. As it was difficult and risky to navigate more than a few lightyears at a time at warp speeds, stops at star systems like this were common and tempted both sides to deploy a ship or two to lie in ambush. The fortunes of war were unpredictable, and the warring sides abandoned the tactics after suffering heavy losses against unexpectedly powerful enemy contingents paying visit to the systems.*

The major innovation introduced on the *Marshall* ships was the first truly effective operational version of the mass-repelling graviton/subspace shield, courtesy of the Andorian technological aid program. By countering both Romulan missile attacks and EM and particle beams, the shield was considerably more effective than the electromagnetic shields of the Romulan warcraft, which could not withstand kinetic-kill weapons. Attempts to refit this shield to older destroyers were unsuccessful, but the *Triton* and *Enterprise* cruisers were able to accommodate the heavy shield generators and thus gained a new lease of life. On the other hand, the *Marshall* enjoyed an unexpected advantage over the cruisers in featuring a less extensively integrated command and computing structure, making the destroyers more resilient to the Romulan cyberattacks that caught much of the Fleet by surprise in the opening months of the war.

An incredibly heavy arsenal of warp-phased particle beam cannon (four Type A 125 GW and six Type B 80 GW weapons, rivaling cruiser armament) was carried on the *Marshalls*, but the primitive shields of the Romulan warcraft proved surprisingly effective against these weapons. It was generally felt that the added cost and complexity of the guns and their massive power systems outweighed their usefulness. All destroyers were crammed with weapons already, so later models eschewed of phase guns, leaving these destructive but power-hungry weapons to cruiser-sized

vessels – and to Starfleet's one and only cruiser-sized destroyer class. Cruisers would continue to feature these cannon as primary or secondary armament until the advent of modern phaser technology (and so would the *Marshall*, for a surprisingly long twilight of a respected career).

Four warp torpedo launchers were carefully shrouded by layers of armor at the tips of the main hull hammerhead. Up to 400 shots were carried, not quite as potent as the heavier projectiles of the *Enterprises* and modified *Tritons*, but devastating nevertheless when fired in rapid salvoes of four. Romulan projectile weapons remained weak in comparison throughout the war, yet were far from impotent when properly applied. In 2156, the brand-new *USS Patton* of *Marshall* class (NDH-2201) was the first UESF ship to fall prey to the Romulans yet be able to report of it. The *Patton* had been patrolling the known Romulan areas rimwards of Triangulum Australe after the transmission of the first Earth peace offering, and was attacked by three Romulan ships, apparently a carrier and her two cruiser escorts on their way to β Rigel. Perhaps overconfident, Capt. Spadora decided to engage them at low relative speeds and bring her ship's total firepower to bear on the targets at once. But Romulan lasers swiftly brought down the new shields, and two fusion detonations amidships reduced the ship to scrap. The *Patton* still had time to send a subspace message of the attack, resulting in a declaration of war by Earth. *

The last moments of USS Patton*. The photonic torpedo on its way to a meeting with a Romulan warp carrier was the main weapon of the type, although the lasers here also seem to be effective against the enemy interceptors in this artist's reproduction. No accurate record of the engagement exists: the distress log of Captain Spadora is detailed in places, highly superficial in others, and lacks the tactical telemetry track (whether due to battle damage or user error remains unclear).Due to the shortcomings of the evidence, it has even been suggested that no battle actually took place, and that Starfleet merely forced the government's hand in finally declaring a state of war. A competing and more compelling conspiracy theory paints Capt. Spadora as victim of Romulan information warfare, agreeing that his 'opponents' were fictional but no less deadly for their lack of physicality; the fate of the ship may have been sealed by remotely commanded explosions of her own ordnance.*

From 2156 on, ship after ship of *Marshall* class tried to push through Romulan defenses to attack their capital ships in numerous major confrontations. Operating in conjunction with *Triton* (or, if available, *Enterprise*) class heavy cruisers, and sometimes with older long range vessels, these ships were also essential in deep space operations directed at Romulan staging areas and supplying posts.

But *Marshalls* were expensive to produce. At the cost of a *Marshall* destroyer, the Romulans could field twenty small bird-feathered missile boats that could wear down the mightiest of Starfleet vessels before perishing. Desperate for a decisive battle, UESF sought Romulan centers of

production, finding none, and hunted for Romulan carriers, spreading out its forces in the process. Meanwhile, Romulan forces pressed on, threatening Tau Ceti with a daring deep-penetration maneuver and raising concerns about a massive attack on Earth itself. The brief victories of 2159 temporarily halted this onslaught, but did not make the quest for decisive battles any easier.

The war could only end in one way, UESF admirals and generals said: a direct attack at the twin Trianguli worlds themselves, a terror raid that would 'bomb the bastards to stone age', as the strategy was eloquently formulated.

* * *

At the conclusion of the Romulan War came the mopping up: the disbanding of units, attempts at locating of those declared missing, relief efforts at former war zones – and answering the inevitable secondary challenges from opponents ranging from mere scavengers to opportunistic rising powers. The Federation had to cope with the Tarn, the Vrii, the Naten… History as written in the Federation still does not know whom the Romulans had to face. The challenges were minor compared to what had just taken place, however, and while Starfleet was running its war legacy ships ragged in the new conflicts, there never emerged good enough a reason to add the costs of re-escalation to the Federation postwar budgets.

Especially the destroyer category of vessels was lacking in excuses for modernization. The aerodynamic *Gangeses* and more vacuum-oriented *Cavalries* were allowed to deteriorate and then retire, as their warp performance did not permit them to operate on the new frontiers. The *Marshall* class was forced to fight on in compensation. And that it did, with just a handful of attrition replacements joining the war veterans in the early sixties before purse strings were pulled tight. Nobody at the time would in their darkest and grimmest nightmares have thought that a follow-on type would not be fielded until well into the next century.

Ten of the *Marshalls* that survived the war went on serving in the UFP Starfleet, with NCCs between 34 and 43; eight more continued service in Earth colors. In addition, ten attrition replacements (NCC 44-53) were completed, and the class formed the backbone of UFP and Earth defenses against the Romulans (thankfully still the only substantial enemy known) until the introduction of more modern vessels in the size range. *USS Hannibal* (NCC-39, originally NDH-2216), which served as Admiral Hamilton's flagship during the war, is preserved on the Fleet Museum above Earth, partially refurbished to Romulan War era condition and serving as a special war exhibit.

* Curiously, neither the Romulans nor the newly formulated and not yet completely official Federation Council ever formally declared war. Officially, the fight was between the United Earth Starfleet and space pirates known as Romulans, not between the UFP and the Rihannsu Star Empire!

Doppler

Scout
2157-2177

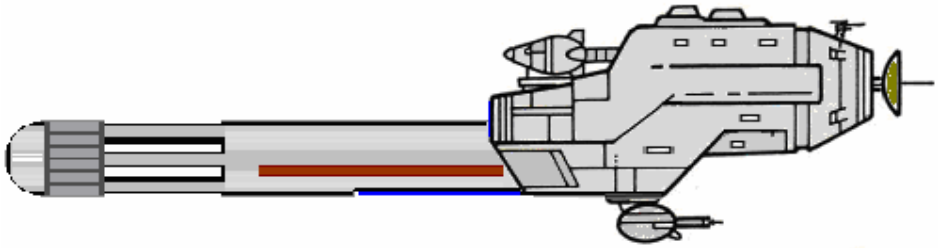
Completed:	94
Length:	150.0 m (w/o sensor dish) 162.0 m (w/ sensor dish)
Beam:	46.1 m
Height:	36.5 m (w/o ventral cannon)

	45.0 m (w/ ventral cannon)
Mass:	99,100 tons
Officers:	8
Crew:	42
Cruise speed:	w 3
Max. speed:	w 4.1
Endurance:	6 months
Weapons:	1 laser emitter (250 nm / 450 MW) aft of bridge 4 laser emitters (250 nm / 200 MW) on forward hull 1 Type C phased particle cannon (80 GJ / 100 GW) in ventral turret (optional) 2 torpedo tubes w/ 20 photonic torpedoes in ventral turret (optional)
Shields:	Polarizable armor over main hull (original) 2-layer graviton/subspace globular forcefield (refit 2161-63, select ships) Navigational deflector on forward hull
Transporters:	None
Auxiliaries:	1 reconnaissance pod

Ships of historical interest:

USS Appalachia (NS-5902)

SOURCES:	(D own, using SFC ship as forward pod) (N SFC) (H SFC)



The less than stellar record of the *Mercury* scouts in obtaining information from behind Romulan lines was a major problem for UESF. With the introduction of the *Marshall* class, admirals finally had the tools to wage offensive war against the Romulan forces. But without detailed information from scouting missions, the enemy could not be located. Clearly, a more survivable scoutship type was needed to replace the *Mercuries*.

In 2157, modifications were performed on an as yet unnamed *Mercury* hull to boost its weapons capacity. The entire fire control system was changed, beginning with computer hard- and software upgrades and later expanding to a refit of all fire control sensors and laser emitters. Laser power conduits were redesigned for better endurance and peak power transmission. The three decks below bridge were all omitted and the bridge buried deeper inside the main pressure hull. Bow lasers were doubled in number, and the navigational deflector replaced by a far larger assembly, sometimes capped by a sensor dish at the extreme bow.

This tucking-in of vulnerable parts was but the passive element in increasing survivability. In a significant propulsive reconfiguring, impulse agility was boosted by replacing the centerline engine with two units smoothly cowled in armor on both sides of the pressure hull stern. Warp propulsion in turn was trimmed down by the adoption of a single centerline nacelle, its forward end again

carefully armored beneath the stern. A rotating phased particle beam cannon and torpedo turret could be slung under the cowling and provided optional heavy fire support in multiple directions.

Crew requirements went down to fifty, but accommodation standards could not be improved as total volume had gone down even more radically. Four lifeboats were still available in the new design, and a 15-meter reconnaissance pod with full atmospheric capability was added, berthed on the upper stern of the pressure hull. A landing party of eight plus two flight crew could be stealthily inserted near enemy surface installations, or a boarding team breached into an enemy hull, yet no such party ever returned to tell of the true nature of Romulan physique, let alone of tactically more significant issues.

The final and most important survivability-increasing modification was the installation of an Andorian subspace shielding device, far humbler than the *Marshall* units yet still far better than the heaviest EM shields or hull armor. The shield generator system was mounted in two side sponsons flanking the forward hull.

The new scout was a much more survivable design than the original *Mercury* class. The prototype was quickly named *USS Doppler* and sent to scout on Romulan carrier fleets in the Leo direction. The *Doppler* played only a humble part in the defensive intelligence operation that spread a net of monitoring vessels against Romulan flanking attempts and culminated in the interception of Romulan forces at the battle of Prantares. She was soon followed by more than fifty sister ships, however – and the increase in tactical and strategic information brought by these ships was decisive. Earth admirals now went for the offensive, sending large hunter fleets into Romulan space to search for naval bases, based on hints gleaned from the observing of Romulan naval movements. One such expedition paid off in 2159, when the old cruisers *Nimitz*, *Gorshkov* and *Yamamoto* managed to cripple a major offensive force replenishing on a planetary base. Others met with disaster in Romulan ambushes, but Earth was finally on the move now. After 2159, Romulans were on the defensive, and the war became a race of finding and destroying enemy fleets and command outposts hiding in space. Planetary assaults and attacks on shipping dropped down to almost nil for the final stages of the war.

The historically most significant representative of the *Doppler* class by far was the vessel that revealed the position of a Romulan forward command post at Cheron. Although not realized at the time, the base served as the main subspace communications relay station for forward Romulan forces, and the raid mounted against it virtually paralyzed Romulan attacks and collapsed their defense structure at a crucial moment. Curiously, there is disagreement as to which *Doppler* scout made the historic observation: *USS Cordwainer*, *USS Miramar* and *USS Selyan'a* all were operating in the area, all sent back coded reports, and all were lost with all hands before their next report. Moreover, UESF Forward Observation Outpost 22 receiving the reports was destroyed only two days after relaying the information.

Pursued by a wing of missile boats, USS Appalachia *(NS-5902) flees from 198 Eridani, soon to become the site of a major battle between the warfleets. Here, Romulans were successfully gathering ships for a flanking attack that would have cut off Vulcan from the main Earth forces. The routine patrol mission of the* Appalachia *revealed the intentions just in time for the 3rd Fleet to mount a preemptive attack. The Romulans retreated with light losses but had to abandon 198 Eri for the duration of the war. Instead, Starfleet established a supply base on 198 Eri II.*

The *Dopplers* suffered lighter losses than their *Mercury* forebears. Of the 94 ships built, only 22 were lost in action. Eighteen of the best-preserved survivors received NCC registries and forcefield generators for service in the joint UFP Starfleet after 2161; others were sold to allies as local defense vessels. Upgrades were harder to come by, since the technology aboard the *Dopplers* had become outdated already during the war. The last *Dopplers* ended their service in 2177, and were succeeded by small numbers of *Placido* multimission ships. No specimens were saved for the Fleet Museum, but several ships were converted for civilian use. These can still be found in various planetary surplus depots in the UFP core area, in varying states of disrepair – although again, a few examples have been refurbished for competing in the Bolian regatta.

Minuteman

Destroyer
2158-2175

Completed:	29
Length:	160.0 m
Beam:	66.1 m
Height:	46.5 m
Mass:	189,500 tons
Officers:	8
Crew:	42
Cruise speed:	w 3
Max. speed:	w 5.1
Endurance:	6 months
Weapons:	2 laser emitters (250 nm / 450 MW) on dorsal primary hull 2 laser emitters (250 nm / 450 MW) on ventral primary hull 2 Type C phased particle cannon (80 GJ / 100 GW) on primary hull bow 1 fwd torpedo tube w/ 80 fusion torps on primary hull bow 2 fwd torpedo tubes w/ 20 photonic torps on side sponsons 2 aft torpedo tubes w/ 20 photonic torps on side sponsons
Shields:	Polarizable armor over primary and parts of secondary hull (original) 3-layer graviton/subspace globular forcefield (refit 2162-63, select ships) Navigational deflector on secondary hull ventral midhull
Transporters:	None
Auxiliaries:	1 shuttlepod, 1-2 work pods

Ships of historical interest:

USS Alaska (NDD-154), *USS Minuteman* (NDD-140)

SOURCES:	(D ST:Legacy computer game) (N ST:Legacy computer game) (H ST:Legacy computer game)

The UESF fighting forces of the 2150s were dedicated to system defense in doctrine and equipment alike. Yet with the introduction of a working dilithium-focus powerplant and plasma recharger technology, ambition was understandably directed at controlling greater swaths of space. An optimistic timetable called for the construction of combat-dedicated deep space patrol vessels between 2158 and 2165 for the fielding of a fighting force in the late 2160s, and possible punitive expeditions against pirate strongholds in the 2170s. For this, some two dozen destroyer-type starships would have to be procured.

System defense would not be among the mission profiles of the deep space destroyers. The designers bidding for the project thus abandoned aerodynamics and lifting body configurations. Variations of the *Marshall* class were suggested, with modern cruiser engines to hike up the already considerable cost. Growth versions of the *Djartanna* and *Cavalry* system defense destroyers were also offered. The winning bid was the child of a different era, though: put forth in 2157, when extensive fighting in deep space already was grim reality, it expanded on an unexpected success story of the early war years. No longer needing to guess about the nature of the enemy, and no longer at liberty to experiment much, Starfleet chose as its next champion a direct development of the *Daedalus* class.

The austere simplicity and ease of manufacture for the primary hull was retained, even if the new structure was longitudinally stretched to twice the volume. A strong secondary hull structure of almost boatlike grace would now cradle the habitat section at its bow, eliminating the weak point of the connecting neck now that extreme measures for protecting the crew from the hazards of the drive system no longer were necessary or possible.

Starfleet's faith on the warp five engine may not have been matched by the trust the crews placed on its reliability and safety, but the performance edge was welcome indeed. The drive system rode like a saddle with twin PB-5 engine nacelles as its stirrups, and with stubby horizontal struts attaching it to the loins of the secondary hull. The struts pumped energized plasma from the annihilation reactor into the warp coils, but also featured pathways through which antideuterium could be fed – for engine spiking, and for the external photonic torpedo launchers, the main weapon of the vessel. At the high point of the saddle arch sat an impulse drive block feeding off main drive plasma. Radiators and expander vents along the arch helped manage the quirks and spikes of the high-strung power system, and jettisoning of the entire saddle assembly served as the last line of defense against a feedback cascade. The system was still sturdily secured, with a horizontal boom connecting the top of the arch to the primary hull and also providing maintenance access.

For all its structural complexity over the *Daedalus* counterpart, the secondary hull seemingly accommodated little new. The main reactor and its armored antimatter tanks were well protected in the middle, with the all-important plasma rechargers venting upwards and the IMRF units also masked from enemy view at the primary/secondary hull juncture. A sensor and deflector array at the ventral midhull was of modest *Daedalus* standard, only boosted in strength by the greater available

overall power. However, the stern of the hull cradled another ovoid citadel making all the difference in combat: this facility would house Andorian shield generators as soon as those became available. Also protected within were secondary power systems. The primary citadel was left for crew accommodation, command and control spaces, a fifth torpedo launcher incapable of using antimatter warheads, and two side loading bays, typically also permanently accommodating a single atmospheric auxiliary and some work pods.

Globular forcefields flare as a Romulan Battlehawk, impervious to Type C phase cannon, succumbs to a well-placed antimatter torpedo. The sparsity of directed energy weaponry on the Minutemen *never amounted to a true battlefield liability. Note the glow of the IMRF units amidships.*

The upper and lower bows held gunports for directed energy armament, which initially was thought to consist of mid-caliber phase guns. However, by the time the *Minuteman* was completed in 2158, mankind was already at open war with a culture that could resist these marvels of weapon technology. Delta laser weaponry proved much more promising against Romulan shields, and was readily installed – yet Starfleet had to rethink the whole concept of the deep space destroyers. Would investment in vessels of lesser than cruiser firepower be wise, when the warp five drive systems could be better spent on further *Enterprises*, *Poseidons* or *Achilleses*?

Production nevertheless continued, in parallel with several cruiser projects. The destroyers eventually numbered 29, about half of these reaching completion before the end of the war. They never outnumbered the cruiser force, or even significantly challenged any single cruiser class in terms of numbers or availability – in the latter, their overcautiously positioned weapons and propulsion systems proved an exotic and crucial serviceability weakness. They did contribute to the war effort considerably, and provided torpedo punch in many a desperate battle where phase beams failed to penetrate enemy defenses. Yet they had very little future left when the war ended. Only a handful persisted till the 2170s when block obsolescence pruned Starfleet of its last wartime relics.

Achilles / Helena

Cruiser
2158-2203 (*Achilles*)
2158-2174 (*Helena*)

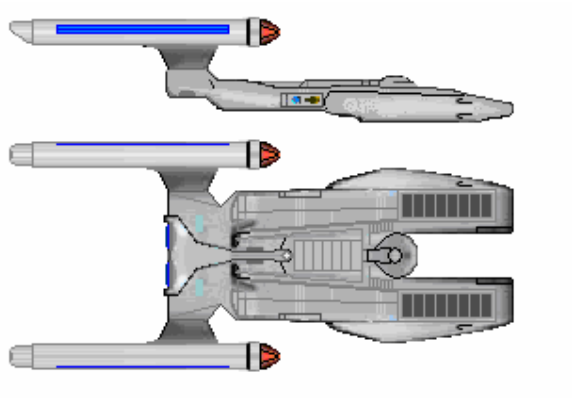
Completed:	22 total: 12 *Achilles* 10 *Helena*
Length:	207.1 m (*Achilles*) 186.0 m (*Helena*)
Height:	33.1 m (*Achilles*) 27.9 m (*Helena*)
Beam:	132.6 m (*Achilles*) 107.2 m (*Helena*)
Mass:	238,800 tons (*Achilles*) 217,100 tons (*Helena*)
Officers:	23 (*Achilles*) 20 (*Helena*)
Crew:	175 (*Achilles*, Romulan War standard) 78 (*Achilles*, postwar standard) 162 (*Helena*, Romulan War standard) 60 (*Helena*, postwar standard)
Cruise speed:	w 3
Max.speed:	w 5.0 (original) w 4.1 (*Achilles* refit 2169)
Endurance:	4 years (*Achilles*) 3 years (*Helena*)
Weapons:	*Achilles* original: 2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral aft hull 2 Type B phased particle cannon (125 GJ / 200 GW) on bows 2 fwd missile tubes w/ 40 fusion missiles in primary hull bow cutout 2 fwd torpedo tubes w/ 30 photonic torpedoes in primary hull bow cutout *Achilles* refit 2159-60: 2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral fwd hull 2 laser emitters (150 nm / 800 MW) on ventral aft hull 2 laser emitters (150 nm / 800 MW) on bows 2 fwd torpedo tubes w/ 70 photonic torpedoes in primary hull bow cutout *Helena* original: 2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral fwd hull 2 Type B phased particle cannon (125 GJ / 200 GW) on bows 1 fwd torpedo tube w/ 30 photonic torpedoes in primary hull bow cutout *Helena* refit 2159-60: 2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal fwd hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral fwd hull 2 laser emitters (150 nm / 800 MW) on bows 1 fwd torpedo tube w/ 70 photonic torpedoes in primary hull bow cutout
Shields:	Polarizable armor on hull and nacelles 1-layer subspace/graviton forcefield bubble Navigational deflectors on bows
Laboratories:	1 signals intelligence (*Achilles* original) 1 GP, 1 medical (*Achilles* refit 2164)
Transporters:	1 GP (1-pad); Mk I
Auxiliaries:	4 spatial pods (*Achilles*)

3 spatial pods (*Helena*)
2 atmospheric shuttlepods, 4 spatial pods (*Achilles* refit 2164)

Ships of historical interest:

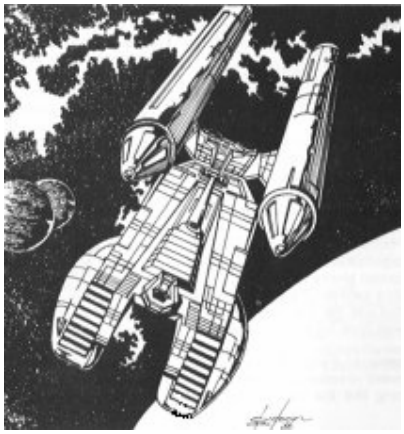
USS Lorelei (NCA-254/NCC-23), *USS Parakeet* (NCA-256/NCC-25)

SOURCES: (D FASA Romulan War Sourcebook)
(N LUG)
(H FASA, LUG, own)



It was only a year into the fighting in the Romulan War that Earth truly understood the futility of 'qualitative high ground' against the endless ranks of agile and bold Rihannsu attack craft. Certainly the best of UESF vessels held their own against the enemy, but at a price Earth could not afford to pay. Resources dedicated to completing the heavy cruiser construction programs meant a lower total of hulls completed, a lower number of planets protected. Worse still, the most advanced and complex of Earth's fighting vessels were also the ones most vulnerable to Romulan cyberattacks, forcing Starfleet to devote disproportional resources to their protection and further increasing the cost. In 2157, heated and anguished debate at UESF Command eventually resulted in a compromise known as the 'seventy per cent deal'. That much funds would be released per each subsequent cruiser keel, in relation to the high-performing *Enterprise* class.

Eight months of concurrent design, development and construction produced the first UESF war cruiser. The *Achilles* class merged attributes from both the tightly tuned *Enterprises* and the incredibly robust *Marshall* heavy destroyers. Warp five propulsion was still a design criterion, and the advanced dilithium regulator technology of the *Enterprise* class was adopted without hesitation. Improvements introduced with the PA-1C engines concentrated on survivability and maintainability. Six- rather than four-spoked guards on the ramscoops and plasma diffusers gave the armored nacelles a menacing look. Rather than be mounted on separate horizontal booms, the pylons attached to a single broad structure that still carried in duplicate all the PA-1 elements. Plasma rechargers now vented port and starboard rather than up, and the IMRF crystal was ventrally rather than dorsally exposed, but internal differences between the angular *Achilles* hull and the rounded *Enterprise* booms were minimal. The ventrally accessed shuttlebay was only slightly less lavishly equipped than its *Enterprise* counterpart; dorsal gunports mounted the same aft-firing Type A phased particle cannon. Only aft-firing torpedo tubes were omitted from the design.



*A joint attack on a Romulan 'U-15' (*Vriha*) class cruiser by* USS Birmingham *and* USS Union *offers effortless comparison of* Achilles *and* Enterprise *design features. Most noteworthy from this angle is the omission of primary hull impulse nozzles and aft missile and torpedo tubes from the former.*

The forward hull was trimmed down from its full saucer form. As laboratory spaces and cargo holds were discarded, the bows were bifurcated into two heavily armored prongs, with the paired missile and torpedo launchers in the deep gap in between. The main role of the remaining bows was to house the forward-firing phase cannon, two Type A and one Type B per bow section, as well as the twin navigational deflector arrays on the outer flanks. A combat crew of 23 officers and 175 men served the classic cruiser mission, although accommodated in more spartan conditions than their *Enterprise* equivalents. Many specialists still tended to scientific instrumentation, even if now in pursuit of tactical intelligence rather than abstract knowledge. Ground combat and boarding specialists were also regularly embarked; a significantly extended planning room complex aft of the bridge was adjoined by accommodation for these specialists. With considerable risk but noticeable success, the single Mk I transporter platform was employed for boarding action.

Some adjustments were made to the weapons and sensor suite from the fourth vessel onwards, in response to mounting wartime experiences. Aft phase cannon and forward secondary batteries were replaced by high-power lasers, and the missile tubes were sealed off. By 2160, these changes had been effected on the original quartet of cruisers as well, although there never was anything approaching a common standard of equipment in the *Achilles* force. Rather, new gear was installed as soon as it became available, and each cruiser for example came to carry a different shield generator. Maintenance in such circumstances called for a great deal of specialization. Then again, as the vessels were tasked with penetration sorties of extreme range, there seldom was any crew rotation that would have diluted the ship-specific expertise of the engineering teams. The crews spoke of themselves as being 'married to their ships', a situation quite unfamiliar to the armed forces of the preceding century Earth, although commonplace enough in the mercantile fleet.

Forward replenishment from a Hercules *transport places the* Lorelei *(NCA-254) of* Helena *class and the* Kerry *(NCA-245) of* Achilles *class conveniently parallel for size comparison. UESF's 'war cruisers' efficiently and elegantly served their purpose in the Romulan War. Their compact configuration enabled sufficient numbers to be built, but predictably proved unsuited for peacetime operations. Especially the* Helenas *were far too small to accommodate research gear.*

Concurrently with early *Achilles* adjustments came a decision to downscale the design one more step. The more affordable *Helena* cruisers mounted the same powerplant and warp propulsion system, but dropped two primary cannon, all missile tubes and one of the torpedo tubes to allow for an even more compact hull. Warp nacelles were brought closer to each other, without major effects on speed but an increase in cruise power consumption; combined with reduced fuel tanks, this gave 25% lower overall endurance. Impulse systems were greatly compacted as well, although the result was greater agility and acceleration for the smaller cruiser. A classic martial naming scheme of successful historical war vessels of cruiser type was applied on the ten *Helenas* ultimately completed as well.

One of the most famed victories for the *Achilles* fleet came at γ Hydra, a distant battlefield where Admiral Larson in early 2160 managed to amass his tattered and dispersed cruisers into a powerful unit that decimated its Rihannsu counterpart and opened a temporary second front against the Romulan Star Empire. Low on munitions, fuel and supplies, the five *Achilleses* and two *Enterprises* still had to fight their way back to human-held space. In a controversial move, Larson decided to leave behind the *Kirov* and the *Kerry*, along with two hundred crew, in order to stock the rest of the fleet with sufficient dilithium for a voyage home; the crucial resource had become a grave strategic liability that dangerously hobbled the deep space maneuvers of the UESF.

The fleet made it safely back to Earth, and a year later, light cruiser *Piranha* and the transport vessel *Roy Malcolm* were dispatched to pick up the castaways. Their daring rescue mission was for nought, however: the two cruisers could no longer be located. Only in light of the much later discovery of debilitating radiation in the system could a plausible theory of their fate be formulated. In all likelihood, the vessels had attempted to leave the deathtrap system at sublight, only to succumb to the radiation effects while underway. Even with contemporary sensors, attempts to find the derelicts have proven fruitless, and it is suspected that an initial desperate homeward course has resulted in them currently coasting through Romulan space.

Humans would only return to γ Hydra a century later – but there would be no Romulan presence there either, the Neutral Zone having been drawn in accordance with the outcome of the historic battle. An equally lasting imprint from the events was Starfleet's decision to abandon dilithium in future power applications, a move also suggested by the dwindling reserves of the precious substance and the failure modes encountered on dilithium-equipped vessels.

* * *

Turning the *Achilleses* into peacetime explorers was somewhat counterintuitively easier going than the conversion of *Enterprise* units. Mainly this was due to the fact that the *Achilles* production run had reached twelve hulls and ample spares. There also was a lesser degree of damage and fatigue on the *Achilles* war survivors. Four vessels (or 4.7, if one counted the remaining essentially spaceworthy two-thirds of the *Salem*) were available for continued service in UFP Starfleet colors.

Only minor ‘swords to plowshares’ adjustments were initially performed, such as installing a general purpose laboratory, extending the medical facilities, and reconfiguring sensors for survey duty. These were quite sufficient for letting the ships score several scientific victories on par with those of the *Enterprise*. Much of the space within 100 ly of Earth still remained unknown to humans, or their new allies, few of which had the interest or the hardware to perform competing surveys of meaningful scope.

Speeding past Big Horn at Aldebaran, the Orlova *flaunts her newly painted NX registry. The paint had barely had time to dry before Federation Starfleet in 2162 decided upon a common scheme of generic registries. The* Orlova *continued a career of exploration as NCC-10 for seven more years, scoring four first contacts and nine combat victories.*

The exploration careers of the *Achilleses* were cut short, however: as early as 2169, a refit of wholly different scope and aim was effected on two of the vessels, and the other three retired, when dilithium regulators were declared too risky for use. *USS Birmingham* and *USS Glenn* stand apart as the only Starfleet vessels ever to be modified from dilithium focusing to the lower-performing forcefield antimatter feed constriction and still retain a combat mission. Both soldiered on at a reduced top speed of warp 4.1 until early 2203. Loss of the former to unknown causes in the line of duty resulted in withdrawing of the latter from deep space duty as well. The *Glenn* still remains in near-operational condition at Cait, preserved as a museum piece after half a century of sublight system patrol at 15 Lyncis.

Of the seven *Helena* war survivors, the fatigued *Emden* was immediately scrapped in 2161. As most large cruisers at the time were undergoing overhauls or refitting for peacetime duty, the distinct honor of carrying the Federation flag befell the humble *Parakeet*. The *Lorelei* would pick up the heroic *Cavalier* survivors in early 2162; the *Aurora*, *Mistral* and *Rio Negro* would again go to war the following year, and be lost to the Tarn. Recalled from deep space by the dilithium decree, the *Parakeet* would finally be stricken in 2174, along with the less well known sister ship *Algerie*.

Christopher

Light cruiser
2158-2182

Completed:	18
Length:	182.2 m
Beam:	102.0 m
Height:	33.0 m
Mass:	215,200 tons
Officers:	16
Crew:	145

Cruise speed:	w 3
Max. speed:	w 5.9
Endurance:	2 years (standard) 4 years (reduced-crew operations)
Weapons:	2 laser emitters (150 nm / 1.2 GW) on dorsal primary hull 4 laser emitters (150 nm / 800 MW) on secondary hull 2 fwd missile tubes w/ 50 fusion missiles or other ordnance on ventral primary hull 1 fwd torpedo tube w/ 20 photonic torpedoes on ventral primary hull
Shields:	1-layer graviton/subspace globular forcefield Polarizable armor on most of primary hull Navigational deflector on bow Auxiliary navigational deflectors on dorsal primary hull
Transporters:	1 GP (3-pad); Mk I
Auxiliaries:	2 shuttlepods, 2 assault shuttles

Ships of historical interest:

USS Christopher (NCL-2000/NCC-28)

SOURCES:	(D own) (N MJ Friedman 'Starfleet: Year One') (H own, MJ Friedman 'Starfleet: Year One', Michael A. Martin 'ST Enterprise: The Romulan War')

Parallel with the *Achilles* class, another new cruiser-sized design emerged as a response to the Romulan War. The *Christopher* light cruiser was a totally new class featuring no *Triton* or *Enterprise* components. Built for speed and endurance, the ship was optimized from the beginning for extremely mobile warfare, and would act as the spearhead of a new tactical approach. The cruisers would no longer prey on the frustratingly elusive Romulan carrier groups, but would perform deep strikes against fixed installations, moving the war to the Romulan turf for the first time. A key requirement to this approach would be an increase in scoutship quality and quantity, which had already given UESF its first major victory in 2159. But only with the new long range cruisers could such strikes be mounted with any certainty of success.

Every lesson learned from *Cavalry*, *Marshall* and *Minuteman* destroyers was applied here, from the omission of particle beam weaponry to the use of heavy frontal armor and provision of room for up-to-date subspace/graviton shield generators. In fact, in terms of design and equip, *USS Warren E. Christopher* (NCL-2000) could well be considered a destroyer instead of a true cruiser. Quickly joined by no less than 17 sisters, the ship nevertheless soon proved her worth as an independent, high endurance fighting platform worthy of the more prestigious designation.

The primary hull of the *Christopher* was a two-part structure reminiscent of an alligator head: a rounded triangle of an upper section housed three decks of C^3I functions and habitat space, with a command superstructure atop, while the smaller lower 'jaw' housed twin missile tubes with

magazines for at most fourteen heavy 900 mm fusion or photonic missiles each, plus a single warp torpedo tube at the very bottom. A pair of 95,000 ton PA-4 warp engines on sturdy pylons sprouting at shallow dihedral from a bulbous secondary hull represented traditional thinking and gave the ship a silhouette somewhere between the classic prewar cruiser and destroyer. Tried and proven construction techniques could be used, for it was not the hull that was significant in the new cruiser. Nor was the integrated weapons system unconventional: in addition to the launchers, there were two gigawatt-class, warp-accelerated main lasers to provide primary firepower, with four smaller lasers for close-in protection.

What made a difference was the combination of a high endurance powerplant, a superb inertial navigation system and a separate major computer dedicated completely to the task of long-duration warp navigation. While two *Cavalries* or one *Marshall* might pump out equal missile, torpedo or laser firepower, the destroyers could not compete in the range of combat operations. At a cruise speed of full warp three, some twenty lightyears could be spanned in a single combat sortie – forty, if the ships were stripped of some weaponry, crew and equipment, and given extra fuel. And the actual attack runs could be performed at dash speeds up to warp 5.9, leaving most adversaries standing still.

Due to their superior speed and range, the *Christophers* seldom operated in concert with other ship types, although complex ambushes were at times performed jointly with modern destroyers. *USS Chester W. Nimitz* and *USS Raymond Spruance* took the place of their fallen namesakes of *Messier* class, while others received names honoring various lost destroyers. The names proved good omens, for not a single *Christopher* was lost while idle on Earthbase orbit or flying into a Romulan ambush. Eight cruisers nevertheless perished in attack sorties, in battles that may have been uneven but in which the initiative at last was on the Earth side.

As two Cavalry *destroyers launch their missiles at more distant targets, light cruiser* Anaconda *(NCL-2008) plunges directly into a swarm of enemy missile boats at Nimbus in 2160. While the* Christophers *were never designed to fight against small craft the way the older cruisers were forced to do, the* Anaconda *more than held her own in the engagement; superior UESF fire control was beginning to turn the tables against the Romulans and making their small craft less of a threat to Earth fighting vessels.*

The greatest hour of the *Christopher* class came in 2160, when a flotilla of seven specially configured light cruisers, stripped of some consumables and most crew and carrying a mixture of heavy anti-ship and anti-surface missiles and a maximal fuel load, penetrated Romulan defenses with a daring uninterrupted warp run of 52 days. Despite the immense problems of coordination due to complete sensor and communications silence while in warp drive, the cruisers arrived at the 83 Leonis system in perfect formation with only minor systems damage to one vessel. Enemy capital ships in the region had been lured away by a massive feint involving several *Enterprise* units in one of the most extensive military maneuvers in the entire war. Local defenses at Cheron still responded

with deadly force, and the UESF flotilla lost two of the light cruisers in quick succession. Yet the surviving cruisers fired their missiles with precision at the frontline command center spotted four months earlier by a *Doppler* scout. Elements of the feint force joined in on an easy kill of the remaining facilities.

Six other strikes of this type against other recently unveiled Romulan installations exploited the strategic-scale feint, featuring mixed fleets of *Christophers, Thofsins* and *Phindas* and omitting all slower types. Two were never heard of again, but the remaining four all scored devastating hits on their targets. Yet none was more important than the battle at Cheron: unbeknownst to the crews, the ships had managed to destroy the hub of the entire Romulan subspace communications network in sectors 23 through 28. The utter confusion into which the Romulan command structure had been thrown would have meant easy victory for Earth. The only way for the Romulans to protect their frontline bases now would have been to position their fleets inside the respective systems, without the option of strategic mobility. Instead of risking total loss of both bases and ships, the Romulans decided to throw the game. A request for truce was sent out in October 12, 2160.

* * *

Surviving *Christopher* units continued operations beyond the onset of peace. Since local space was quite saturated with war surplus vessels, and since the victorious Federation had few challengers, there was little interest in developing a direct successor design. Yet the deep space capabilities of the *Christophers* were not as useful in peacetime duty as one might assume, as there was no room or power to be spared for research gear. No permanent laboratory spaces were ever installed aboard the vessels, nor did the sensor suites receive the advanced short range planetary survey instruments of the *Enterprises*. The light cruisers mainly attained fame in early pirate hunts, and served admirably in enforcing Federation law and order across the former dominions of the UFP signature members.

When the time for retirement came in 2182, four *Christopher* vessels including the original class ship were still active. All were sold forward to existing and hoped-for allies in the coreward direction.

Poseidon

Heavy cruiser
2159-2173

Completed:	17
Length:	223.7 m
Height:	37.5 m
Beam:	132.6 m
Mass:	258,500 tons
Officers:	23
Crew:	158
Cruise speed:	w 3
Max.speed:	w 5.0
Endurance:	4 years
Weapons:	2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal primary hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral primary hull

2 Type B phased particle cannon (125 GJ / 200 GW) on dorsal primary hull
2 Type B phased particle cannon (125 GJ / 200 GW) on ventral primary hull
2 Type B phased particle cannon (125 GJ / 200 GW) on fwd primary hull (w/ dorsal and ventral gunports)
4 fwd torpedo tubes w/ 40 fusion torpedoes on ventral primary hull
2 fwd and 2 aft torpedo tubes w/20 photonic torpedoes in dorsal pod

Shields: Polarizable armor on hull and nacelles
Navigational deflector at bow

Laboratories: 2 GP

Transporters: 1 GP (3-pad); Mk I

Auxiliaries: 2 transatmospheric shuttlepods, 4 spatial pods

Ships of historical interest:

USS Coto (NCC-213), *USS Homer* (NCC-216), *USS Olympia* (NCC-209), *USS Poseidon* (NCH/NCC-200)

SOURCES: (D ST:Legacy computer game)
(N ST:Legacy computer game)
(H ST:Legacy computer game)

By the time the *Achilles* and *Helena* cruisers were chosen as the affordable way to continue the war, UESF had already pledged itself to at least four keels of an earlier, costlier approach. The *Poseidon* class had been Starfleet's original successor to the *Triton* cruisers, and was built using the expensive and time-consuming prewar methods. On the other hand, it also carried prewar technology of superior performance, making the *Poseidons* an eventual fleet spearhead type. Neither technological edge nor production economy won the war in the end; the chance conclusion to the conflict left undecided the question of whether the *Achilles* or the *Poseidon* approach would have been the correct way to proceed. What cannot be denied is that the *Poseidon* was Earth's best warship at the time of the Cheron victory.

Built out of *Enterprise* hulls, the ships had been originally intended as further explorers. Their simplified structure, wherein aft engine booms were replaced by a single aft-protruding hull block, still contained the essentials of an NX-type vessel, including plasma rechargers for high warp performance and a shuttle hangar for exploration auxiliaries. No external IMRF dome was included, as a more stable field configuration could be obtained by placing the nacelles farther forward and, incidentally, also below the horizontal centerplane. Unfavorable AG nodes could also be avoided in the new design, and the saucer impulse engines were now capable of handling sublight propulsion all by themselves, at locations optimal for thrust vectoring.

USS Coto *(NCC-213) banks to a relaxed deep space turn, rather unrepresentative of the remarkable maneuverability of the class. The well-braced torpedo launcher with its two plus two tubes is prominently displayed, as are the dorsal plasma rechargers for warp five performance. Dual reactor swapping bays are visible on both sides of the smallish shuttle hangar.*

However, combat specifications were quickly issued when fighting against the Romulans broke out, displacing several pieces of exploration gear. The shuttlepod complement was halved, and the space was used for an antimatter distribution system that fed a dorsally mounted photonic torpedo launcher. Two forward and two aft tubes were provided. The system had a superior rate of fire compared with *Enterprise* arrangements. Although it lacked magazine space, twenty torpedo casings could still be loaded, primed and fed into any of the four tubes by the central loader. A more conventional set of four tubes was available in the primary hull, compatible with the older range of weapons. Also, twelve phase cannon ports were provided in the primary hull. The nominal warload was four Type A and eight Type B weapons.

Due to the hesitation on procurement policy after the disastrous first year of the war, only the prototype vessel was completed in time to take part in major combat. For the final battles of 2159, the *Poseidon* carried a single Type A cannon plus seven heavy lasers, mainly participating with devastating volleys of antimatter torpedoes. The *Olympia* and the *Coto* were launched in time for the victory parades, then returned for fitting of mission gear. The remaining three ships of wartime construction left their box docks in 2161-63, freeing the facilities for the completion of two postwar batches of the vessels. At the completion of the production run, the *Poseidons* sported the registries NCC-200 through NCC-216, already hinting at Earth's ambition towards a multi-hundred-strong combat force. It would take decades for such ambition to be realized, however.

USS Olympia *in late UESF colors. When these vessels became part of the UFP Starfleet, they received a different set of decorations including full pennants. More striking visual change came from the adoption of optically opaque outboard field windows on the nacelles, as with the* Columbia *conversions.*

The *Poseidons* continued Earth's power projection program where the *Enterprises* had left it. Relying on dilithium-regulated power generation, they nevertheless fell victim to the same reliability and availability problems. Also, being slower than the *Christophers* by a full warp factor, they never quite got to do the most interesting assignments, to sail to the farthest shores, to respond to the most acute crises. Yet their influence on future shipbuilding was significantly greather than that of the *Christophers*. It is regrettable that despite their technological near-perfection, they are often left in the shadow of the *Enterprise* class as well, being seen merely as the little sisters of that prominent cruiser type.

Yorktown

Battle cruiser
2160-77

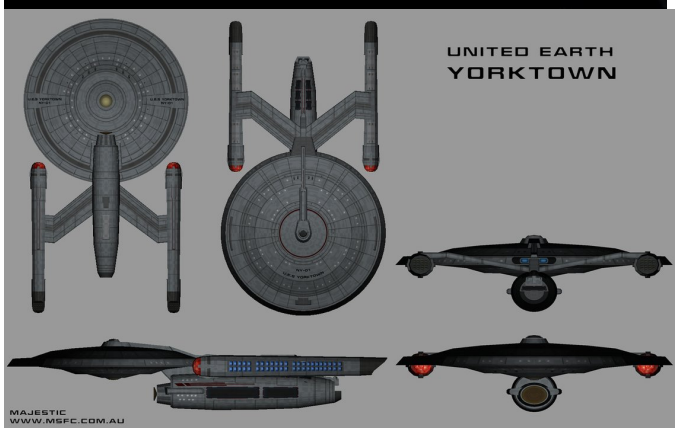
Completed:	1
Length:	236.1 m
Beam:	120.1 m
Height:	38.0 m
Mass:	345,000 tons
Officers:	82
Crew:	270
Cruise speed:	w 3
Max. speed:	w 4.9
Endurance:	4 years
Weapons:	2 laser emitters (150 nm / 1.0 GW) on dorsal primary hull 2 laser emitters (150 nm / 1.0 GW) on ventral primary hull 4 Type K phased particle cannon (700 GJ / 1.0 TW) on dorsal primary hull 4 Type K phased particle cannon (700 GJ / 1.0 TW) on ventral primary hull 4 plasma cannon (2.0 GW) on dorsal primary hull 4 plasma cannon (2.0 GW) on ventral primary hull 8 Type K phased particle cannon (700 GJ / 1.0 TW) on ventral secondary hull 8 plasma cannon (2.0 GW) around secondary hull 4 fwd missile tubes w/ 80 fusion or photonic missiles or other ordnance on ventral primary hull 2 fwd torpedo tubes w/ 40 photonic torpedoes on ventral primary hull
Shields:	7-layer graviton/subspace globular forcefield

Navigational deflector on secondary hull bow
Polarizable armor on hull and nacelles

Transporters: 2 GP (3-pad); Mk I

Auxiliaries: 2 shuttlepods, 20 defensive fightercraft

SOURCES: (D ST:Legacy computer game)
(N ST:Legacy computer game)
(H SFC, own)

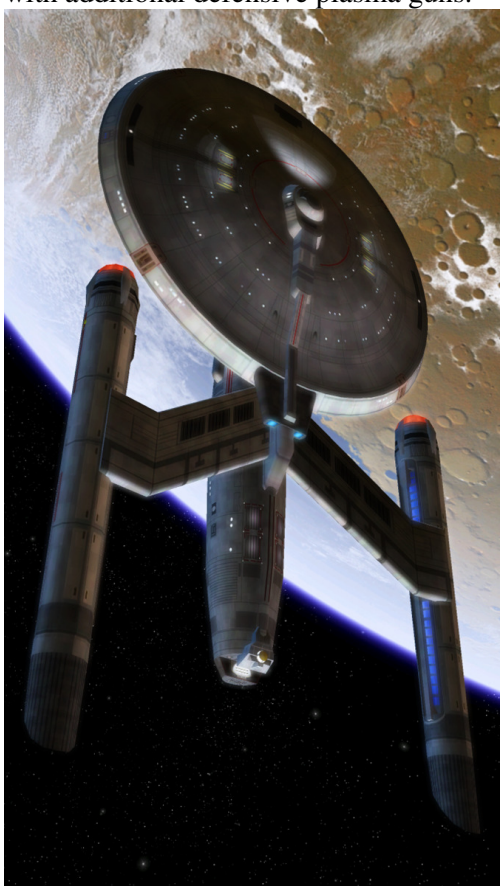


For the purpose of boring through Romulan defenses, UESF began in 2158 to build three large battle cruisers, with several more in planning. Based on existing Earth and Andorian technology taken to extreme proportions, the third-of-a-million-ton ships would carry hundreds of photonic-warhead missiles and torpedoes, be protected by dozens of self-defense fightercraft and layers of laser, plasma and forcefield defenses, and fly at nearly warp five to the Romulan homeworlds, untouched by the perimeter defenses of the still expanding Romulan empire.

Starfleet's initial bid for the role was the *Yorktown*, an application of *Enterprise* and *Poseidon* technologies and hull components on a grander scale. The saucer as such was actually of slightly smaller diameter than those of the predecessor cruisers, and one deck flatter on both dorsal and ventral superstructure. Yet joining it was a massive tubular structure, an entire second hull a hundred meters long, that would shelter the fightercraft contingent in a stern hangar. The bow of the secondary hull would house an annihilation powerplant twice as large as the *Enterprise* original, and

also accommodate the ship's navigational deflector. The impulse engines of the vessel would be located in the juncture of her warp engine pylons, in a well armored neck structure where all primary power leads would be concentrated for citadel protection.

This would liberate virtually all the room in the primary hull for an unprecedented offensive and defensive armament. A row of six launch tubes on the underside was to spit out a combination of high speed antiship photonic torpedoes and the fusion missiles that would vaporize Romulan fortifications and industries. Eight 700-gigajoule particle cannon would complete the bombardment, while four heavy 150 nm lasers and eight rapid-fire plasma cannon kept enemy vessels at bay. Further bombardment cannon would be installed on the lower sides of the secondary hull, along with additional defensive plasma guns.



The Yorktown *demonstrates her giant, 135 m PA-1 engine nacelles to advantage. Unfortunately, the engines were unable to provide the tactically required speed for the juggernaut, leaving her outclassed in the very role she was designed for. She excelled in all other roles, however, and would spawn the highly successful* Horizon *class a few decades later.*

There was a fatal shortcoming in the balance of offensive and defensive weapons, however. Cruiser engagements in 2158 and 2159 proved that the Romulan forces could mount an impregnable defense against the heaviest Starfleet penetrators if they could amass sufficient numbers of cruisers and destroyers of their own. Home system defenses could be expected to feature this threshold number of vessels at all times, unless a major strategic feint could be effected. Key to success thus lay not in firepower alone, but in the ability to push it past enemy formations without an exchange of fire. High dash speed, equal at least to that of the superfast *Christopher* light cruisers, would be a strategic necessity.

This the drive system could not provide, not even with the high output, dilithium-focus reactor that kept throwing dangerous tantrums at the warp trials of *USS Yorktown*. The inaugural battle cruiser was doomed to fight her battles against Rihannsu deep space fleets, in violent cruiser actions, never getting the chance to rain destruction on key enemy bases or production facilities. A challenger with at least one full warp factor over the *Yorktown* would be needed to carry the torch, hopefully to the powder cellars of the enemy.

Yet the war would soon end, in a very different fashion from the one envisioned. The *Yorktown* would continue to serve, now under different masters with different goals. She would never achieve fame or receive breakthrough technologies – yet eventually, she would serve as the template for the next great leap in starship construction, inspiring the *Horizon* class of heavy cruisers.

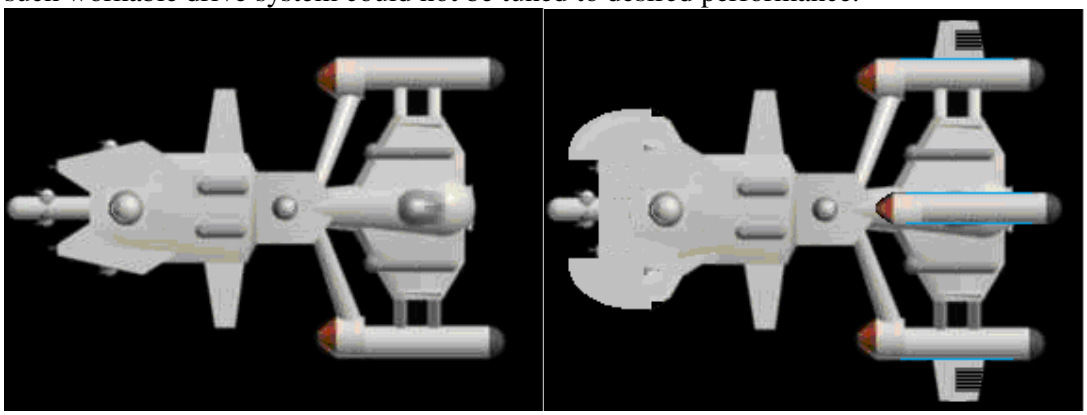
Victory / Crusade

Battle cruiser
(2162, 2166)

Completed:	1
Length:	312 m
Beam:	189 m
Height:	63 m
Mass:	445,000 tons (as completed) 423,200 tons (trials configuration)
Officers:	85
Crew:	290 (as completed) 210 (trials configuration)
Cruise speed:	w 3
Max. speed:	w 6.4
Endurance:	4 years
Weapons:	2 fwd laser emitters (150 nm / 1.0 GW) on dorsal main hull 2 fwd laser emitters (150 nm / 750 MW) on ventral main hull 4 lateral laser emitters (150 nm / 1.0 GW) on main hull flanks, 2 port, 2 stbd 4 Type K phased particle cannon (700 GJ / 1.0 TW) on dorsal main hull 4 Type K phased particle cannon (700 GJ / 1.0 TW) on ventral main hull 18 plasma cannon (2.0 GW) around aft hull 4 fwd missile tubes w/ 80 fusion or photonic missiles or other ordnance on ventral main hull 4 fwd torpedo tubes w/ 80 photonic torpedoes on ventral main hull
Shields:	8-layer graviton/subspace globular forcefield Polarizable armor on hull and nacelles
Transporters:	2 GP (3-pad); Mk I
Auxiliaries:	6 shuttlepods, 6 assault shuttles, 20 defensive fightercraft
SOURCES:	(D SFC, Michael Lanziger&Paul Lloyd) (N Michael Lanziger&Paul Lloyd) (H SFC, own)

The sad tale of UESF battle cruisers reached its second, closing chapter in the *Victory* class of high speed penetration cruisers, vessels that did not live up to any part of their designation. Intended as heavily armed offensive platforms surpassing even the *Yorktown* in firepower, they never saw any penetration action where the armament could be put to proper test. Their top speed never reached the hoped-for heights, either – and the career of the only completed vessel involved no cruising, but

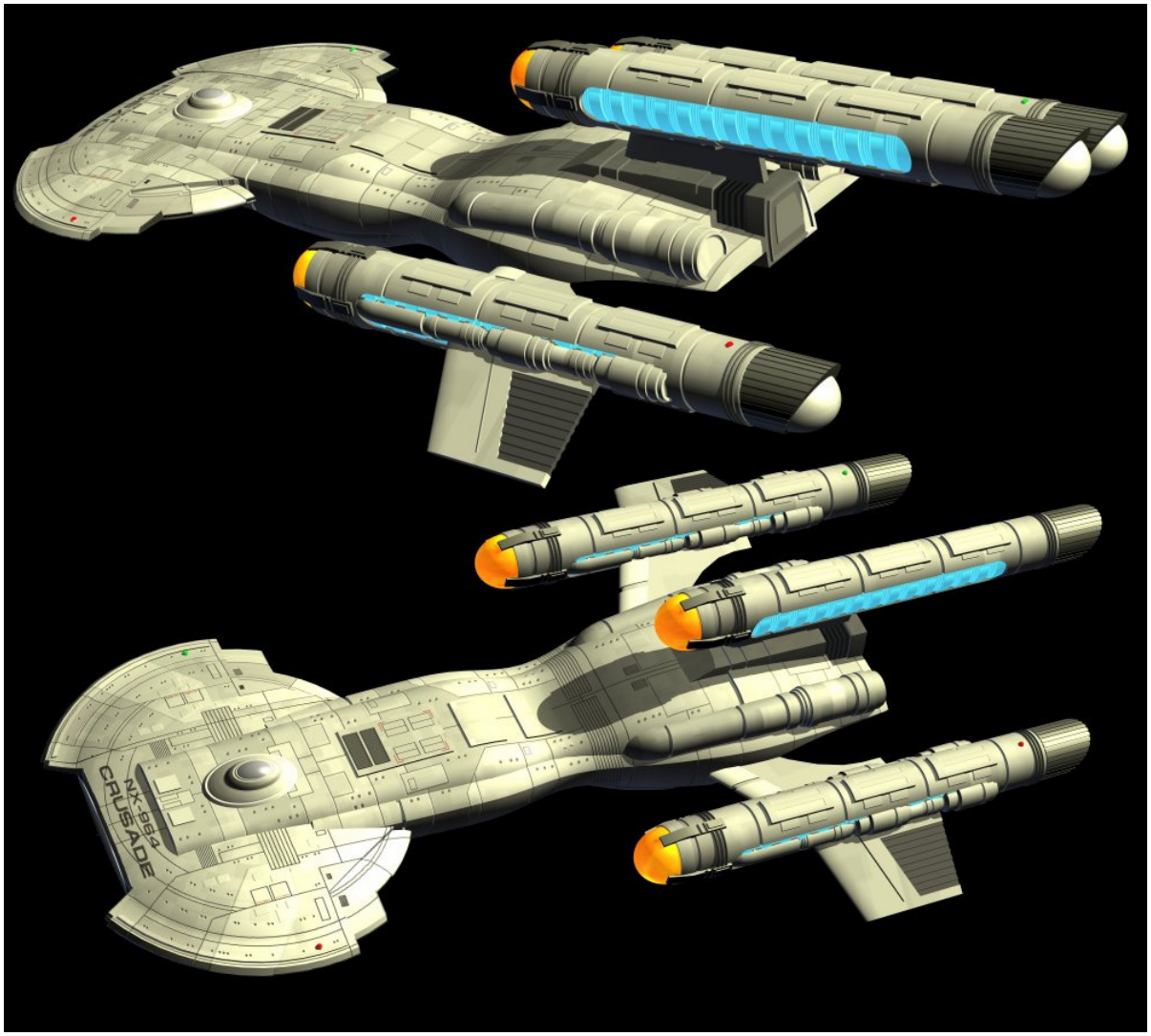
consisted of brief trial runs only. This was hardly the fault of the designers, however. Twists of history conspired to steal the vessels of their glory, and lack of time and resources meant that the as such workable drive system could not be tuned to desired performance.



The would-be USS Victory *taking shape at the X Eridani yards, precariously close to the war theater. Yet to be installed on the left are the third nacelle, the outboard field guide fins, and the impulse sponsons rounding the sides of the forward hull, as well as most of the sensing and scanning systems. The* Victory *did get cleared for warp testing before termination of the project, and performed a series of flights in 2166-67, yet yielded no major technological dividends for future ship generations. The KBB-11 heavy nacelles never found other applications.*

For the offensive edge, the saucer hull of the *Victory* was to carry the same four forward-firing missile tubes as the *Yorktown*, but these were flanked by a total of four torpedo tubes. Six dorsal and six ventral gunports would protect whatever modular beam armament would be installed. Aft of the saucer, the hull continued as a broad, streamlined block. It featured an hourglass tapering between the forward mission section with two winglike fighter launch stations and the aft reactor space with a trio of dilithium-focus warp reactors. Each wing would support up to ten defensive craft, once it could be agreed what type of craft was to be carried; there was also a pair of more conventional shuttlebays between the wings, with dorsal rolling doors. Each warp reactor in turn would feed one engine nacelle, the type of which was again to be determined. Contingency cross-feeding was provided for, and there were external surge pipes leading directly to the ramscoops for emergency circulation of plasma. Although bold in scope, the design was based on tried and true technologies.

Yet nothing would have been won by rushing the construction of a weapon that would decide the war on one stroke, one way or the other. Only a completely successful battle cruiser design could perform the audacious raid against the Romulan home system. If the element of surprise was lost in a merely halfway successful attempt, Earth could not hope to win the following conventional race of escalation, not on a palatable timescale. The building plans thus underwent continual changes, as new weapons and materials were suggested and discarded, dwindling resources re-estimated, and the desperate cries from the battlefronts for speeding up construction evaluated, classified and filed away.



The Victory *was given a makeover at the conclusion of the war, involving removal of the fighter bays, most of the plasma cannon, and the direct external plasma leads to nacelle forward ends. Demonstrating the configuration in simulation form, the unbuilt sister* Crusade *is here being marketed as an explorer design. However, the main goal of the design, the warp seven top speed, was soon found unattainable, and further planning was discontinued in the early 2160s.*

Three *Victory* hulls inched their way towards completion, two at Mars, one apparently initially at Kaleb; this position, precariously proximal to the front lines at Manarram, came close to being abandoned in 2160, and the hull had to be clandestinely evacuated to Andor. The transfer, performed in difficult conditions under the code name Golden Pheasant, further delayed construction. Nevertheless, one of the three ships was almost complete when the word came through that the Romulans had sent an offer for truce through subspace radio. The battle of Cheron, fought two weeks earlier and at first ranked by UESF analysts among the dozens of other costly but indecisive Earthfleet deep strikes, had apparently managed to end the Romulan offensive effort once and for all. Romulan ships everywhere disengaged, withdrew several parsecs and waited for news of peace negotiations. These soon began under the leadership of Council Member Abraham Dannon, and work on the battleships was discontinued.

The cost of stopping these enigmatic people had been high. In face of possible further casualties in a war that neither side could win, the members of the wartime alliance, now officially called the United Federation of Planets, decided to accept the Romulan demands of a neutral zone and of complete non-aggression from the part of Earth or UFP members. In the views of many, a victory in space had been nullified by a defeat at negotiation tables. What angered people more was the complete self-isolation of the Romulans; no information was given on the fates of the missing ships and crews, not even on the identity of the Romulans themselves. The treaty of Algeron (the devastated Earth starbase near α Ω B, now a temporary center of UESF operations) was negotiated completely by subspace transmissions without visual feed, up to and including the final ratification by Praetor Karzan and the newly elected human Governor of the Federation Council – and, not so incidentally, wartime Minister of Defense – Cristofur P. Thrope.

The Neutral Zone as defined by the original Treaty of Algeron. Several amendments to the treaty have later been made, and the Romulan Star Empire has since expanded into uncharted space to attain the dimensions of a true interstellar empire.

The treaty of nonaggression was never broken by the UFP; even in face of further Romulan aggression in the coming years, the Council decided not to retaliate. Initially, however, Romulans remained completely docile, seriously undermining the wartime government's position on a compromise peace. This weighed heavily on the postwar Federal government as well. The rift between the federalist President Vanderbilt and conservative Council Governor Thorpe on the issue soon threatened the integrity of the government, and a scapegoat from outside the high chambers of the interstellar alliance had to be found. Earth Councillor Dannon was publicly disgraced and blamed for the humiliating treaty, to the point that he was assassinated while making a pacifist speech on Federation grounds in San Francisco in 2162.

The name of another man also pops out from contemporary records of the negotiations, although his role in them has not been publicized. Exactly twenty minutes before the subspace message calling for truce came through, and again exactly twenty minutes before the transmission of the terms of peace, Ambassador Solkar of Vulcan was seen leaving the Communications room of the presidential palace in Paris, to visit the office of the President of Earth and his Joint Chiefs of Staff. The swift recalling of Solkar and his replacing with Ambassador T'Jan in 2161 end the official record on the career of this mysterious figure, and mark a transition to an era of openness in Earth-Vulcan relations – openness that still does not extend to matters preceding this transition point.

Governor Thrope on the balcony of the presidential palace in Paris after the signing of the treaty. Abraham Dannon on the lower left, with Ambassador Sarahd; Admirals Larson and Mann to the right of the President. Solkar of Vulcan and his aide visible behind the admirals.

2161-2200 - The Federation

The original Federation Seal, featuring a two-dimensional starmap of the founding worlds, as seen from the astrographical center of the early Federation. Design by committee led by F. Joseph III, in 2161.

The years remaining of the 22nd century of Earth history were also the first years of the United Federation of Planets. Despite some early calls for a more universal timekeeping system, the 'Old Reckoning' prevailed in the centers of human power. Many saw parallels between the 2060s and 2160s in terms of the challenges and opportunities facing Earth and its allies. Much as in the long aftermath of the devastating WWIII, an alliance of convenience between unequal partners was slowly solidified into a union based on equality and mutual respect. But in many ways, the alliance remained as inhomogeneous as ever. In the best spirit of IDIC, different races undertook different tasks in the UFP, the brunt of defense arrangements falling squarely on the shoulders of Earthpeople.

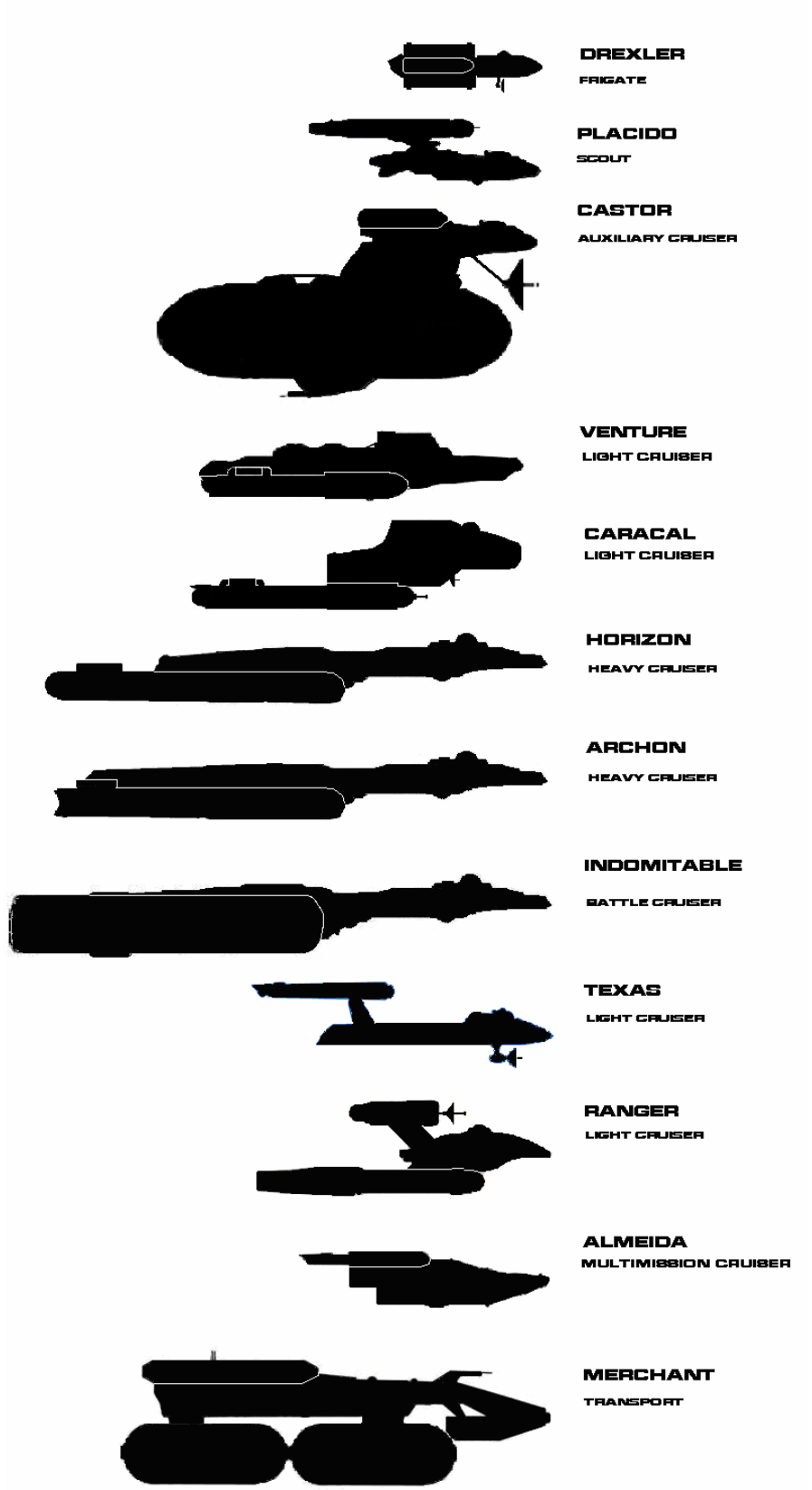
The decades from the first Treaty of Algeron to the turn of the century saw the modernization of the United Earth Starfleet, the Andorian Self-Defense Force, the remains of the Vulcan navy and various minor operators into an efficient combined Starfleet. Only the best ships of the Romulan War era were accepted to the fleet, and replacements were designed for many now-obsolete types. The first four 'centuries' of registry numbers in the new, unified scheme were allocated: NCC-01 through 199 to veteran UESF ships that would remain in service, NCC-200 through 299 to building programs completed or launched in the formative years of the combined fleet, and NCC-300 through 399 to preexisting ships adopted and adapted for novel postwar purposes, mainly assorted testing duties. Andorian ships, mainly Guard units, initially fell under a similar scheme of AGS numbers, while Vulcan and Tellarite ships and craft were more or less evenly distributed across the schemes, if federalized at all.

Conservative, slowish combat types with aereodynamic hulls persisted in Earth's defensive arsenal, while exploration was entrusted on auxiliary cruisers and modular multimission designs that concentrated on minimizing acquisition and operating costs rather than maximizing performance. Severe shortcomings resulted from the lack of proper scoutship types, and the operational profiles of the cruiser fleet were still under development. A sense of missing direction plagued the Fleet as the constant organizational reshuffling of the new defense forces resulted in one doctrine change after another. Still, what emerged in the late 22nd century was a relatively efficient exploration and defense fleet able to meet most of the requirements of the time, and willing to admit its shortcomings in face of new threats and opportunities presented by the following century.

With the help of interstellar co-operation, the groundwork was laid for major advances in the technology of space warfare. The post-war era did not yet see the full results of this development, but three significant improvements were made: the enhanced subspace/graviton shields, the long-

range subspace communications systems, and the warp-accelerated nanometer lasers. These provided immunity from kinetic-kill weaponry, possibility of coordinating maneuvers in real time, and improved capability of warp intercept. Electromagnetic shields and polarizable or ablative physical armor as well as plasma and phased particle beam weaponry were gradually abandoned as outdated, even though UFP adversaries found plenty of destructive potential in further refinements of these technologies.

Two distinctive generations of ships were built to utilize the innovations. One was typical of a war-weary society, and sought to combine old engineering solutions in a modular manner into new, economically advantageous operational concepts without aiming for high individual performance. Another utilized the flattened hulls and improved warp dynamics of the immediate prewar generation in a more optimistic and adventurous quest for future power. The following chapter outlines the early years of Starfleet, the limitations imposed by the equipment available, and the aspirations to overcome these limitations.



The principal ship classes of the latter half of the 22nd century in comparison view. The lifting body hull still dominates over the flat saucer; many modular or multihulled types are introduced.

Columbia

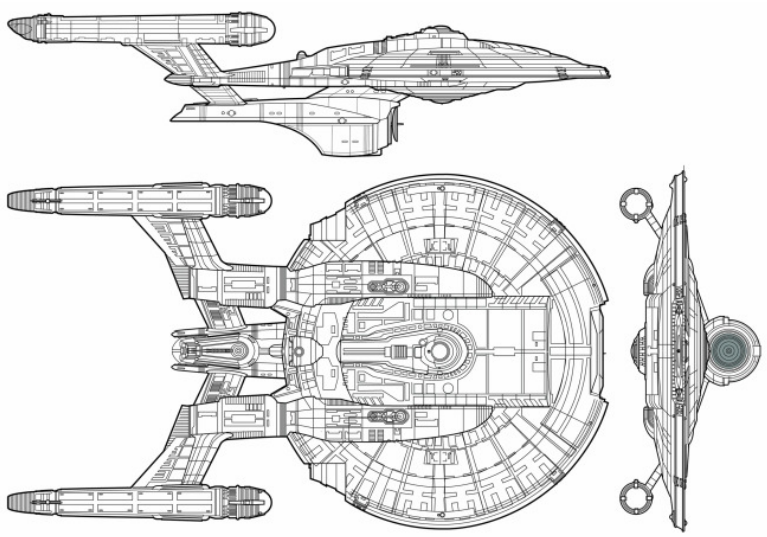
Explorer
2162-2192

Completed:	9 total: 1 refitted from *Enterprise* in 2162 8 built in 2165-67
Length:	225.1 m
Height:	53.4 m
Beam:	132.6 m
Mass:	297,000 tons
Officers:	23
Crew:	189
Cruise speed:	w 3
Max.speed:	w 3.2 (*Endeavour*, initial) w 5.8 (*Endeavour*, final) w 6.1 (*Columbia* standard)
Endurance:	7 years
Weapons:	2 Type A phased particle cannon (500 GJ / 500 GW) on dorsal primary hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral primary hull 2 Type A phased particle cannon (500 GJ / 500 GW) on ventral booms 4 Type B phased particle cannon (125 GJ / 200 GW) on fwd primary hull (w/ dorsal and ventral gunports) 2 fwd torpedo tubes w/ 40 photonic torpedoes on dorsal primary hull 2 fwd torpedo tubes w/ 40 photonic torpedoes on ventral primary hull 1 aft torpedo tube w/ 10 photonic torpedoes on secondary hull
Shields:	1-layer subspace/graviton forcefield bubble Navigational deflector at secondary hull bow Auxiliary navigational deflector at primary hull bow
Laboratories:	4 GP, 1 astrophysics, 2 planetary sciences, 1 medical
Transporters:	1 GP (3-pad); Mk I (*Endeavour*) 2 GP (3-pad), 1 cargo; Mk I (*Columbia* standard)
Auxiliaries:	2 transatmospheric shuttlepods, 4 spatial pods

Ships of historical interest:

USS Endeavour (NCC-06), *USS Valiant* (NCC-14)

SOURCES:	(D Doug Drexler) (N Christopher Bennett, ‘ST:ENT Romulan War’ and ‘Rise of the Federation’ series) (H Christopher Bennett, Michael A. Martin, ‘ST:ENT Romulan War’ and ‘Rise of the Federation’ series)



At the conclusion of the Romulan War, UESF was in possession of three principal types of deep space combat vessel: slightly diminished formations of modern fast cruisers like *Christophers* and *Achilleses*, in relatively good service condition but severely lacking in endurance and the ability to mount upgrades or additional gear; lumbering giants like *Messier* or *Triton*, good only for fighting an enemy that agreed to stopping by; and hordes of nimble destroyers and corvettes that would be swatted out of existence in a matter of minutes if attempting a solo frontier sortie. None were prime choices for promoting the Earth agenda beyond local space. Yet out of the ranks of the newborn Federation, it fell on Earth forces specifically to carry the joint flag to new worlds and civilizations: Vulcan and Andor wanted nothing to do with expansion or exploration for now.

As Starfleet deployed its light cruisers on foolhardy errands across unwise distances, Earth's one remaining space expansion arm, UESPA, set out to recreate the uniquely human push to the unknown. A lot more was at stake than mere specieist pride. Neither Vulcan nor Andor had such far-flung colonial assets as mankind, whose private and corporate vessels had exploded out of Sol at the release of the secrets of FTL propulsion. On the other hand, the older and more established civilizations were not as starved of key resources as humanity, still largely confined to a single star system as far as manufacturing and indigenous mining industries were concerned. While Tellar had extensive trade networks in place, it was not as vitally dependent on them. And while Vulcania, Centauria and Andoria may have been the founder empires with the misfortune to border on the Romulans, it was Terra that had extended its diplomatic and commercial reach past them towards Vega and Rigel, treading on ancient toes.

What Earth needed the UFP to have the most was knowledge. What lay beyond could only be revealed by fielding exploration vessels, and a two-pronged campaign was launched to create those. A way was devised to turn the masses of *Daedalus* corvettes back into survey vessels capable of meaningful research. Since little could be done to improve the survivability of the tiny 'tin cans', ships of heavy cruiser caliber were in turn given a boost in endurance. The final batch of *Tritons* trundled out at warp three to find out who really ruled Rigel and whether there still would be secrets in the Orion or Vegan ruins for humans to uncover. Meanwhile, the *Endeavour* refit, once deemed a prestige project without practical applications, was turned into a bona fide effort to improve reliability, range and exploration prowess.

Unlike with the tentative *Enterprise* modification, the original powerplant of NX-06 was removed altogether. Instead of the F4.0 substitute reactor, the ship was now powered by the much larger and clumsier but also less risky SSWR-I system where annihilation was controlled with the help of the newly perfected forcefield technology rather than by dilithium crystals alone. The new powerplant was again housed in a large ventral pod mounted directly beneath the former reactor bay and connected to it via a thick vertical shaft. Antimatter tanks were now carried in the bulging lower part of the pod for an extra three years of endurance; top speed was also hiked up by almost a full warp factor.

Use was made of the pod in other ways as well. An improved navigational deflector of Rigelian make was purchased, joining a modern Vulcan FTL sensor array at the bow, and small holds for supplies, research gear and cargo were added on the lower stern where they could be easily accessed. A new external access route was needed in any case, as the pod had been mounted in place of the original shuttlebays. No actual shuttle capacity was installed, however; the secondary hull merely sported four docking ports in addition to the small holds, and the primary hull holds now had to accommodate any auxiliary craft carried. The IMRF stabilizing crystal was relocated in the pod as well, and structural supports and power leads were extended from the pod to the boom aft ends in continuation of the engine pylons.

The Endeavour *undergoing the final stages of refitting, portraying her new secondary hull to advantage. Its forward part houses the new power generation functions, while the doors to the aft cargo spaces are clearly visible here, as are the three structures connecting the pod to the preexisting spaceframe.*

The vessel initially formed a subclass of her very own in UFP Starfleet service, but this was soon to change. Production of all-new hulls was launched, as no further *Enterprises* were in serviceable condition; a class ten newbuilds strong was projected, and somewhat esoterically renamed in honor of the *Columbia*, the first explorer to be lost. The pathfinder-veteran received the registry NCC-06, as the new interstellar system made no difference between combat cruisers and explorers in pennant lettering. The mission profile nevertheless very much remained one formerly deserving of an NX designation.

The Endeavour *lights up nebular gases in a demonstration of the poor integration of her warp fields with the Andorian shield bubble. A string of wormhole mishaps in the sixties would result from the failure to understand the finesses of duonetic modeling – while data from survivable incidents would improve that understanding, allowing Starfleet to confront the next hurdle in the path to proper warp theory. The* Endeavour *never challenged the Ishakawa-Dell barrier, let alone the Tyme one; if the later* Columbias *did, nothing was learned from it at this stage yet.*

The test flight program ran in parallel with the fitting out of the vessel. Armament was virtually unaltered, with low-fatigue phase guns installed from stock; modern heavy lasers were an option deemed too much trouble for the worth. The sublight missile tubes now served probe deployment needs, and the late war standard warp torpedo launcher configuration was only modified by the relocation of the aft tube into the secondary hull stern. Despite the loss of the original shuttlebay, a flight of K42 or SP-50 transatmospheric pods could still be carried, in the supply holds opening aft on both sides of the former main reactor chamber. Said chamber now became senior officer accommodation, and further laboratory spaces were installed in the berthing areas of the primary hull. The original bow deflector was reduced in size but not discarded altogether, and took on additional sensing functions. Rigelian technology was applied on the impulse drive, and a Vulcan tractor beam replaced the physical grapples. Yet it was only when Andorian shield generators were finally installed aboard that compatibility issues began to arise. With the shields raised, all targeting and sensing was expectedly hobbled – but so was warp drive, with desperate retuning efforts restoring equilibrium only at a dismal warp three.

Still at least more potent than the *Tritons*, the *Endeavour* was in November 2162 commissioned for a sweeping mission of frontier diplomacy in the Tandar-Rigel flank of the nascent Federation. Meanwhile, work progressed on shield/warp field integration, at first on the *Triton* fleet, then on the new human flagship. Top speed of the *Endeavour* could gradually be hiked back up to warp 5.8 – and the first newbuilds, emerging in early 2165, did even better, hitting warp 6.1 on trials even if not risking it in operational use

The late standard *Tritons* remained in service with minimal modifications. Many of their postwar missions were as amazing in scope as those of the *Columbias*, but they also took a toll on their overstrained propulsion systems. The dilithium foci of the *Constellation* finally shattered in 2168, killing Commodore Arkadi Lunov, the last surviving cruiser commander of the legendary 'escape velocity' era. Similar accidents had claimed the *Constitution* and gravely damaged the *Union*; although these had been wartime losses, they had not been forgotten, and in 2169 Starfleet ordered all dilithium-regulated reactors shut down for an indefinite period of reassessment.

Results of the investigation were not favorable. When the long-idled *Endeavour* was paid off in 2174, Starfleet had already decided on peristaltic forcefields as the focusing system for all its future cruisers. The resulting slight drop in efficiency was accepted as the price of vastly increased reliability and safety, and the *Valiant* (NCC-14) trailblazed the conversion of the *Columbia* class to this type of power generation for the final two decades of operation. The *Horizon* and *Advance* cruisers that inherited the position of the *Columbia* class were content with maintaining rather than challenging its speed records. Starfleet would not return to the dilithium technology until half a century later, and then in greatly altered form. Still, experience would soon show the preferability of dilithium regulation, and one is left to wonder whether Starfleet and the UFP exploration program were unduly held back by the caution of the 2170s.

Murmansk

Heavy transport / command ship / cultural exchange ship
2167-2189 (*Murmansk*)
2169-2214 (*Capitol*)
2170-2246 (*Broadway*)

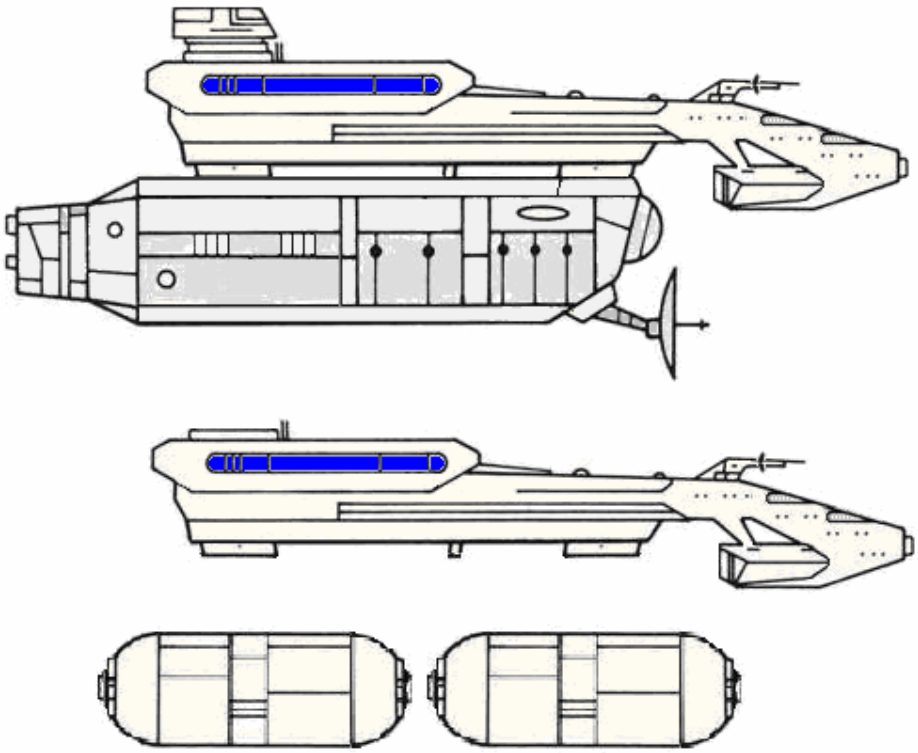
Completed:	31 total: 28 *Murmansk* heavy transports 3 *Capitol* command ships 2 *Broadway* cultural exchange ships
Length:	250.0 m (w/o modules, or with 3 or fewer Type III cargo modules or 1 Type IV cargo module) 265.0 m (w/ Type VII or VIII cargo module or 2 Type IV cargo modules) 295 m (w/ type VIIIC command module)
Beam:	51.5 m
Height:	43.7 m (w/o modules) 54.9 m (w/ shuttlebay module) 50.7 m (w/ Type VII cargo module) 79.5 m (w/ Type VIII cargo module) 109.9 m (*Capitol*, *Broadway*, w/ Type VIIIC command module and shuttlebay module, antennas extended)
Mass:	101,000 tons (w/o modules)
Officers:	3 (*Murmansk, Broadway*) 29 (*Capitol*)
Crew:	30 (*Murmansk, Broadway*) 48 (*Capitol*)
Passengers:	158 (*Broadway* cultural exchange specialists) 800 (w/ Type IV passenger module)
Cargo:	45,000 tons
Cruise speed:	w 3
Max. speed:	w 3.75 (original) w 3.9 (refit 2173) w 4.0 (refit 2208) w 4.5 (refit 2211)
Endurance:	4 years
Weapons:	None
Shields:	3-layer graviton/subspace globular forcefield
Transporters:	None (*Murmansk*) 1 GP (3-pad); Mk I (*Capitol*, *Broadway*)
Auxiliaries:	None (*Murmansk*) 2 medium shuttles, 2 heavy shuttles (*Capitol*)

4 medium shuttles, 1 heavy shuttle (*Broadway*)

Ships of historical interest:

USS Hurok (NCC-78)

SOURCES: (D HCFP, SFC)
(N HCFP, SFC)
(H HCFP, SFC)



Major changes swept through Earth's mercantile fleet in the postwar years. As wartime alliances solidified into federal unity, the bilateral trade agreements between member cultures were replaced by a broader network of economics. Under the Vanderbilt administration, virtually all corporation-level trade pacts were dissolved, and cargo routes were opened for free competition. Many of Earth's Boomer businesses were marginalized in the process. On the other hand, Earth's military logistics fleet was in a unique position to secure commercial contracts, as its organizational structure and hardware drastically differed from those of its mercantile and military competitors, combining out of necessity the best of both worlds.

Few foreign military supply ships could haul semi-refined ores the way Earth's lifeline designs did. Fewer still were built with the operational flexibility and multi-year endurance. Earth was quick to capitalize on the advantages by fielding the *Merchant* class of heavy transport ships. The standard structure of a bow module with propulsive and habitat functions, a spine for general goods cargo, fuel and ballast systems, and a modular hold arrangement was scaled up once more, to some 250 meters of total length. A few changes were made to the trusty old format, however. Warp propulsion now consisted of a stern-mounted pair of CWD-A7 nacelles, the 45,000 ton civilian counterpart of PB-6. Power was generated by two compression fusion reactors derived from military systems as well. No fewer than nine decks were provided for habitation at the forward compartment. Impulse engines and warp repeaters were mounted laterally, and a navigational deflector installed on bow.

The cargo modules to be carried under the spine were larger than ever, optimized for bulk transport. The Type VII module (essentially a double-length Type IV, with flatter endcaps) protruded just a few meters below the bow section of the ship, while the thrice as large Type VIII required a separate deflector emitter to protect it from superluminal impacts. Combinations of older Type III and IV modules could also be carried. Flexibility in cargo transfer operations required a shuttle hangar astern, above the main reactor compartment. This facility was modular and carried only when required, however. Typically, loading and offloading would still depend on orbital ports that possessed independent surface-to-orbit systems. Transporter-based bulk loading systems were slowly being introduced, but mechanical conveyors remained the primary means of cargo transfer well into the 23rd century.

Starfleet's interest in transports of this type was waning, however. There no longer existed a strategic need for the Earth military to haul ore. Beyond retaining a few class J vessels for moving fissionables, Starfleet wanted to sell its ore transport fleet to commercial operators. Yet a crucial commercial advantage would be lost by disbanding the logistics net that made the fleet greater than the sum of its ships. On February 2167, the Subcommittee for Logistics and Trade submitted to the UFP Council its proposal for an organization dedicated to mercantile operations under the general Starfleet command structure. An exceptionally swift process dissolved many doubts about the bureaucratic inertia of the new federal government, and by March 16th, resulted in the founding of Starfleet Merchant Marine.

By the end of the month, some 60% of Starfleet's transport vessels had been assigned to the new organization. Several acquisitions had also been made, among them twenty-eight *Merchant* class transports, under the Starfleet name *Murmansk*. The vessels were sent to inaugurate cargo services between UFP core space and the Regulus direction, and to assure purely commercial operators that the spacelanes in this region were now safe for transit. The *Murmansks* were of an austere standard, lacking the modular shuttlebay or any armament. Shielding was slightly improved over the original civilian level, however.

In 2169, when *Merchant* production was reaching its peak, Starfleet purchased five more units. Three of these were configured as *Capitol* deep space command ships for SF Command needs, and also carried starship repair and replenishment gear in significant quantity and quality in the customized Type VIIIC command pods. The shuttlebay module and a series of large sensor arrays were permanently carried. A year later, two other ships put the same modular add-ons to very different use, and formed the *Broadway* subclass of cultural exchange vessels. The *Broadway* and the *Hurok* were a combination of spaceborne research facilities, negotiation rooms, exhibition halls and education centers, and carried a permanent specialist crew of 158 civilian experts in addition to the SMM operating crew. At each port of call, the number of people onboard would triple, as local researchers, diplomats, student groups and assorted audiences would make full use of the facilities.

The Merchant Marine sold its transports by 2189, but SFC kept operating the *Capitol* command vessels till the early 23rd century. It also added several auxiliary cruiser types to the combined tender and command ship family, patching the holes in actual cruiser coverage the best it could. Three engine refits were effected, and steadily improved the performance of the *Capitols*. The *Broadways* underwent the same refits, and the *Hurok* remained in operation until 2246, retired more due to the changes in political atmosphere than to technological obsolescence. Many civilian *Merchant* vessels reached the ripe age of 120-130 before being retired in the 2280s.

Almeida

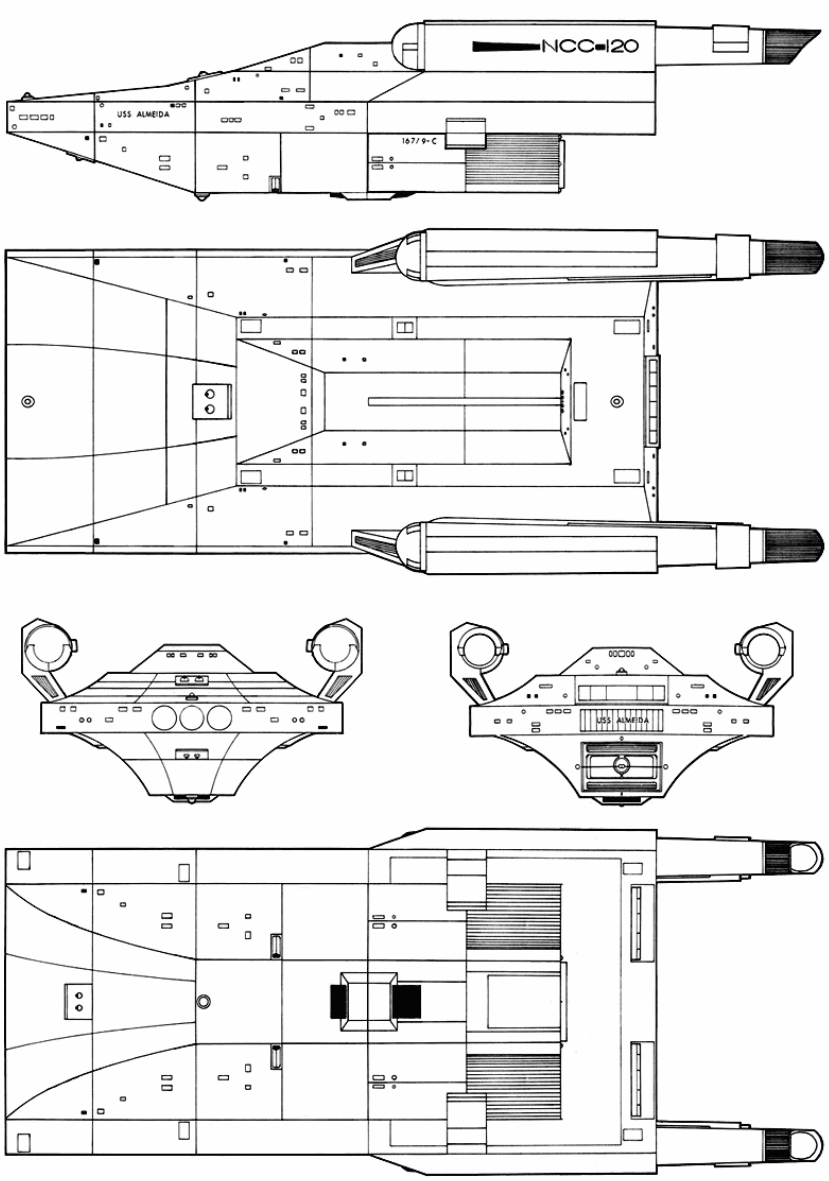
Multimission cruiser
2168-2188

Completed:	12
Length:	153.3 m
Beam:	62.4 m
Height:	34.1 m
Mass:	230,000 tons (w/o module) 241,000 tons (w/ cargo module) 252,000 tons (w/ combat module) 249,000 tons (w/ survey module I) 254,000 tons (w/ survey module II)
Officers:	18
Crew:	75 (+ up to 60 mission specialists w/ survey module I)
Cruise speed:	w 3
Max. speed:	w 5.9
Endurance:	5 years (w/ combat module or survey module I)
Weapons:	2 laser emitters (150 nm / 1.2 GW) in twin bank on dorsal bow 2 laser emitters (150 nm / 1.2 GW) in twin bank on ventral bow 2 laser emitters (150 nm /1.2 GW) in single banks on ventral combat module flanks (optional) 4 fwd torpedo tubes w/ 40 photonic torpedoes on ventral combat module (optional)
Shields:	1-layer graviton/subspace globular forcefield 3 navigational deflectors on bow
Transporters:	1 GP (3-pad), 2 emergency evacuation (22-pad), 2 cargo; Mk I
Auxiliaries:	3 light shuttles, 6 work pods

Ships of historical interest:

USS Almeida (NCC-120), *USS Arcturei* (NCC-131), *USS Beta Aurei* (NCC-129), *USS Chandira* (NCC-128), *USS Cryghton* (NCC-122), *USS Gentry* (NCC-130), *USS Lorelei* (NCC-121), *USS Mannara* (NCC-124), *USS Nemesis* (NCC-126), *USS Spectre* (NCC-123), *USS Ta Sydra* (NCC-127), *USS Trident* (NCC-125)

SOURCES: (D HCFP/Michael Morrissette)
(N HCFP/Michael Morrissette)
(H HCFP/Michael Morrissette)



In the aftermath of the Romulan confrontation, Starfleet had more scars than medals to show for its years of service. The transport and scout fleets were decimated. The remaining force was biased towards single-purpose offensive units of scant strategic value. The once considerable Vulcan strength was depleted, in practice leaving Andorians alone to hold the dented shield and sword. And for all its glories, the war had resulted in precious little of the usual postbellum commodities of added intelligence, gaining of resources or lessening of threat.

More damning than all this was the psychological impact. Earth and her allies had persevered, at a dreadful cost – but they had not triumphed. Two immaterial witnesses stood testimony to this: the presence of the despised Neutral Zone, and the absence of heavy cruisers in the UFP Starfleet. The surviving Terran *Tritons* and *Enterprises* were all decommissioned for extensive overhauls and refitting, while the fatigued Vulcan *T'Khut* fleet, for the past half a century more a political force than a true military one, had in further symbolism been ordered to distribute its armament and powerplants for use in fortifications at the Romulan border. The flag of the Federation was carried

by the light cruiser *Parakeet*, a travestry so embarrassing that nobody dared bring up the issue of renaming the vessel after something more dignified.

Similarly lacking in courage were the factions that wanted to see a strong Earth military take the helm of this limping and leaking Starfleet; advocating equipping for another war would have been political suicide. Instead, the Committee for Starfleet was bombarded by proposals for trailblazing 'multi-use' technologies, bold in scope but often falling short of strategic significance. Rising considerably above others was the Aurora Design Bureau entry for a combined combat, exploration and support vessel, a modest design that would utilize modularity for coping with its multiple missions. In it, the Committee saw a sufficiently balanced solution to quality and quantity problems, and in 2165 ordered twelve vessels to be built as the backbone type of Federation Starfleet's first all-new ship generation, with twelve more as an option. Development of warp 7 superships was put on back burner for the time being.

Reasons of prestige more than performance or dimensions dictated an initial heavy cruiser designation for *USS Almeida* (NCC-120), completed in slightly less than three years. At 230,000 tons of total mass, the 150 m vessel was something of a lightweight, especially in relation to her internal volume. Built along *Merchant* lines even if to a more modest scale, she featured a simple load-bearing box hull with eight lightly braced decks, plus another two on a command superstructure atop. Also much like her mercantile counterpart, the *Almeida* mounted her two warp engines high, had a combined engineering center abaft for impulse and warp power generation, and featured a ventral stern cut in which cargo modules could be accommodated. Military missions were realized by tinkering with the relationships between the various components. The PB-10 engines were 80-kiloton monsters capable of warp 5.9, and the LG-A powerplant featured dilithium foci. The add-on modules formed but a fifth of total volume at best, while the spacious bow sections could accommodate significant internal cargo and some supercargo in addition to the 93 crew.

Equipped with a weapons module, USS Ta Sydra *(NCC-127) acts as warden to the superficially similar* Libra *class auxiliary cruiser on extended survey. It would be far more typical for an* Almeida *to herself be protected by dedicated combatants, especially towards the end of the active service of the type.*

There was no hull armor on the vessel, her passive protection now resting solely on forcefield generators, initially with the associated problems of warp field interaction. Basic armament differed in philosophy from the legacy cruisers of the 'zeroeth generation', consisting of two twin banks of late war standard Lockheed 150/1.2 lasers slaved to a relatively austere sensor and computer system. Somewhat heavy and cumbersome for the self-defense of a transport, they would come on their own when accompanied by a dedicated combat module instead of a generic cargo compartment. Such a module would add tactical sensors and computers, feature two more banks of heavy lasers, and incorporate lateral launchers for torpedoes, without creating major mass penalties. Alternately, a survey pod could be carried, either in the form of a cargo container refitted with sensors, labs and

survey gear stowage, or as an independently operable, separable vehicle that would perform planetfall at the target world.

Swiftly mass-produced and delivered in its entirety by 2172, the class performed up to specifications in every technological respect. Starfleet soon found out the hard way that this was far from sufficient, though. As conflicts around the young UFP dwindled down, the hybrid cruisers were largely liberated of their defensive obligations and set free of their assigned patrol areas. But therein lay major logistics problems: hypercomplex itinenaries were needed to provide an *Almeida* with the right mission pod at the right time and place for survey or supply operations, and these were always thrown into chaos when an unexpected evacuation sortie or priority shipment displaced an *Almeida* mission in space or time. By 2178, six of Starfleet's ten combat pods were stranded at faraway starbases, four of the original six survey landers stuck at starports near the core worlds, and there was a constant shortage of cargo containers at the frontier. No other ship type was fully compatible with the modules, even though assorted transports could haul them as inert cargo to desired locations, at the expense of more useful loads.

The paradoxal inflexibility of the hybrid configuration seemed like a damning fault at first. Yet improved planning was about to solve the problem at least partially when the truly critical shortcoming was exposed. The dilithium foci of the *Almeida* powerplants were declared unsafe in the aftermath of *Triton* accidents, and a deadline of 2188 was set for their retirement. Starfleet dutifully scaled down *Almeida* operations, and by the dictated date was ready to sell the final hybrids to commercial operators. Refitted with peristaltic feeds and downrated to warp 4.0, the erstwhile cruisers became full-time transports, serving Federation interests until 2206.

Drexler

Frigate
2169-2241

Completed:	39
Length:	81.0 m
Beam:	50.1 m
Height:	26.3 m (deflector extended) 22.8 m (deflector retracted)
Mass:	95,200 tons
Officers:	13
Crew:	47
Cruise speed:	w 3
Max. speed:	w 3.5
Endurance:	1 year
Weapons:	2 laser emitters (200 nm / 800 MW) on port and stbd fwd primary hull 1 Type B phased particle cannon (125 GJ / 200 GW) on ventral aft hull (original) 1 laser emitter (200 nm / 800 MW) on ventral aft hull (refitted in place of phase cannon in 2187-89) 1 torpedo tube w/ 20 photonic torpedoes on primary hull bow (removed in 2202)
Shields:	4-layer graviton/subspace globular forcefield Polarizable armor on hull Retractable navigational deflector below primary hull
Laboratories:	1 GP (standard) 1 astrography (NCC-226)

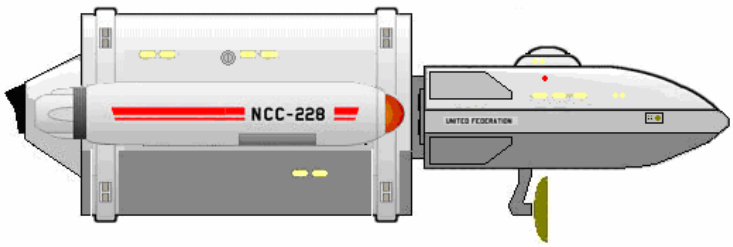
Transporters: 2 GP (2-pad); Mk I

Auxiliaries: 2 atmospheric shuttlepods

Ships of historical interest:

USS Gilmore (NCC-226), *USS Helios* (NCC-223)

SOURCES: (D SFB)
(N SFB, Dayton Ward & Kevin Dilmore 'Distant Early Warning')
(H SFB, Dayton Ward & Kevin Dilmore 'Distant Early Warning', own)



Fought far away from Sol, the Romulan War provided precious few opportunities for operating starships out of surface bases. Nevertheless, the transatmospheric, warp-capable interceptor-destroyers typical of early 22nd century UESF were pressed to duty in the distant front lines, and found a tactical niche there. Many a battle involved the use of planetary atmospheres for diversion or protection. Others called for surface reconnaissance and strike, tasks for which starships usually were the only assets available. Thus, even though the saucerlike primary hull of the *Tritons* and *Columbias* already dominated Earth capital warship design, it was no surprise that one further lifting-body warp combat ship would be fielded at the end of the war.

The design for the smallish frigate-type vessel that UFP Starfleet coveted featured modularity fashionable in the late 2160s. This brought forth the best attributes of transatmospheric and interstellar vehicles by segregating the functionalities into two distinct hull sections.

Yet the resulting reduction in integration effort and costs was every bit as significant at this time of financial problems. To the surprise of many human analysts, Earth's first true interstellar war had not given the economy an upward boost of the kind created by previous conflicts on the planet's surface and vicinity – possibly because only one side of the conflict now came from that planet. The overall economy of the newly formed Federation had improved from the increasing interaction, that much was evident, but the individual planetary systems did not yet know how to translate that to net profit without beggaring some of the member worlds and hyperinflating the economies of others. Thus, funds to UFP Starfleet were a mere trickle in comparison with the quantities pumped into UESF during the war.

Caught at the moment of separation, USS Breeman *(NCC-219) has just spread her wings and prepares to retract the ventral antenna. The massive firepower packed in the tiny forward section carries the penalty of low endurance, made good after redocking by replenishment of fuel and consumables from the voluminous aft hull.*

The *Drexler* frigate reflected the budgetary austerity in compactness and simplicity of form. The forward hull was a clean-lined lifting body devoid of interstellar or interplanetary propulsion systems, dedicated instead to those pieces of mission gear that would be needed on atmospheric or planetary forays, be they exploratory or combative in nature. Two powerful forward-firing lasers flanked a twenty-shot torpedo tube for a devastating combination of firepower in minimum dimensions. Crew facilities lay to port and starboard of the weapon systems, while the bridge sat atop the four-deck hull, tying to general C^3I assets in combined flight mode but catering only for the needs of the aerodynamic combatant in case of separation. A two-pad transporter was provided next to a planetfall ramp astern, both these means of egress being supported by an armory and a staging area. Basic atmospheric and transorbital propulsion came from simple fission engines that would only come to play when the forward hull was separated from the interstellar propulsion section.

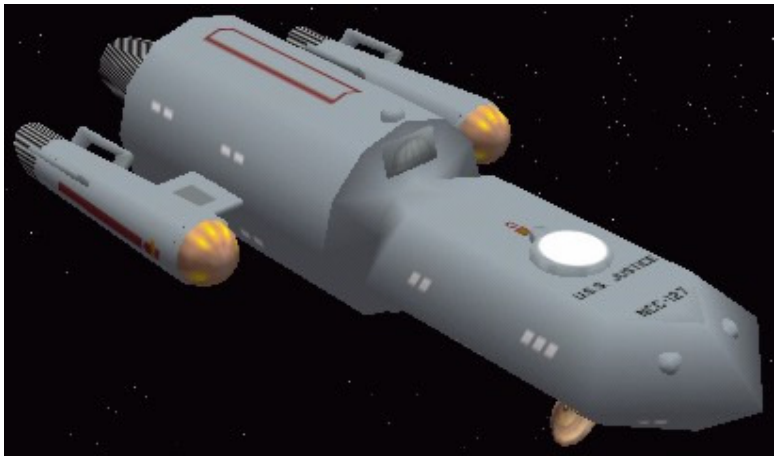
The aft hull eschewed with all pretension of aerodynamics, being a simple cylinder with a conically tapering impulse section abaft and two 38 m, 10,000 ton nacelles of PB-9 type mounted laterally. Internal arrangements and power systems owed much to *Daedalus* technology, quite evident also in the exterior geometry. A single war surplus Type B particle cannon on a ventral mount made possible space combat at warp and impulse alike. Later on, this weapon would be discarded and a third laser cannon installed instead, as the power needs of lasers were much lower with respect to their destructive potential. It was in fact largely due to the power limitations of the small postwar vessels that Starfleet put its faith on warp laser armament, even though the policy soon extended to far larger vessels.

Separation was a fairly simple operation featuring the closing of two passageways and a dozen leadthroughs for fuel, data and power, a physical unlatching, and a gentle puff from the RCS systems. Control surfaces would then unfold from the upper and lower flanks of the forward hull stern, the ventral sensor array would retract, and the forward section would become a maneuverable atmospheric combatant. Up to 20 separation and reattaching maneuvers could be performed before major maintenance would be needed. A standard communications array and a second transporter platform in the aft hull would help in keeping the two sections in operational contact. Even a pair of tiny shuttlepods was provided, in a dorsal bow hangarette. Indeed, the drive section was an independently operating space vessel on its own right, with a navigation bridge surrounded by the combat management and sigint facilities also needed in combined flight mode.

During these early years of UFP Starfleet operations, even a short range mission could well take a ship to an area of exploratory or general scientific interest. Since the *Drexler* class was actually tasked with interstellar operations, some investment in scientific instrumentation was clearly warranted. A permanent laboratory was included in the aft hull to coordinate the research efforts, and three science operations officers brought aboard – giving the ship a larger officer complement than wartime destroyers or some cruisers had carried, and hinting at things to come. Little sensor gear was installed overall, however, save for the austere, retractable navigational array beneath the forward hull. In 2171, UESPA took a special interest in *USS Gilmore*, outfitting her with hypermodern mapping sensors for the Interstellar Year of Astrography. Unfortunately, the postwar funding of this venerable organization was no better than that of Starfleet. In terms of the scope of Starfleet's new mission, the scientific systems and resources of the frigates and other military vessels received all too little attention.

Nor did the *Drexlers* get as much chance to loiter into uncharted space as originally expected. Convoy duty and deep space escort no longer was a mission requirement in the postwar threat environment. The piracy issue was given low priority, and perhaps rightfully so: the marauders had downscaled their operations drastically during the war, not wanting to be caught in the crossfire. Just 39 of the total production run of 66 were thus delivered to their intended use, and remaining 27 shunted to local defense duty. Standing by to repel a future Romulan invasion, yet utilized and, more significantly, funded by the Federation Customs Service in the meantime, the ships suffered relatively little fatigue and damage. In the 2180s-90s, most were still in good condition and did their part in helping Starfleet through its period of postwar block obsolescence.

Starfleet was in no hurry to develop a follow-on design until its mission requirements and the overall Starfleet charter would be further clarified. In the end, this took more years than the *Drexler* class had left. The retirement from frontline service in 2202 reflected both the growing obsolescence of the type and the expansion of the Federation to dimensions that no longer could be efficiently spanned by light combat vessels. When interest in light combatants was resparkled by the Klingon offensive, the call to arms only concerned newly designed types; the *Drexlers* were restricted to training duty, a role in which they performed admirably until the early 2240s.



In pennant paint befitting the 2238 date, USS Justice *(NCC-227) leaves orbit for another training mission. The modifications made to the single impulse engine are not prominent from this angle, but the removal of aerodynamic surfaces from the flanks of the forward section is evident, belying the reduced operability of the aging vessel.Gone as well is the torpedo armament.*

Other Federation organizations less choosy with their equipment, and more concerned with the continuing bane of piracy, carried on the *Drexler* heritage. In the 2250s, Federation Transit Authority took on a modernization program where PB-40 propulsion and phaser armament was installed, revigorating the design for police cutter use. Under the guise of *Masterson* class high endurance cutters, the newbuilt vessels complemented the lower endurance *Thunderbolts* in spacelane patrol, SAR and anti-piracy tasks. A top speed of warp six afforded by the new engines made the design attractive for Starfleet use as well, and the vessels were considered part of Activation Class Three reserves, much as the FCS *Thunderbolts*. None entered active Starfleet records, though; thus, the type is not discussed further in Part II of this work.

Easily distinguishable from the original Drexler *frigates, this* Masterson *high endurance cutter sports an all-new forward section of simplified aerodynamics and a pair of smoothly faired PB-40 nacelles. A dilithium-focus reactor provides significantly improved performance for propulsion and weapons alike. Some seventy vessels of this type were utilized by FTA from the fifties to the late nineties, as the last remnants of the immediate postwar ship generation.*

Placido

Surveyor / scout
2170-2230

Completed:	18
Length:	153.2 m
Beam:	88.1 m
Height:	45.2 m
Mass:	98,500 tons (original) 96,000 tons (refit)
Officers:	8
Crew:	53
Cruise speed:	w 3
Max. speed:	w 4.9
Endurance:	2.3 years
Weapons:	*Original*: 2 laser emitters (200 nm / 750 MW) on dorsal midhull 2 Type B phased particle cannon (125 GJ / 200 GW) on dorsal bow 1 Type B phased particle cannon (125 GJ / 200 GW) on ventral bow 2 fwd torpedo tubes w/ 40-80 probes on port/stbd ventral midhull *Refit 2202*: 2 laser emitters (180 nm / 900 MW) on dorsal midhull 2 Type B phased particle cannon (125 GJ / 200 GW) on dorsal bow 1 Type L phased particle cannon (800 GJ / 1.4 TW) on ventral bow
Shields:	1-layer graviton/subspace globular shield Navigational deflector beneath warp nacelle
Laboratories:	1 GP, 1 planetary sciences, 1 life sciences/chemistry
Transporters:	2 GP (3-pad); Mk I
Auxiliaries:	2 atmospheric shuttles

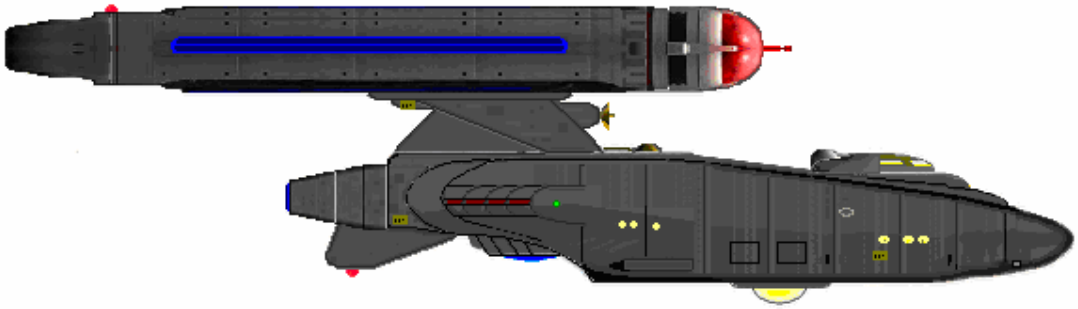
Ships of historical interest:

USS Akula (NCC-278), *USS Bellweather* (NCC-258), *USS Icarus II* (NCC-263), *USS Schliemann* (NCC-271)

SOURCES: (D own)
(N SFC, FASA)
(H SFC, FASA)

U.S.S. PLACIDO

SCOUT



The tiny Starfleet research force, consisting mainly of auxiliary cruisers of various types, was being strained to the extreme by the end of the 2160s. Demands for restarting the exploration program were becoming more and more heated, but all Starfleet could do was quote the well-known figures: one couldn't explore much with a fleet consisting of warp three nearspace assets, less than 40 operational deep space scouts and the handful of proper cruisers not currently engaged in post-war troubleshooting or border patrol. Most UFP member navies had been unable to donate useful research vessels, lacking the tradition of pure science operations far away from home space. Worse still, the specialized *Mercury* and *Doppler* military scoutships were at the end of their viability. Replacements were needed either in significant quantity, or possibly significant quality and speed that would compensate for the lack of numbers.

The military scout designs were sound as such, but their compact hulls lacked room for upgrades and improvements. Nor would they be capable of atmospheric operations, which still held considerable scientific interest. For the project to be worth the effort, top speed and endurance also had to be increased over the auxiliary cruiser figures to cover the gaping holes in scoutship coverage. Finally, in order to pass budgetary muster, the type would have to be capable of a dual

mission profile. In 2168, a committee led by Dr. Marton Bendes sat down to define the ideal Federation scientific scoutship, employable as a military reconnaissance asset in case of resurgence of hostilities. Some of the momentum of wartime R&D still survived, as after just nine weeks, the specifications were presented for the industry to compete on.

Two main contractors were chosen, for there were also two halves of the ship to be completed. One was the mission spaceframe, a traditional destroyer-category lifting body capable of planetary operations as well as multi-year deep space endurance. Empress could ride on its *Ganges* and *Drexler* experience and swiftly completed the initial test article. The other half was a separable warp propulsion module, complete with the main powerplant and fuel tankage plus a single 87,000 ton PB-8 nacelle, sturdily secured on triple pylons above the bulk of the module. CWD began systems integration work in early 2169, and could present a flight article by May 2170, giving Starfleet half a year to test the mission spaceframe in atmospheric, orbital and sublight interplanetary conditions.

Integration of the propulsion module to the horseshoe adapter at the stern of the mission hull was performed on May 9th, with test flights commencing on May 22nd. Warp three was accomplished on June 3rd; on return to Martian orbit, the test vessel was met by a Starfleet delegation carrying a bottle of champagne, a dedication plaque, and orders to commission the vessel under the name *USS Placido*, NCC-256. Full production of a total of twenty-four units was authorized at once, and several auxiliary cruisers recalled in order to provide experienced crews for the new surveyors. This commitment to the modern scout type, as well as to the extensive research and survey program on which the vessels were to be employed, bade well for the future of Federation exploration.

Her propulsion module a distant star among myriad others, USS Wegener *(NCC-268) dives into the atmosphere of Turkana IV. The* Placidos *were agile indeed 'down in the soup', folding out vertical stabilizers from the cavity left astern by the propulsion module. On the surface, a ramp would in turn extend from between the stabilizers for efficient egress of research gear and vehicles. Dorsal lasers could be tuned for spectroscopy and meteorology; the ventral phase cannon could drill deep into the crust of a planet even when the ship was resting on her four landing pads. The complexity and versatility of the ships came at fairly palatable price. The project was only killed by a rapid priority shift to more numerous, more affordable and more conventional vessels in the late 2170s.*

However, leaner times were ahead. Multiple simultaneous blows of block obsolescence shook Starfleet in the seventies, and forced the cancellation of further *Placido* procurement. As funds were channeled to restoring the cruiser forces, and the last wartime scouts were stricken, the exploration program went back to basics. Auxiliary cruisers were once again purchased; *Placido* survey missions were continued with such modest resources that they were commonly known as '*Placebo* missions' in Exploration Command. Starfleet now had to pay a high price for its most versatile survey vessels, even when their operating and maintenance costs were just as reasonable as

originally projected: wear and tear forced the idling of ship after ship, halving lifetime estimates and doubling attrition from terminal structural fatigue.

None of this could occlude the glowing operational record gathered by the *Placidos*. Thanks to their speed and range, the scant eighteen vessels were seemingly everywhere. A cruiserlike top speed of warp 4.92 was recorded on *USS Minstrel* (NCC-274) in 2174, a new distance-from-Sol record of 370 ly on *USS Harvey* (NCC-257) in 2182. *USS Bellweather* (NCC-258) was among the first vessels to test tectonic manipulation by melting down a series of fault lines on γ Spica III in 2174 – an action much acclaimed in its time, but later scorned as a mistake, and a gross Prime Directive violation, had General Order One been in existence at the time. Captain Jan Oonlander of *USS Icarus II* (NCC-263) had to endure much good-natured chaff over the fact that his aeronautically named scout was the first to establish contact with a winged – and, indeed, truly airborne – sentient humanoid species on α Virginis II in 2193.

A Placido *at speed. Plenty of it was provided by the PB-8 engine and its twin plasma rechargers, and by the PBT primary impulse system beneath. The separation line for the propulsion assembly is fairly obvious from this angle. Secondary reaction engines at the trailing edges of the mission hull remained attached during separated mode, providing atmospheric and interplanetary performance.*

For the duration of overlapping service careers with wartime scouts and cruisers, the *Placido* class was the main means of keeping Starfleet in the deep space exploration business. Not only did the scouts, compact in size and low in number as they may have been, spearhead the plunge into the unknown with their daring solo sorties. They also donated their design for use by the *Castor* and *Lupus* classes of auxiliary cruisers and the *Shackleton* support and supply type, all with different space propulsion modules of humbler performance and greater affordability, and with various mission-specific pods in tow.

The 2180s revamping of the Fleet allowed for the formulation of a different doctrine, one that tasked independent deep space missions solely on top-of-the-line cruisers. The *Placidos* had another role to fill now: tactical scouting ahead of fleets called for modern, high speed units. As long as none could be designed at lesser than light cruiser size, the only rational alternative was to utilize an existing and paid for warpship, and to expend minimal resouces on making 'modern' and 'high speed' at least moderately fitting descriptions of the type.

The expenditure involved upgrading the lower phase gun to the heavier Type L standard and ripping out the old torpedo tubes (which had never packed destructive ordnance anyway) in favor of improved tactical sensors. Navigation and communications gear were updated as well, this being the only measure to improve the speed of the vessel, that is, to shorten the time of transit to battlefields or other theaters of operation. The refreshed scouts started their frontline service in 2204. There was little fear of them looking awkward or out of place in the hodgepodge fleets of the time, still featuring some ancient *Marshall* destroyers alongside three or four tentative lineages of light cruisers. What their presence did accentuate was Starfleet's lack of a modern light fighting vessel, a

frigate or destroyer, in the *Placido* size category – a shortcoming to which yet another patch job based on the *Placido* spaceframe was the inadequate remedy, as described in the *Kovaris* entry later on.

Only one *Placido* made an impact in history during this second career: *USS Akula*, NCC-278, gave sterling service in the Battle of Arquin Pillar in 2223 and almost survived her ordeal, succumbing to a reactor implosion twenty minutes after the Klingon retreat. At the time, jettisoning of the space propulsion section and its antimatter reaction chambers was no longer a praticable option, the latchup and purge systems having been neglected for far too long.

Castor

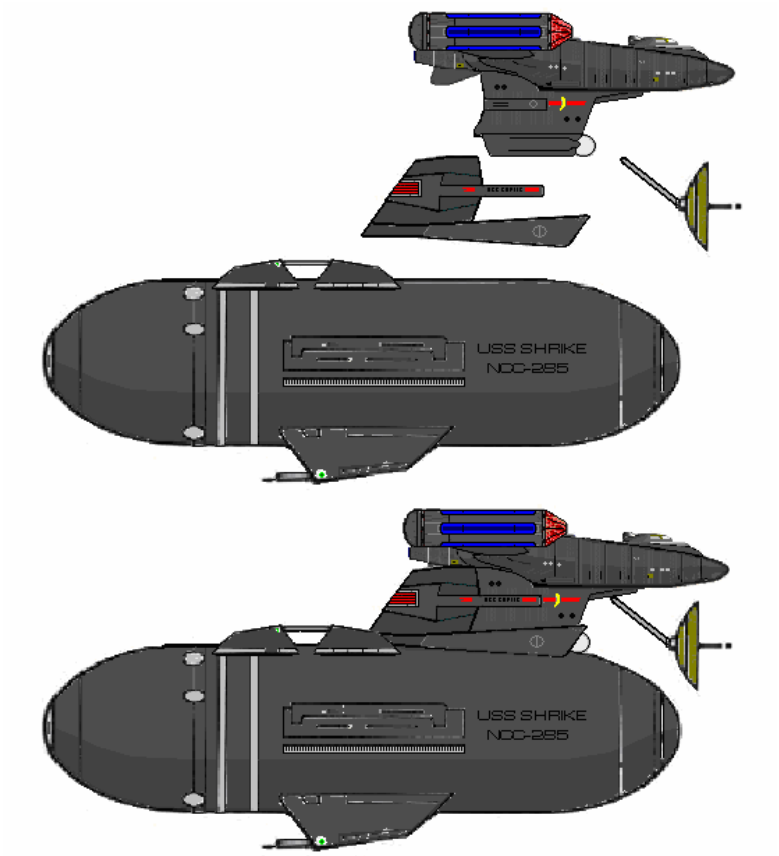
Survey cruiser
2174-2208

Completed:	20
Length:	242.0 m
Beam:	108.4 m
Height:	114.8 m
Mass:	67,300 tons
Officers:	3 ship operations 26 survey operations
Crew:	40 ship operations 31 survey operations
Cruise speed:	w 3
Max. speed:	w 3.35
Endurance:	3 years
Weapons:	4 laser emitters (150 nm / 400 MW) on lateral primary hull
Shields:	3-layer graviton/subspace globular shield
Laboratories:	1 GP, 1 planetary sciences, 1 life sciences/chemistry
Transporters:	1 GP (2-pad); Mk I
Auxiliaries:	4 atmospheric shuttles, 2 spatial shuttlepods

Ships of historical interest:

USS Alert (NCC-283), *USS Castor* (NCC-280), *USS Clara Barton* (NCC-287), *USS Greyhound* (NCC-282), *USS Pollux* (NCC-281), *USS Shrike* (NCC-285)

SOURCES: (D SFC)
(N SFC)
(H SFC)



The postwar UFP Starfleet was really no better off regarding exploration starships than its prewar UE forebear had been. Even though superb new cruisers had now been fielded, the increased military and diplomatic duties tied them up rather completely. And although pure survey vessels had also increased in number and reach with the *Placido* program, the volume of space to be explored had become so vast that most survey indices used by UESPA indicated a clear downtrend throughout the 2160s and 70s.

The brunt of medium range survey duty was carried by the venerable *Daedalus* class ships, which could be considered auxiliary at best. They were few in number and small in size, and Starfleet desperately wanted to field an auxiliary cruiser equipped with more powerful impulse systems, modern survey and communication gear, much greater internal volume, and better structural integrity. After a brief competition between various design bureaux, Starfleet settled on a Gemini Industries proposal that combined a barebones *Placido* hull with affordable, twin-nacelle warp machinery and a keel extension with fuel bunkerage and sensor mounts. The ship hauled along a gigantic yet lightweight secondary hull pod, via the help of an adapter piece that clamped the keel; the adapter also housed the extra impulse engines needed for maneuvering the combination at sublight.

Some twenty *Placido* hulls were ordered from their original production facilities, and two new spacedocks built to accommodate the construction program. The hulls were internally configured to rough *Placido* standard; the new 58 m nacelles were mounted on lateral pylons at the wingtips, wreaking havoc on transatmospheric performance but not precluding landings and takeoffs outright. The ventral sensor dome was replaced by a long boom mount for a significantly larger and more versatile dish array. Defensive lasers were fitted in abundance, with four 400 MW hyperaccelerated emitters dotting the main hull. Shields were also close to the original standard, based on a

multilayered system similar to the *Daedalus* one, and comparable to combat vessel shielding in ideal circumstances.

Mechanical locking points on both sides of the the keel gave a firm grip for the middle component of the spacecraft – the interface structure housing the main impulse wings, interstellar navigation gear and ventral cargo clamps. While a variety of loads could in theory be carried, the component completing the whole was a single trititanium-durasteel pod 217 meters long and 62 meters across. This huge structure was principally a light support frame and protective envelope for a staggering number of different sensors. Yet inside were also accommodations for survey crews, which could number in the hundreds for short duration missions. The regular contingent of the ship already included almost thirty officers, only three of whom were directly involved in ship operations, the rest handling various science functions. Four very capable atmospheric auxiliary craft were available for the survey teams. In comparison, the option of separating the lifting body hull from the rest of the ship was rarely used for planetary forays – but sometimes utilized for a wider survey of the neighborhood, so that the sensor section could be left on orbit of a planet of interest.

The twenty survey cruisers completed were christened the *Castor* class (with the second ship off the dockyards inevitably named *Pollux*, and the others following various unrelated naming practices). Registries from NCC-280 to NCC-299 were allocated, using up the numbers remaining in the rather obscure quota system by which the first generation of UFP Starfleet assets had been organized. Survey operations began in late 2174, when *USS Shrike*, escorted by the heritage light cruiser *Yellowjacket*, retraced the historic route of survey ship *Defiant*, albeit without finding evidence on the fate of the original explorers. Similar 'refresh cruises' were performed by other *Castor* units as well, sometimes without escort, as political conditions near Earth had stabilized significantly.

Mission profiles were soon refined to take into account the widening starbase network. With the help of these bases, the auxiliary cruisers could survey and secure most of the region of space formerly cursorily charted by *Enterprise* ships. Starfleet was aware that this was just a temporary solution, and that a truly new cruiser type would have to be fielded in the near future. For the time being, the internal organization of the Federation put too much strain on resources for any to be left for radically new capital ship programs.

Against the impressive background of the Briar Patch nebulae, two Castors *maneuver in concert with an* Almeida *lead ship on a long range survey mission. At this stage, Starfleet inventory did not include ships capable of performing this type of mission on their own; either a task force of ships was deployed for an extended mission, or a single vessel made a more or less cursory assessment on a small number of targets. Survey ships on solo missions often went missing in action. Their fates were usually not revealed until the latter half of the 23rd century, when proliferation of fast warp propulsion systems drastically increased the frequency of Federation visits throughout the former exploration zones.*

Famous *Castor* survey ships include *USS Greyhound*, which in 2176 observed the first confirmed extragalactic visitor to human-explored space, a probe entering the UFP at warp 30. It is believed the device, a seemingly inert metal cylinder, came from the Smaller Magellanic Clouds. Federation probes sent towards the area are yet to arrive, and messages from them are not expected until after several centuries, by which time faster ships will undoubtedly have usurped from them their mission significance. *USS Clara Barton* in turn helped fight the Rigelian fever at its outbreak in 2199 by providing both laboratory facilities, database services and quarantine enforcement that initially limited the plague to Rigel V. In 2190, *USS Alert* lived up to her name by revealing to the Federation the outbreak of internal unrest in the Romulan space. No historical explanation has been found for the brief battle near β Cersus, but the incident was enough to convince the UFP Council to allocate more funds for the competition of the *Caracal* class multi-mission cruisers and other ambitious Starfleet programs of the time.

Silence soon descended on Romulan space again, but few regretted the brief loosening of budgetary strings. In any case, and despite the absence of external threats to the Federation, Starfleet held regular wargames near Arcturus and Procyon, operating the spacious and well equipped *Castors* as command ships in offensive formations. Despite exercises of this kind, the wartime unity of the Fleet already showed signs of eroding. Vulcan was quite on schedule in the process of decommissioning its old warfleet, and expected Andoria to follow suit. Yet as long as Starfleet had nothing but auxiliary cruisers to offer in return, it was difficult to see how Fleet unification could proceed as planned.

For the duration of the 2180s-2200s, Starfleet thus significantly downscaled its operations again, hoping to provide time and resources for reorganization. It soon found out that the Klingon Empire considered this a sign of weakness, and possibly a backhanded challenge as well. It also learned a healthy respect of Orion guile and venom as the various pirate operatives continually disturbed Starfleet maneuvers, UFP civilian traffic and local mining establishments, colonies and settlements. The reputation of Starfleet did not yet quite strike fear in the hearts of wrongdoers.

Texas

Light cruiser
2175-2241

Completed:	50
Length:	189.9 m
Beam:	85.3 m
Height:	50.1 m
Mass:	212,000 tons
Officers:	21
Crew:	85 (standard exploration configuration) 140 (combat configuration)
Cruise speed:	w 3
Max. speed:	w 4.1
Endurance:	3 years
Weapons:	2 laser emitters (150 nm / 1.0 GW) on port/stbd primary hull 2 laser emitters (150 nm / 800 MW) on fwd primary hull 2 laser emitters (150 nm / 800 MW) on aft secondary hull 2 fwd torpedo tubes w/ 70 fusion or photonic torpedoes on ventral primary hull

Shields: 4-layer graviton/subspace globular shield
Navigational deflectors on port/stbd primary hull
Polarizable armor on primary and secondary hulls

Laboratories: 2 GP

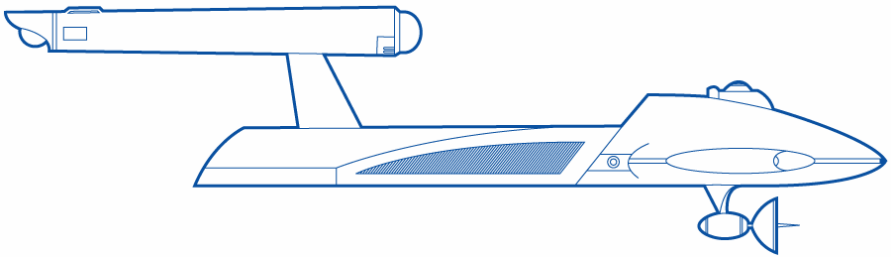
Transporters: 1 GP (6-pad), 1 emergency evacuation (22-pad), 2 cargo units; Mk I

Auxiliaries: 4 light shuttles

Ships of historical interest:

USS Gobi (NCC-909), *USS Labrador* (NCC-916), *USS Oklahoma* (NCC-945), *USS Sinai* (NCC-912), *USS Sonora* (NCC-907), *USS Takla Makan* (NCC-904), *USS Taimyr* (NCC-920)

SOURCES: (D SFB/Steve Cole & Richard Kerr, dimensions altered)
(N SFB)
(H SFB)



Block obsolescence hit the young UFP Starfleet hard in the 2170s. Losing the military scoutships was bad enough for Exploration Command, but at least the drafting of numerous auxiliary cruisers provided an affordable partial remedy. Defense Command was far worse off when the *Marshall* heavy destroyers and *Christopher* light cruisers were retired from defending the borders and heartlands of the Federation. The intended successor, the *Active* heavy destroyer, was cancelled at the last minute, ostensibly because her performance specifications did not meet Starfleet expectations. In face of continuing Romulan silence and seemingly unshakeable peace, it was difficult to gain support for the design, let alone the construction, of a new heavy combatant. When permission for a successor class was finally given in January 2172, frantic engineering efforts were needed to create the required designs and construction methods, lest the gap between generations grow intolerably wide.

By late 2173, though, all the elements were ready. The design chosen for the prosaically named New Light Cruiser was not so ambitious as to call for extensive prototyping, and a go-ahead was given for four precursor hulls. Production of at least ten further vessels was also all but guaranteed from the outset. Starfleet's ultimate aim was to procure fifty cruisers, enough to replace both the *Marshalls* and *Christophers* at one stroke.

The first light cruiser to reach completion was in May 2175 launched as *USS Texas* (NCC-900). Her lines clearly revealed her lineage. The two-part structure of the vessel featured a detachable, aerodynamic command hull and a slightly larger engineering section, the latter mounting two PB-7 warp engines of 70,000 ton mass each. The lifting body structure of the command hull was closer to *Christopher* than *Marshall* in design, but served the same threefold role of primary weapon and sensor mount, command center and crew evacuation module. The smooth exterior was armored overall, with a dorsal sensor dome jutting out above the main bridge, and a dish array placed on a corresponding ventral location. The bow corners held 800 MW laser emitters; 1 GW units were mounted laterally, outboard of the twin navigational deflector assemblies, giving full spherical coverage. Two forward-firing torpedo tubes were located ventrally. Both the primary and secondary hulls also featured ventral tractor beam emitters.

Internally, there was enough room for two autonomous laboratory units on Deck 3, both of which enjoyed direct physical access to the centrally located main computer core. Forward of the lab area were the ship's secondary batteries; aft of it, the separation engines. Forward of the starboard lab were sensor and probe control rooms, also part of the ship's rather extensive scientific suite. Forward of the port lab was the transporter complex. Life support systems and officer accommodation were the primary functions on Deck 2; a high ratio of officers to crew was now standard for ships engaged in exploration duty, and twenty-one personnel of Ensign grade or above were required aboard a *Texas*. Some thirteen of these still engaged in traditional officer work of managing ship's operations and tactical operations, and had their workstations clustered in the upper part of the ship. Main fire control was located just forward of the main computer shaft, main navigation room aft of it. The main bridge and its sensor dome formed Deck 1 atop the shaft.

In classic manner, lower decks were tended by the ratings, although extensive automation and peacetime doctrinal and budgetary choices reduced crew size to a fraction of the *Christopher* figures. The wide Deck 4 was the main crew accommodation deck, with spacious standard berthing for 85, combat berthing for up to 170, plus storage for consumables. Sickbay, galley and gymnasium were naturally also to be found here. The bow was completely dedicated to forward laser emitters and their support systems, however. Decks five and six were again of limited beam and housed the torpedo launchers and their magazines, as well as shield generators and hull polarizer rotors.

The secondary hull housed an auxiliary control room in addition to being home to main and auxiliary power systems, fuel tanks, and cargo transporters and holds. At the center of the hull was a docking bay and service hangar for four light shuttlecraft, again indicating the exceptional exploration prowess of the design. Access was via ventral hatches, and docking was still facilitated by mechanical arms; it would be quite a while until precision tractor beams would take over the approach control role.

The traditional placement of the hangar allowed the impulse engines to be placed directly astern. Two reactor clusters were used, but their exhaust nozzles formed a single linear array. Between the impulse reactors sat the main Fairey powerplant, feeding the PB-7s. The conservative compression fusion powerplant of 10:1 m/am spicing did not quite give the design an *Enterprise*-like performance. Warp 3 cruising was easily attained, yet top speed was in practice limited to little over warp 4.1, a significant step down from *Christopher* standards. Yet the opponents of the day were the sheer distances to be covered in exploration and patrol work, rather than hostile fleets to be flanked, so cruise mattered more than dash.

The Gobi *(NCC-909) sails out with auxiliary survey cruisers* Minotaur *(NAR-24) and* Alesia *(NAR-23), support cruiser* Cryghton *(NCC-122) and the elderly scout* T'Khian *(NCC-75). Explorer flotillas of this sort proved an impractical tool in expanding the Federation horizons, yet at least facilitated a better understanding and control of what lay inside UFP territory. Modern Starfleet pennants have been applied on all vessels for this 2179 sortie towards the Taurus nebula.*

Test cruises by the four initial vessels were successes both technically and operationally. They were welcome from the public relations point of view as well: the first true postwar capital ship project helped solidify support for Starfleet among the member navies. Getting funding for all the fifty units was an uphill battle, but funds freed from the cessation of all *Christopher* and most *Marshall* operations helped Starfleet attain the procurement goal by 2182. Sequential registries from NCC-900 to NCC-949 were allocated. This actually represented quite a discontinuity in the numbering scheme, as even the latest destroyer models were not supposed to go past NCC-400. However, Starfleet hoped to adopt a new numbering scheme wherein mission classes would be discernible from registries, and thus the *Texas* ships got 'light cruiser numbers' in the 900-999 range while the heavy cruisers began with NCC-1000. Registries between 700 and 799 were to be left for projected survey and research units, 800-899 for military scouting and intelligence gathering, 400-699 for additional destroyer programs, and all higher four-digit numbers for future growth. This attempt at making the registries more informative was doomed to fail due to unpredictably changing procurement policies, such as the sudden surge of light cruisers at the turn of the century, or the abandoning of battleship ambitions. But there was no real reason to maintain the practice of allocating running numbers, either, since exceptions and cancellations were inevitably mixing up this type of ordering as well.

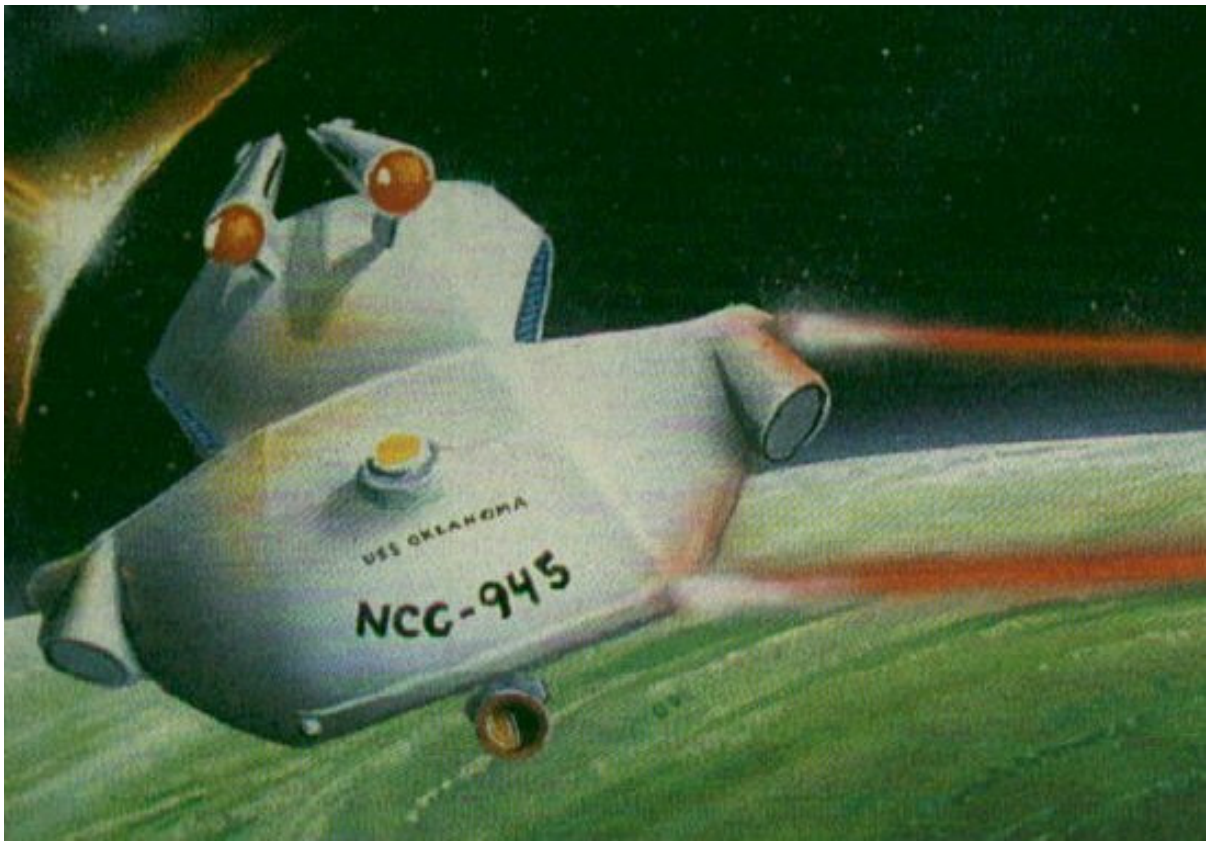
Military engagements in the last quarter of the 22nd century were rare. The *Texas* cruisers were allowed to embark on exploratory cruises, typically as part of a task force consisting of two auxiliary cruisers, a logistics support vessel and sometimes a scoutship in addition to the light cruiser. No *Texas* losses were suffered on these relatively short-legged if sometimes years-long missions, although *USS Gobi* (NCC-914) had to fight bitterly in protection of her chattel in a 2191 engagement against transdimensional Tobaki raiders.

Showing how low a cruiser can get, USS Harar *(NCC-941) settles down on the surface of Locus Point, Paraagan II. Next to the ore transports of the old mining station, the cruiser is a minuscule thing, but soft-landing her safely still takes some skill and effort. The system defense missions of the* Texas *class at the turn of the century often involved landings and seldom demanded warp drive, explaining why the nacelles of the* Harar *have been removed. Reinstallation was a simple enough matter, however, and the simplicity greatly facilitated the later refits that would restore the pride and prestige of the class.*

Even by the turn of the century, the light cruisers were showing few signs of fatigue. Poor relative propulsive performance was the main factor in ending exploration deployments by 2205. Most *Texases* became insystem 'guard dogs', as Starfleet gradually prepared for the fleetwide adoption of saucer-type hulls for its long range forces.

The Klingon offensive threw all such planning into chaos. The important defensive role of the *Texas* vessels was acknowledged and retained, yet plans were put to motion to refurbish the ships for

greater offensive performance. The 2230s *Texas* refit and following advanced subclass construction programs are described in a separate entry later on. Meanwhile, ships that did not participate in the full refit were either withheld from action or modified for lesser rather than higher combat performance. In 2236-37, *USS Takla Makan*, *USS Sonora* and *USS Taimyr* had their shuttlebays replaced with large deuterium tanks and extensible fuel transfer interfaces, and were equipped for use as frontline replenishment tankers. *USS Labrador* received a ventrally carried subspace antenna for long range tactical scans. All these ships lost their torpedo launchers and heavy lasers in the conversion process, even though bow lasers were retained.



The Oklahoma *fires a broadside in a 2219 skirmish with marauders intent on pillaging the settlements on Agnihotra. Postwar-standard forcefield shielding easily deflects particle beam fire against the stern quarter of the venerable light cruiser, symbolizing the stubborn perseverance of these second-rate vessels.*

The last unmodified *Texas* cruisers were retired en masse in 2259. Upgraded and successor designs were kept in service much longer, however. The combat record of the antiquated design remained respectable in the 23rd century as well, even if in second-line combat engagements and preemptive deployments. The reluctant 2172 investment on the light cruisers proved its worth for Federation security many times over.

Byrne

Hospital ship
2179-2217

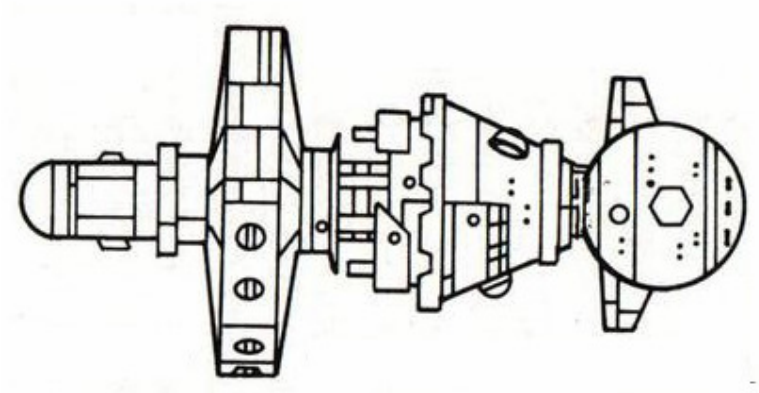
Completed:	7
Length:	290.0 m

Beam:	137.3 m
Height:	137.3 m
Mass:	160,520 tons
Officers:	7 (ship operations) 29 (medical operations)
Crew:	76 (ship operations) 344 (medical operations)
Capacity:	500 long-term patients, 20 first aid cases per minute
Cruise speed:	w 2
Max. speed:	w 3.1
Endurance:	2 years
Weapons:	2 laser emitters (200 nm / 200 MW) on pylons (removed in 2203) 2 plasma cannon (2.0 GW) on pylons (removed in 2203)
Shields:	1-layer graviton/subspace globular forcefield
Laboratories:	2 medical
Transporters:	1 GP (3-pad); Mk I
Auxiliaries:	2 to 6 medevac shuttles, 4 to 10 atmospheric shuttlepods; 2 large atmospheric transports for planetside missions carried on NH-200, 201

Ships of historical interest:

USS Byrne (NH-200), *USS Carrington* (NH-205), *USS Jenner* (NH-202), *USS Li Cheng* (NH-204), *USS Ortez* (NH-203), *USS Phlox* (NH-206), *USS Wallace* (NH-201)

SOURCES: (D SFC)
(N SFC)
(H SFC)

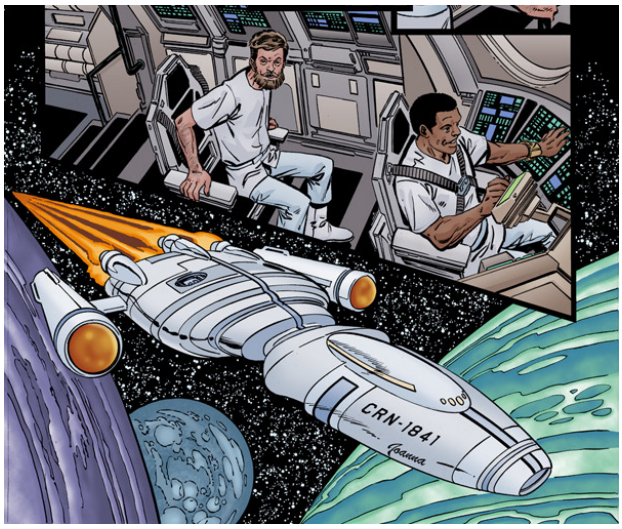


Second-generation warp drives enabled spaceships to reach operational theaters within months or weeks instead of years. The need for hospital ships was deemed to have decreased significantly since the Romulan War, now that fast spaceships could speed patients to the nearest starbase in reasonable time. Still, a confrontation at the outer fringes of UFP-explored space was likely to result in casualties that would have to be handled *in situ*. To replace the outdated *Hopkins* hospital ships, Starfleet fielded a type modified from starliner components; thus emerged the *Byrne* class. Once again the vessels were named after medicine Nobel winners. Giving them full 'military' NCC-prefix registries was also contemplated, to highlight the integrated, multimission nature of the new Starfleet. Eventually, the NH prefix was adopted instead, and the Federation took the explicit stance of supporting the conceptual sanctity of casualty evacuation and care through various treaties, conventions and systems of identification symbology.

The *Byrnes* were loosely based on the popular *Infinity* series passenger ships. They featured a cylinder-symmetric hull with a forward sphere 66 m in diameter and a conical midsection flaring from 48 to 85 m, and were carried by a propulsion system section with a single axially mounted 120 m Mitsuhirato Mi-88 nacelle surrounded by a collarlike assembly of sixteen radial fusion reactors. The propulsive assembly was scaled up from the original starliner one simply by doubling the number of reactors and the amount of fuel carried, and could be separated after it had deployed the hospital. Only sub-impulse propulsion was available for the hospital section itself.

In the sphere, eleven decks normal to the longitudal axis featured patient wards, operation rooms, cryostasis facilities and research laboratories. Winglike equipment pylons housed support functions, including two self-defense lasers, plasma guns and shield generators. The weaponry was mostly symbolic, and the ships were to be operated with a frigate or destroyer escort in military theaters – Starfleet viewed the odds of the hospital ships being protected by interstellar treaties with grim realism, even if the actual operations of the *Byrnes* were out of Fleet hands now.

The conical heart of the ship was dedicated to nonmedical or support functions. The command and navigation facilities were located to one side, flanked by hangars and docking bays for up to six medevac shuttles and a number of salvage pods. The initial two vessels, *USS Byrne* (NH-200) and *USS Wallace* (NH-201), were direct conversions of existing *Infinity* starliners, and retained their high-class docking bays and large observation lounges. The midsections of the two ex-liners also berthed two large atmospheric transports, converted from excursion boats to deployable medical centers for operations on class M, L and K planetary surfaces. The five following vessels were newbuilds, and had slightly more utilitarian layouts in mid-hull. They featured increased numbers of shuttlepod mounts in place of the excursion boat docking berths, enabling the ships to deploy a maximum of ten auxiliary craft to assist in sorting out wreckage or towing in disabled craft. The newbuilds also added a small fission reactor for radiomedicinal purposes, filling a space reserved in the original design for a spa center. Main power for the hospital section in all seven ships was provided by a single ejectable fusion reactor opposite the command area.



Seeing service far above and beyond the expiration of all warrants and guarantees, one of the medical barges of USS Wallace *contributes to the Federation Frontier Medicine Program. Despite being equipped with PB-40 engines, reasonably up-to-date astrogation systems and modern medical gear, the barge (now* SY Joanna*) retains her original impulse propulsion system and gravitics even in the early 2270s.*

The ships were built at a leisurely pace between 2179 and 2188; even the last five differed slightly from each other in medical equipment standards. Constant system upgrades, mainly to astrogation and communication soft- and hardware, were still infrequent compared with the efforts to keep the medical gear at the forefront of Federation know-how. All weapon systems were removed in 2203 as antiquated if also unused.

The high operating costs of the vessels, mainly due to their civilian-standard power systems that were not quite up to the rigors of constant travel at warp 2 from one colony-support deployment to another, finally led Starfleet to consider discontinuing medical ship operations. Instead, spaceship medical facilities were upgraded and the starbase network extended to provide medical care. The last *Byrne* class ship, *USS Carrington* (NH-205), was retired in 2215, but shortly reactivated in 2217 to assist with the evacuation of Bayard's planet. The ship had to be towed in place for that operation, but served admirably at constant 300% overcapacity, helping ensure medical safety of the evacuees during the two-year operation.

Boyden

Cargo drone
2184-2220

Completed:	108
Length:	62.6 m
Beam:	31.0 m
Height:	39.5 m
Mass:	40,350 tons (typical, unloaded)
Officers:	None
Crew:	None
Cruise speed:	w 2
Max. speed:	w 3
Endurance:	10 years
Weapons:	None
Shields:	1-layer conformal forcefield 2 navigational deflector emitters on bow
Transporters:	None
Auxiliaries:	None

Ships of historical interest:

SS Bethesda (NCC-G036)

SOURCES: (D SFC)
(N SFC)
(H SFC)

In the 2179 mandate, Starfleet was given a general overseer role in the newly organized Federation, including duties of defense, research, charting and maintenance of space lanes, Federation-wide law enforcement and support of civilian space traffic. It was obvious that warships and science vessels alone would not suffice for such a broad mission description. A wide variety of civilian vessels was

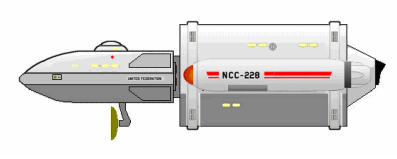
drafted for support and maintenance roles, but some specific mission types were ill handled by such unsophisticated or perhaps excessively sophisticated equipment. A major problem was fast transportation of supplies, spares, fuel and valuables for extended Starfleet operations.

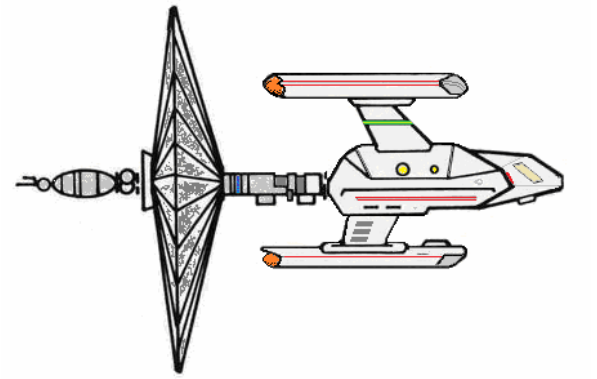
The time was not yet ripe for the fielding of fast, light warp transports. Advanced warp technology was only adaptable to moderately large vessels, too few of which existed for all the supply and support needs of the Fleet. Only a handful of class Y freighters suited for warp three upgrading were in Starfleet possession, rather than the hundreds of vessels needed, and further production of the model was deemed unwise. Solutions were sought elsewhere, including the realm of unmanned cargo drones. Thus far, these drones had only utilized impulse or low-warp technology, and were not fielded by Starfleet in quantity. In 2180, the situation was changed by a request for proposals for a medium-warp unmanned cargo vessel for Starfleet use.

Warp propulsion was the major bottleneck in the development program, since the high performance of typical modern systems came at the cost of complexity incompatible with unmanned operations. Finally, in 2183, Gulliver GPF Industries was able to perfect an automated warp drive system utilizing a floating-core rotary fusion reactor, deuterium-tritium fuel and very short, simple and maintenance-free plasma conduitry. A fuel incompatible with the standard Fleet deuterium was bound to cause logistics problems, but pure deuterium fusion was deemed too risky due to the higher temperatures and compressions needed. Warp coils were purpose-built for the design, increasing costs but improving reliability in this special application.

Overall hull shape was then dictated by utilitarian concerns. A boxy primary spaceframe mounted the three identical nacelles one down, two to the upper sides, the reactor bulging from between them, and fuel bubbles flanking the reactor housing. Impulse nozzles were located at centerhull stern, flanking an aft plasma expander fin, for a clear thrust vector while pushing external loads. Internal cargo handling machinery was located on the primary hull bow, from where small containers, bulk cargo, gases or liquids could be transferred to the cargo area. External loads could be slung on a bow mooring spine, similar in diameter to the *Vanguard* one.

The drone obviously looked nothing like the Starfleet defense or exploration designs of the time, save perhaps for its warp nacelles. Still, it immediately found a place in the hearts of Logistics Command personnel, and 56 units were ordered initially. A selection of swappable cargo hold modules for the carriage of differing cargo types was also purchased, although 'backward compatibility' was promised for the major container types used by earlier manned transports. A second batch of the same size was ordered in 2184, when the first original-batch units were delivered. Service name *Boyden* was adopted for the drone series, and NCC numbers ranged from Q012 to Q119 (later G012-G119); the new ships more than doubled Starfleet's warp cargo drone complement.





A relatively lightly laden Boyden *drone hauls a subspace telescope antenna, shepherded by a* Drexler *frigate. Such attention was reserved for priority shipments only. Whether this antenna structure qualified is a matter of opinion. As a scientific instrument, it undoubtedly was crude and outdated even back in the 2190s, as Vulcans would have pointed out. Yet a likely use was in a forward military listening outpost, a field of Starfleet operations where Vulcan opinion weighed little.*

This major acquisition program was one of the earliest UFP Starfleet efforts to produce non-military spacecraft, and as such was expected to run into some troubles. Initial cost overruns were quickly covered by savings from the replacing of manned craft with *Boyden* drones. However, the unmanned and undefended vessels easily fell into pirate hands if left unguarded – so some manned craft were always tied down to *Boyden* operations. Also, the AI programs piloting the drones did not perform quite as flawlessly as simulations had indicated, and only the Mk 6 version of the program was deemed reliable enough to allow the drones to run crowded space lanes unguided. Spaceport approach and departure was naturally always under full remote control.

Based on operational experiences, Starfleet chose convoying as the preferred mode of operating these craft. Destroyers or frigates were assigned to escort one to four *Boydens* at a time through pirate-infested regions; remote control units for the drones were installed on the escorts for contingencies. The flexibility of the drones still made these convoys more practical in supply duty than dedicated manned transports (which would have to have been escorted by manned defense ships as well). The *Boydens* served with distinction until 2220; some 25 units were lost, 14 to pirates, and some 120 shipments were ransacked, but more than eleven thousand shipments reached their destinations more or less safely.

The emergence of compact warp technology in the next century diminished the need for cargo drones somewhat. The follow-on design of *Sherman* class was still a valuable part of Starfleet inventory, and benefited from AI advances. Its delayed introduction in 2224 left a slight gap between drone generations, as the stopgap drones of *Namaskaar* and *Webb* classes were never produced in sufficient quantity. Thus, the retiring of *USS Bethesda* (NCC-G036), the last of the *Boydens*, in 2220 was accompanied with a definite sense of loss. Currently, no examples of the drones survive in surplus depots or museums, but the epic Robinsonade 'Stardrifter' by K. Wickly has immortalized the (fictional) *USS Hooper* of this class, as well as her single hapless occupant, Impulse Technician 3rd Class Gary Boone, in the minds of countless generations of young readers.

Watt

Fleet tanker / transport
2189-2225

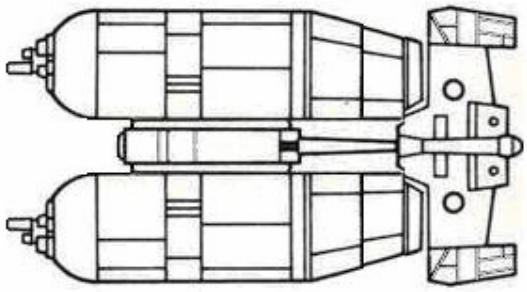
Completed: 192

Length:	134.1 m 164.2 m (w/ Type IV containers)
Beam:	100.2 m
Height:	34.0 m
Mass:	189,000 tons
Officers:	4
Crew:	56
Cargo:	30,000 tons
Cruise speed:	w 3
Max. speed:	w 3.9
Endurance:	4 years
Weapons:	2 laser emitters (200 nm / 400 MW) on single banks on port/stbd dorsal fwd hull 2 laser emitters (200 nm / 400 MW) on single banks on port/stbd ventral fwd hull
Shields:	1-layer graviton/subspace globular forcefield
Transporters:	None
Auxiliaries:	None

Ships of historical interest:

USS Chiu Degong (NCC-S121)

SOURCES: (D SFC)
(N SFC)
(H SFC)



Starfleet's initial hopes of sustaining its transport fleet through upgrades proved unrealistic for several reasons. Wartime attrition had hit the pool of large transports suited for the up-engining. The attrition had also demonstrated the poor combat characteristics of the prewar types, mainly their clumsy handling both at warp and impulse. The manpower balance and maintenance, repair and overhaul cycle length of the old designs were all wrong for the late 22nd century environment, where voyages of three years had become exceedingly rare, and repeated trips of three weeks were a more likely assignment.

Yet many Starfleet operations still hinged on logistics scaled for the use of the classic prewar star transport. Using ships of commercial stock to perpetuate these operations was no longer viable, since civilian operators and the SMM had called for, and received, ships of far greater capacity. By the 2180s, Starfleet was forced to design a medium transport optimized for its needs and ill suited

for other types of operations. The designing process was an excellent opportunity to correct all the shortcomings of the old models at one stroke.

The *Watt* medium transport was in every respect a military machine, built for high maneuverability and speed, and taking no shortcuts for affordability where improved structural strength could be sought instead. The classic tug-plus-containers configuration was pared down to the essentials, and those essentials then taken to their limits. The two 60 m, 50,000 ton PB-11 nacelles above and below the spine of the vessel were easily capable of warp three cruising and of a top speed close to warp four. At the ends of the two broad wings of the command sections, Hien-Gou M78 impulse engines provided 800 g accelerations at a full load of 30,000 tons. This load would normally be packaged into two rows of Type II containers, but an important secondary role as fleet tanker would entrust the *Watts* with two Type IV -sized deuterium or tritium tanks instead. *Vanguard* style adjustable grapples would accommodate both types of load with ease. Protection of the cargo would be possible both at warp and impulse with four 400 MW accelerated lasers at bow, and with two shield generators embedded in the wing structures.

The success of the design was guaranteed from the outset, since failure was not an option. A solid order for eighty vessels was signed in 2186, before prototyping had even begun. When the first *Watt* hulls were completed in February 2189, in two batches of three, they entered a simultaneous technical validation and operational testing program, with both tanker- and transport-configured vessels engaged in both supervised regular operations and demanding special maneuvers. Results were quickly fed back to the design process, and the Mk II *Watt* transport entered full production in March, 2190.

More than 190 vessels were ultimately completed, some seventy of them going to the SMM. The Mk IIa transports and Mk IIb tankers typically served Starfleet in fixed roles, while the more flexible Mk III could switch from containers to neutronic hydrogen tanks in a matter of hours. In the new operational reality of short missions and rapidly changing tactical situations, such flexibility was useful indeed.

Pirate attack! In this rather fanciful holoentertainment reproduction of a real 2197 incident with Nausicaan raiders, breaching pods are approaching the seemingly crippled USS Chiu Degong*, whose steel-nerved captain is 'playing 'possum' till the last moment. In practice, the mere introduction of forcefield shielding had put a sharp dent in such boarding attempts. Only a very foolish pirate commander would risk physical approach in flimsy pods when the switch of a deadly subspace/graviton field could be flipped at any moment. The proliferation of transporter technology in the region would soon alter things somewhat, reducing the time window needed for boarding, and making it necessary to protect valuables against beam-out with suitable scramblers.*

In terms of star hours or lightyears, *Watt* operations never quite attained the scope of prewar Earth transport adventures. In terms of total mass of goods and fuel hauled, they outdid the *Hercules* operational record eightyfold; in counting individual sorties, more than 700-fold! Importantly, no *Watts* were lost to piracy or military action – and while the latter was due to there being no such action, the former could be rightly attributed to the agility and shield strength of the transports. Between 2190 and 2218, some 78 foiled attempts at piracy were recorded. During that time, four

Watts were lost to technical failure, two to natural phenomena, and one to a game of go in an unconventional, definitely nonregulation but ultimately successful instance of frontier diplomacy. In most cases, the crews could be safely recovered.

With the Klingon onslaught, casualties began to mount, however. Fatal to the tanker and transport fleet was the assumption that Klingon risk/gain analysis on convoy attacks would be identical to Romulan. It took Starfleet more than a decade to discover the correct figures for convoy size and escort strength against this new opponent, who was clearly willing to risk more for less. Also, for the first time in its history of space commerce warfare, Starfleet had to deal with deep-ranging killer flotillas of cruisers, the trademark of the Klingon military machine. Even in the safest regions, only the strongest convoys could feel secure. Starfleet interest thus turned towards larger transports that would minimize the number of shipments and the difficulty of providing protection. Rather than 5,000 tons, the modern double-length cargo container would carry more than a hundred thousand – well beyond the capabilities of the *Watt* tugs.

There theoretically remained a niche for smaller transports yet, as lone supply vessels of lesser individual strategic value could hide in the depths of space and thus avoid attacks. Starfleet research on the field soon turned out for example the *Sherman* and *Independence* series of medium transports for the application. *Watt* units were withdrawn along with the Type II container in the early 2220s. The mercantile community scarely noticed, as the smaller containers had been abandoned as unprofitable years before. No *Watt* resales were made, and the class quietly disappeared to scrap yards.

Demise of the *Watt* class clearly marked the end of an era, even if an artificially prolonged one. Concurrently with the retirement, the last civilian warp transports of the classic Earth type were removed from UFP commerce registries, as old family businesses either finally abandoned their aging vessels, or sailed beyond the reach of the central government for the very last time.

Venture / Cahuya

Light / survey cruiser
2186-2233 (*Venture*)
2231-2281 (*Cahuya*)

Completed:	30 *Venture* light cruisers built in 2186-2199 10 refitted to *Cahuya* survey cruiser in 2231-34
Length:	197.4 m (original) 234.0 m (refit 2231)
Beam:	119.4 m (original) 132.7 m (refit 2231)
Height:	42.4 m (original) 55.1 m (refit 2231)
Mass:	410,000 tons (original) 492,000 tons (refit 2231)
Officers:	31 (original) 25 (refit 2231)
Crew:	260 (original) 360 (refit 2231)
Cruise speed:	w 3 (original) w 6 (refit 2231)
Max. speed:	w 4.8 (original)

w 8.0 (refit 2231)

Endurance: 5 years

Weapons: <u>Original:</u>
2 laser emitters (200 nm / 750 MW) in twin bank on dorsal bow
2 laser emitters (200 nm / 750 MW) in single banks on dorsal stern
2 laser emitters (200 nm / 750 MW) in single banks on ventral bow
1 torpedo tube w/ 65 fusion or photonic torpedoes and 15 probes on ventral bow (patrol configuration)
1 torpedo tube w/ 25 fusion or photonic torpedoes and 75 probes on ventral bow (survey configuration)
<u>Refit 2231:</u>
2 laser emitters (200 nm / 600 MW) in twin bank on dorsal bow
2 laser emitters (200 nm / 600 MW) in single banks on ventral bow
2 laser emitters (200 nm / 600 MW) in single banks on ventral stern

Shields: 1-layer graviton/subspace globular forcefield (original)
1-layer conformal forcefield (refit 2231)
Navigational deflectors on port/stbd ventral primary hull
2 auxiliary navigational deflector emitters on dorsal bow

Laboratories: 2 GP, 1 planetary sciences, 1 astrophysics (original)
2 GP, 2 planetary sciences, 1 astrophysics, 2 life sciences (refit 2231)

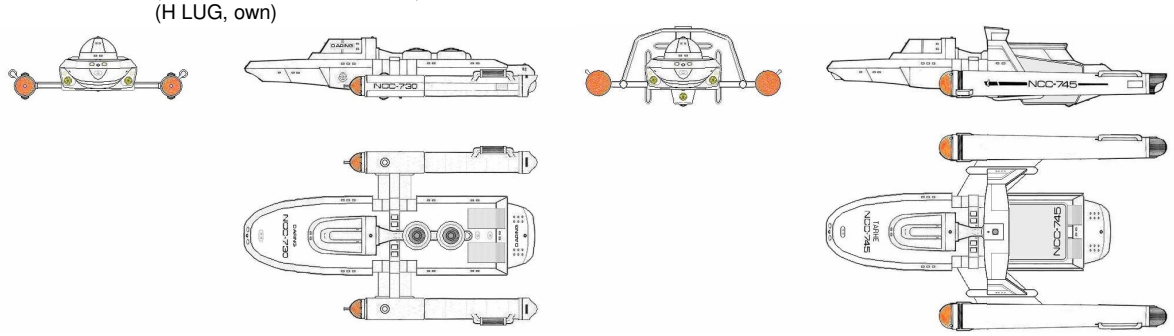
Transporters: 2 GP (3-pad), 2 cargo; Mk I (original)
3 GP (6-pad), 4 cargo, 3 emergency evacuation (22-pad); Mk II (refit 2231)

Auxiliaries: 1 cargo barge, 4 medium atmospheric shuttles (original)
4 light shuttles, 2 work pods (refit 2231)

Ships of historical interest:

USS Cahuya (NCC-740), *USS Inuit* (NCC-747), *USS Venture* (NCC-720)

SOURCES: (D SSA/Todd Guenther)
(N SSA/Todd Guenther, LUG)
(H LUG, own)



With the cancellation of the *Baikonur* (NX-700) deep space survey cruiser and her VX-10 engines, the vessel destined to inaugurate the range of mission-descriptive registries reserved for survey purposes was the *Venture* (NX-720). Prime motivation for the design was the impending retirement of the last *Daedalus* units and the growing obsolescence of *Castors*, the most potent of the auxiliary cruisers available. However, mere generation change would not suffice; as it was already known that military programs would be a black hole of funding in the immediate future, the next surveyor would be built in limited numbers, with at most 30 and more probably just a dozen keels approved. Speed and range would have to compensate for lack of numerical strength, and for once the cost-benefit analyses favored the adoption of a modern military engine.

Essentially, Exploration Command was once again sent searching for a survey cruiser design it could both afford and dare send to the outer reaches of its theater of operations. It was the latter need that necessitated that the cruiser be a co-recipient of PB-14 military warp propulsion technology. As a side effect, the resulting vessels would sooner or later face drafting by Defense Command – a mixed curse, considering it made the construction of the high performance surveyors financially possible in the first place.

Few other technologies in the *Venture* were shared with the ongoing, purely military light cruiser programs. Construction of the boatlike primary hull would be based on conventional metalloceramics rather than TiMo nanoalloys, and main power would, for frontier reliability and redundancy, be provided by two rather bulky 10:1 fusion reactors. The powerplant domes protruded from a dorsal centerline spine that extended forward to the command superstructure. A sail three decks high featured the navigation bridge and operations control rooms as well as extensive cartography facilities; at its base, a broader deck held officer accommodation, with a mess hall forward.

The top two decks of the main hull were divided between crew accommodation at bow, laboratories beneath the command sail, main engineering facilities farther aft, and twin hangars astern for supporting a standard flight of four shuttlecraft. Lower down, the hull tapered sharply at bow, and on the other hand flared to two side bulges amidships. The forward ends of the bulges held navigational deflector subspace field generators that also catered for the FTL scanners of the vessel, providing excellent long range sensing capabilities. The aft ends held three nozzles each for the M-2130 impulse engines. The fuel vital for long exploration sorties was bunkered between the cowlings, along with spacious holds for what Exploration Command hoped would be consumables and survey gear, and Defense Command assumed would feature surface combat and support vehicles and materiel. These could be offloaded via a ventrally berthed atmospheric barge, or two new-model cargo transporters that were accompanied by two triple-pad personnel units.

The construction program for the survey cruisers extended from 2184 to 2199, churning out spaceframes at a more leisurely pace than the *Caracal* program. Indeed, such were the delays in getting *USS Venture* spaceborne that her first operational mission in 2186, intended to scout out the Sagittarius direction, had already been usurped and completed by the much slower civilian surveyor *Palomar*. For Starfleet to again gain the initiative in deep space exploration, more assets than just the thirty high performance survey cruisers would have to be fielded to augment the combat fleet.

For the *Ventures*, this simply meant full-time employment. After first launched on their voyages of discovery, the vessels clocked in average 8% downtime, five of these due to repairs and three to intermission restocking and refueling. This incredibly demanding schedule consisted mainly of two-year sorties during which crew rotation was more or less impossible. While original plans called for swapping of the entire complement at mission end for one trained ashore as a unit, in reality a breed of deep space veterans would be born, serving on mission after mission and ultimately gaining command positions aboard Fleet heavyweights such as the *Horizon* class.

In a 2233 publicity regatta at SB 22, USS Tarhe *(NCC-745) displays her modernized propulsion system and sensor rig alongside* USS Sami *(NCC-742) of the original configuration. Both vessels would survive until the 2269 final retirement, while their commanding officers at the time of the regatta, Captains LaSalle and Jerthann, would both be casualties to Klingon aggression.*

This was a generation much different from the one raised on the *Daedalus*, *Libra* or *Castor* decks, on brief missions where the recent military reputation of the UFP gave protection and confidence, where mysteries lurked beyond every corner, and where graceful retreat was often the advised option yet seldom a practicable one. The *Venture* veterans worked within a confined if vast area of space, connected to home by improved subspace communications, responsible for the execution of a defined policy of noninterference. They had strict orders to avoid trouble with known enemies, or to add to their number. To their frustration, they would often find their assigned survey regions already trampled by other Federation agencies, enterprises and citizens. Virgin space was assigned to the armed envoys of *Horizon*, *Caracal* or *Mann* descent, then to *Baton Rouges*, then to those *Proximas* and *Icaruses* that could be saved from the battlefronts.

Yet the *Ventures* soldiered on. An engine refit was at long last effected in 2231, introducing the advanced PB-29 type to the survey cruiser community. The forward main reactor was swapped for a total conversion one, the aft one deleted; the massive new nacelles received swept pylons of increased strength. Propulsive performance increased at one leap to warp six cruising and warp eight dash speed, vitalizing the class for three more decades of celebrated operations. Yet as only ten of the cruisers would be reworked, Exploration Command made the most of what it was allowed to have. Various modern sensors were rigged on an arching wing that rested on the pylons and vaulted over the reactor superstructure. Three vast subspace antennas were mounted around the hangar area, one on a dorsal pylon, two directly on the hull flanks. The ventral cargo barge was superceded by additional cargo transporters and her berth faired over with a hull extension that accommodated antimatter bunkerage.

Incremental improvements on laboratory facilities, accommodation standards, computing capability and accuracy and firing rate of armament were of lesser scope than the propulsive upgrade. The analysis facilities of the class never quite rose to 2230s-60s standards, and the omission of the bow launch tube in favor of navigation gear vital at higher speeds was something of a blow to the sensing capabilities of the vessels. On the other hand, missions previously conducted by firing a swarm of probes could now be handled with an actual overflight or even a longer stay; the increase in speed was not eaten up by an expansion of operational range. For the last chapter of their lives, the *Ventures* (or *Cahuyas*, as per the first of the refits, NCC-740) were very much 'shallow space' surveyors, not out of distrust towards their research capabilities, but due to the military environment of the time. The loss of *USS Inuit* (NCC-747) at Azha in June 2258 was considered proof positive of a need for even greater separation from the Klingon battlefront. Later analysis suggests the vessel did not succumb to a raiding flotilla, though, but was consumed by a spaceborne lifeform of a type common in the region.

The remaining *Cahuyas* were withdrawn and deactivated in an orderly manner in the 2270s, leaving something of a survey cruiser gap due to the unexpected *Hopi* class retirement. Starfleet would next dare field lightly armed deep space surveyors in the 2290s, placing its bets on fully combat-capable survey types in the meantime.

Caracal

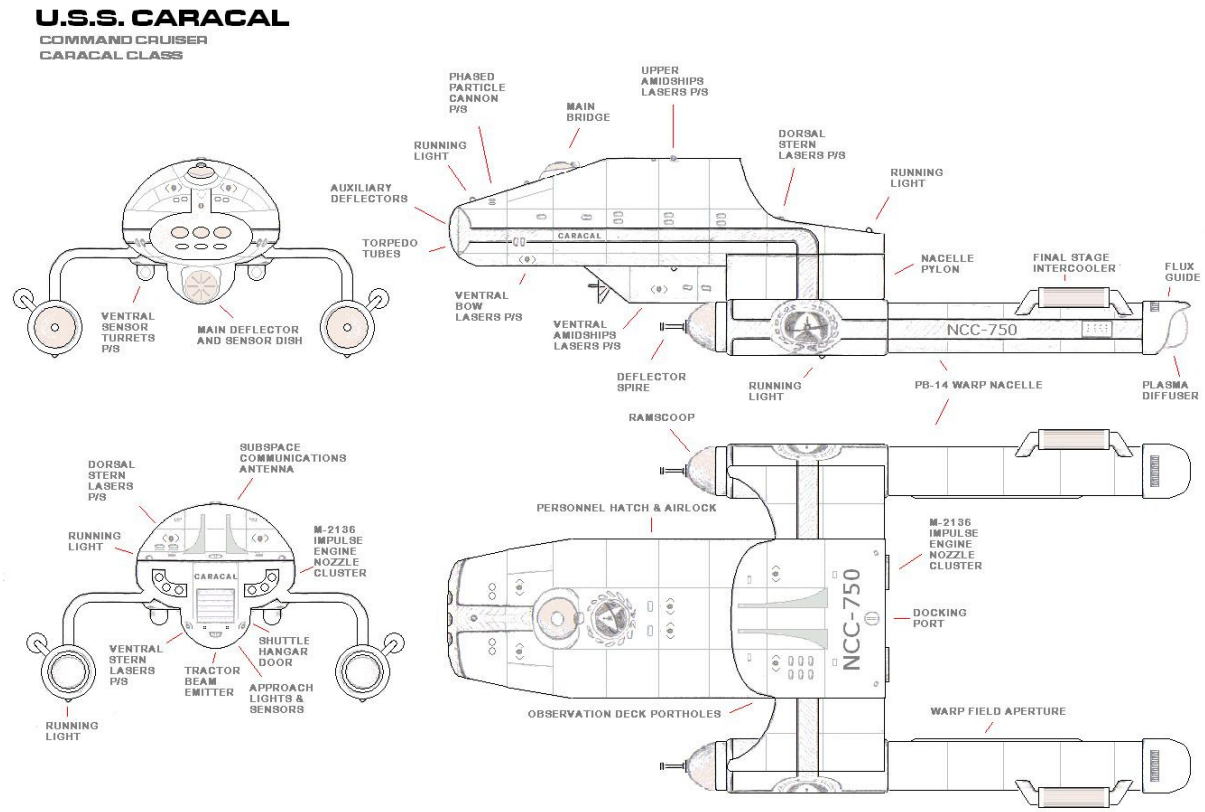
Command cruiser / attack cruiser / light cruiser
2189-2239

Completed:	15
Length:	197.2 m
Beam:	106.1 m
Height:	52.0 m
Mass:	393,600 tons (command cruiser) 392,000 tons (attack cruiser) 390,800 tons (light cruiser)
Officers:	28 (light variant) 34 (command variant) 31 (attack variant, including Marine officers)
Crew:	192 (light variant) 201 (command variant) 252 (attack variant, including 60 Marines)
Cruise speed:	w 3 (original) w 4 (refit 2205)
Max. speed:	w 4.9 (original) w 5.2 (refit 2205)
Endurance:	2 years
Weapons:	<u>Original:</u> 4 Type A phased particle cannon (500 GJ / 500 GW) on twin banks on dorsal bow (command and attack variants) 2 Type A phased particle cannon (500 GJ / 500 GW) on single banks on dorsal bow (light variant) 2 laser emitters (200 nm / 750 MW) in twin bank on dorsal central hull (command variant) 2 laser emitters (200 nm / 750 MW) in twin bank on dorsal aft hull (all variants) 2 laser emitters (200 nm / 750 MW) on single banks on ventral main hull (attack and light variants) 4 laser emitters (200 nm / 750 MW) on single banks on ventral main hull (command variant) 3 torpedo tubes w/ 25 fusion and 20 photonic torpedoes on bow (all variants) <u>Refit 2207-08:</u> 4 Type A phased particle cannon (500 GJ / 500 GW) on twin banks on dorsal bow (command and attack variants) 2 Type A phased particle cannon (500 GJ / 500 GW) on single banks on dorsal bow (light variant) 2 laser emitters (200 nm / 950 MW) in twin bank on dorsal central hull (command variant) 2 laser emitters (200 nm / 950 MW) in twin bank on dorsal aft hull (all variants) 2 laser emitters (200 nm / 950 MW) on single banks on ventral main hull (attack and light variants) 4 laser emitters (200 nm / 950 MW) on single banks on ventral main hull (command variant) 3 torpedo tubes w/ 30 fusion and 40 photonic torpedoes on bow (all variants) <u>Refit 2221:</u> 4 Type A phased particle cannon (500 GJ / 500 GW) on twin banks on dorsal bow (command and attack variants) 2 Type A phased particle cannon (500 GJ / 500 GW) on single banks on dorsal bow (light variant) 2 laser emitters (200 nm / 950 MW) in twin bank on dorsal central hull (command variant) 2 laser emitters (200 nm / 950 MW) in twin bank on dorsal aft hull (all variants) 2 laser emitters (200 nm / 950 MW) on single banks on ventral main hull (attack and light variants) 4 laser emitters (200 nm / 950 MW) on single banks on ventral main hull (command variant) 3 torpedo tubes w/ 15 fusion or photon torpedoes on bow (all variants)
Shields:	2-layer graviton/subspace globular forcefield 3 navigational deflector emitters on bow
Laboratories:	1 GP, 1 signal processing (command and attack variants) 1 GP, 2 planetary sciences, 1 astrophysics (light variant)
Transporters:	1 GP (2-pad); Mk I (command and attack variants) 1 GP (3-pad); Mk I (light variant)
Auxiliaries:	1 light atmospheric shuttle, 1 shuttlepod (light variant) 4 shuttlepods (command variant) 2 shuttlepods, 4 light assault barges (attack variant)

Ships of historical interest:

USS Allegany (NCC-754), *USS Dominium* (NCC-763), *USS Long Beach* (NCC-761), *USS Matanzas* (NCC-755), *USS Palomar* (NCC-760), *USS R'Sah-Dan* (NCC-764), *USS Tayi* (NCC-762)

SOURCES: (D SSA/Todd Guenther, own)
(N SSA/Todd Guenther)
(H SSA/Todd Guenther, own)



In the 2170s, the infamous decade of block obsolescence, funds for Fleet expansion were running low. The grim reality of some 150 truly spaceworthy combat ships, of which less than 40 were of cruiser size, did not meet the requirements of the newly defined role of the force. Extra cruisers were sorely needed for effective exploration, but also for defense and support roles, especially as the design lives of the already grossly overworked *Daedalus*, *Marshall* and *Almeida* ships in the respective categories were predicted to end within a decade or at most two. Since the results of the *Texas* light cruiser program were expected to alleviate the problems, however, other remedies were delayed till the 2180 defense review.

When the as such quite useful *Texas* ships failed to provide sufficient capacity, mainly due to their low speed that translated to low frontline availability, choices had to be made on further procurement. It was generally agreed that the solution lay in faster ships, not in greater numbers of slow ones. Search for a successor to the *Enterprise* class was ongoing, but a smaller design of equal speed would also be needed. The important decision of balance was made in 2185: Starfleet chose to procure twenty heavy and only sixteen light cruisers. The first were to follow the technological path opened by the *Enterprises*; the latter would be of simpler design but modern armament. The modest light cruiser program was given the name *Caracal*, and initial plans submitted in early 2187 for approval.

Meanwhile, internal stabilization of the UFP led to an economy upturn that in turn was reflected on Starfleet funds. Since the basic *Caracal* design and the number of hulls were already frozen by May

2187, the additional funding allocated for the project was mainly channeled to improved onboard equipment. The crucially important modern PB-14 warp engines got a lion's share of the funds. The engineers also wanted to test the limits of new materials, however, and the *Caracal* hull became an ideal springboard for applications. The basically cylindrar structure let the titanium-molybdenum surface take some 50% of dynamic and 85% of static loads, allowing for reduced internal bracing and better utilization of interiors. This construct type was to be further developed for the heavy cruiser project.

Most systems and functions were contained within the eight-deck main hull. Accommodation for 220 crew was provided, as well as ample room for an advanced medical facility and a pair of laboratories in addition to the weapons systems and usual support systems. The ventral midsection was reserved for a compression fusion powerplant. An SUE M-2136 impulse engine assembly, complete with two small auxiliary reactors of its own, took most of the space aft of this, leaving just a small central cavity for a shuttle hangar opening astern. Two groups of three nozzles were used, their thrust fully vectorable by forcefields even past the bulky primary hull thanks to innovative nacelle placement. A ventrally mounted two-deck extension housed e.g. the main deflector and navigational sensor assembly, ventral defense lasers, tractor beam and shuttle hangar support facilities.

The warp coil nacelles were slung low below the main hull, spread by an elegantly curving pylon assembly. The layout produced a flat, agility-improving field, as well as healthy separation of warp coils to increase survivability. High capacity plasma conduits traversed the pylons. Enhanced tubular intercoolers were installed in the nacelle aft ends, compensating for the increased plasma energy levels and freeing some room within the main hull engineering section. Drive plasma purge verniers and flux chillers could be significantly downsized from earlier designs. Total mass per nacelle was roughly 145,000 tons.

However, the pylon arrangement was structurally inferior to the simple straight pylons of earlier cruiser classes, at least with the materials available at the time. While the initial tests of *USS Caracal* (NCC-750) revealed no problems, significant fatigue was reported on several ships after the first three years in operational status. Apparently, the sublight maneuvering system, which was scaled for the more massive original hull design based on older materials, was tearing apart the new, lightweight and agile ships. Atomic matter piles aboard *USS Matanzas* (NCC-755) were damaged and a plasma coupling severed during a violent maneuver in 2195; the plasma and radiation leaks claimed fifteen lives. After this, strict flight envelope limitations were enforced on the whole *Caracal* fleet.

In contrast, warp performance was quite remarkable and the warp engines highly reliable. In the original configuration, *USS Saphir* (NCC-756) achieved warp 4.9 in post-delivery testing. A powerplant upgrade was performed in 2207, based on research done for the *Mann* project. The installation of a new type of flux guide enabled the ships to more carefully manipulate their warp fields and sustain warp 4 maximum cruise speed, with surge reserves for acceleration to warp 5.2. Fuel economy was not quite as satisfying, though, and the ships in general did not operate at high warp except in emergencies.

An effective weapons balance was found by downplaying the role of heavy lasers and concentrating on torpedo and particle cannon firepower. Two twin 500 GW phase cannon were installed on the forward hull, offering a somewhat limited cone of fire that was to be compensated by maneuverability. A modular bridge was located at the top of the tapering bow. The three torpedo

tubes ran below the bridge and the main cannon, each with double loaders and magazines safely buried inside the main hull. Secondary 750 MW (later 950 MW) lasers were installed on various positions on the hull.

A single docking port was located on Deck 6, where the hull sloped down to the impulse engines. A humble contingent of two to four shuttlepods was normally carried within the hangarette between the engines; minimal service facilities were provided.

Floating in a drydock above Earth, USS Saphir *poses for the high-ranking observers of her propulsion tests. The ventral viewpoint reveals the deflector and sensor bulge between the pylons. The* Saphir *represents the attack cruiser variant, as is evident from her four ventral assault barge berths behind the deflector, empty at the time of the trials.*

After a round of budgetary evaluations in 2188, Starfleet found it had enough funds to equip a few of the ships far more lavishly than originally planned. The class was thus built in three variants: command cruiser, attack cruiser and light cruiser. The heavy command variant (8 ships) featured the maximum number of weapon systems, including a total of eight defense lasers mounted on various spots of the main hull exterior. She thus provided almost as much firepower as a full-fledged *Horizon* cruiser, although with smaller energy reserves. However, five of the ships had to make do with reduced-size torpedo magazines due to the voluminous command and control facilities installed aboard. Their principal role was to provide sensing and coordination for destroyer formations. Although the ships were equipped with versatile orbit-to-surface underpylon sensor turrets for battlefield awareness, their secondary role in support of planetary assault operations was relatively seldom practiced.

The attack cruiser variant (5 ships) was dedicated to this type of operations, however. The type eschewed with four defense lasers, and could embark two platoons of Marines and berth four light assault barges below the hull, in a modified ventral extension. Thanks to the M-2156T engine enhancement, she also had the highest impulse performance, especially when not carrying an assault force.

The light cruiser variant (3 ships) carried only single particle cannon mounts and four defense lasers, but was dedicated to auxiliary exploration and support missions with the inclusion of advanced sensors and enlarged laboratory and cargo facilities. The limiting shuttle hangarette reduced exploration potential somewhat, especially compared with the *Texas* class.

Unexpected drainage of funds to starbase construction and maintenance made Starfleet reconsider this up-gunning. For a while, the plan was to build only ten *Caracals*, mostly of the light cruiser variant, since there seemed to be little need for warships in the category of command cruisers.

Luckily, if one forgives the expression, the brief emergence of Romulan threat in 2190 changed this, and all fifteen ships were funded and built after all. Registries for the cruisers ranged from NCC-750 to NCC-764, as Starfleet realized the originally intended 900-999 niche was too limiting even for 22nd century procurement plans, and the 700-799 one would never be filled with pure survey ships in these political conditions. Indeed, were the Romulans to attempt a breakout, Starfleet was prepared to build fifty additional units of both *Caracal* and *Texas* classes.

The departure from the registry scheme was not completely misleading. Due to the silence of the Romulan front after the brief false alarm, the light *Caracals* were mainly pressed to exploration duty: although not carrying as much special gear as the *Ventures*, they could provide meaningful support the assorted auxiliary cruisers in the efforts to expand the UFP borders of knowledge. Strike cruisers in turn expanded the borders more literally, establishing Federation claim on worlds rimward of the Romulan space. In this mission, *USS Audace* fell victim to unknown enemies in 2223 – most likely prey to Klingon disruptor cannon. Despite the availability of improved shipboard subspace transceivers, the cruisers spent most of their missions outside realtime communications range, and the disappearance of the *Audace* was only noticed months after the fact; no flight recorder marker was found. The command variants dutifully served on the Romulan front, efficiently coordinating the movements of destroyer and frigate fleets.

The class received a steady string of overhauls and modifications. After the engine upgrade of 2205, the most important of these was the installation of a torpedo loader system compatible with forced-intermix warheads in 2221. The upgrade, based on experiences from the *Mann* class, was supposed to extend the lifetime of the *Caracals* beyond the 2230s. The refit got off to a bad start, however: unknown to the public for many years, *USS Allegany* (NCC-754) was lost in an early test of the antimatter handling systems in 2215. Even though the explosion killed 86 people and ripped open a spacedock on Arcturan orbit, the incident was played down for counter-intelligence reasons and referred to as a problem with the ship's fusion reactors. This was the last time a Starfleet Incident Investigation Board would attempt dishonesty on such a large scale, and backlash from the inevitable exposure in 2218 did significant damage to public relations.

The mounting fatalities only harmed the reputation of the *Caracal* class within Starfleet, however. Klingons were still suitably impressed by the new warhead type, and it was initially to UFP strategic advantage to keep the *Caracals* in service, for what amounted to destroyer-level deterrent. The ships still were not what Starfleet expected of its cruiser force in the 2230s, and relegation to lesser duties was proposed at the beginning of the decade. Fleet disinterest in the proposal did not stem merely from the poor reputation of the class; common sense also dictated that conversions to auxiliary roles be performed exclusively on the more numerous *Texas* light cruisers rather than be needlessly spread across multiple dissimilar classes. Retirements of *Caracals* began in 2232, with the last unit gone by 2239.

After the latest modifications in 2223, heavy cruiser USS Requin *(NCC-758, in typical command regalia despite lacking the special C^3I facilities) sports a photon torpedo system and latest-standard shields in this scene from Battle of Bettysworld, one in the endless line of border skirmishes with Klingon raiders. Compare the two* Caracal *ships to the* Mann *class cruiser* Cervantes*, escorted on the background by two* Kovaris *destroyers. While sharing a construction process and some components, the two cruiser classes nevertheless represented totally different philosophies of hull form and engine placement. Neither line as such was continued in the 23rd century, even if experiences gained on both later helped shape the starships to come*

Despite the logistic considerations, circumstances forced a brief postscript to the *Caracal* story. In 2250, the decommisioned command cruisers *Palomar*, *Long Beach*, *Tayi*, *Dominium* and *R'Sah-Dan* were taken out of reserve to make up for a shortfall in second-tier cruiser numbers. The ships were only minimally refitted for duty as planetary assault command centers in the final campaigns against Klingon-minded pockets of resistance. They were removed from service in 2251 when more modern ships again became available for the role. Several interested parties made offers for 'efficient disposal' of the vessels, which ultimately were re-engined for service in the Ktarian defense fleet.

Horizon / Advance

Heavy cruiser / battle cruiser
2193-2249 (*Horizon*)
2198-2258 (*Advance*)
2210-2297 (*Whorfin*)
2210-2212 (*Indomitable*)
2222-2251 (*Essex*)
2222-2263 (*Archon*)

Completed:	40 total: 13 *Horizon* heavy cruisers built in 2193-2199 9 *Advance* battle cruisers built in 2198-2204 3 *Whorfin* battle cruisers (later survey cruisers) built in 2210-2215 1 *Indomitable* battle cruiser built in 2210 7 *Essex* battle cruisers built in 2222-2225 7 *Archon* heavy cruisers built in 2222-2224
Length:	294.1 m (*Horizon*, *Advance*, *Whorfin*, *Essex*, *Archon*) 311.8 m (*Indomitable*)
Beam:	117.1 m (*Horizon*, *Advance*, *Whorfin*, *Essex*, *Archon*) 193.9 m (*Indomitable*)
Height:	46.0 m (*Horizon*, *Advance*, *Whorfin*, *Essex*, *Archon*) 53.2 m (*Indomitable*)
Mass:	562,000 tons (*Horizon*, typical) 566,800 tons (*Advance*) 569,200 tons (*Whorfin*) 578,500 tons (*Essex*) 574,500 tons (*Archon*, typical) 771,000 tons (*Indomitable*)
Officers:	35 (*Horizon*, *Archon*, typical) 32 (*Advance*, *Whorfin*, *Essex*)
Crew:	278 (*Horizon*, typical) 268 (*Advance*, *Whorfin*) 289 (*Essex*) 294 (*Archon*, typical)
Cruise speed:	w 3 (*Horizon*, *Advance*, *Whorfin*, *Essex*, *Archon*) w 4 (*Indomitable*)

Max. speed: w 5.3 (*Horizon*)
w 5.5 (*Advance*, *Whorfin*, *Essex*, *Archon*)
w 5.1 (*Indomitable*)

Endurance: 4 years (*Horizon*)
6 years (*Archon*)
2 years (*Indomitable*, *Advance*, *Whorfin*, *Essex*)

Weapons: *Horizon*:
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd dorsal primary hull
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd ventral primary hull
4 Type I phased particle cannon (800 GJ / 900 GW) in single banks on dorsal primary hull
4 Type I phased particle cannon (800 GJ / 900 GW) in single banks on ventral primary hull
2 Type H phased particle cannon (500 GJ / 700 GW) in twin bank on aft secondary hull
2 fwd torpedo tubes w/ 80 photonic torpedoes on ventral primary hull
Advance:
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd dorsal primary hull
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd ventral primary hull
2 Type I phased particle cannon (800 GJ / 900 GW) in single banks on dorsal primary hull
2 Type I phased particle cannon (800 GJ / 900 GW) in single banks on ventral primary hull
2 Type I phased particle cannon (800 GJ / 900 GW) in twin bank on aft secondary hull
2 fwd torpedo tubes w/ 120 photonic torpedoes on dorsal primary hull
2 fwd torpedo tubes w/ 120 photonic torpedoes on ventral primary hull
Whorfin:
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd dorsal primary hull
2 laser emitters (120 nm / 1.2 GW) in twin bank on fwd ventral primary hull
2 laser emitters (200 nm / 750 MW) below secondary hull stern
2 Type I phased particle cannon (800 GJ / 900 GW) in single banks on dorsal primary hull
2 Type I phased particle cannon (800 GJ / 900 GW) in single banks on ventral primary hull
2 fwd torpedo tubes w/ 120 photonic torpedoes on dorsal primary hull
2 fwd torpedo tubes w/ 120 photonic torpedoes on ventral primary hull
Indomitable:
3 laser emitters (120 nm / 1.2 GW) in triple bank on fwd dorsal primary hull
3 laser emitters (120 nm / 1.2 GW) in triple bank on fwd ventral primary hull
2 Type J phased particle cannon (500 GJ / 900 GW) in single banks on dorsal primary hull
2 Type J phased particle cannon (500 GJ / 900 GW) in single banks on ventral primary hull
2 Type J phased particle cannon (500 GJ / 900 GW) in twin bank on aft secondary hull
4 fwd torpedo tubes w/ 80 fusion or photonic torpedoes on dorsal primary hull
Horizon and *Advance* refit 2218, *Archon*:
2 laser emitters (130 nm / 1.0 GW) in twin bank on dorsal hull centerline
2 laser emitters (130 nm / 1.0 GW) in twin bank on ventral hull centerline
1 laser emitter (200 nm / 950 MW) below secondary hull stern
2 Type J phased particle cannon (500 GJ / 900 GW) on aft hull
2 Type J phased particle cannon (500 GJ / 900 GW) on dorsal hull rim
2 Type J phased particle cannon (500 GJ / 900 GW) on ventral hull rim
2 fwd torpedo tubes w/ 55 photon torpedoes and 20 probes on dorsal primary hull
2 fwd torpedo tubes w/ 55 photon torpedoes on dorsal primary hull

Shields: 1-layer conformal forcefield
Navigational deflector on primary hull bow
2 auxiliary deflectors on secondary hull bow

Laboratories: 1 GP, 1 astrophysics, 2 planetary sciences, 1 chemistry/life sciences, 1 linguistics (*Horizon*, *Archon*)
2 GP (*Advance*, *Whorfin*)
None (*Indomitable*)

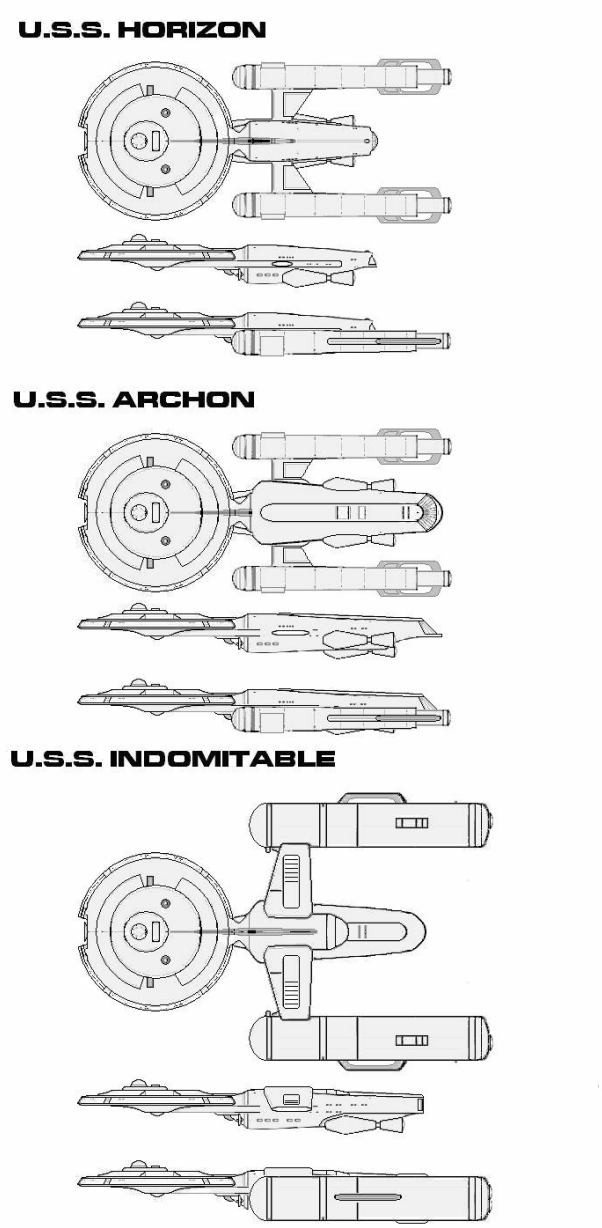
Transporters: 2 GP (3-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk I
Select *Advance*, *Whorfin* brought to Mk II standard

Auxiliaries: 4 heavy and 10 light shuttles, 6 shuttlepods (2200s, typical)
5 light shuttles, 6 sublight tactical craft (*Advance*, *Whorfin*)
5 light shuttles, 4 shuttlepods, 1-2 special environment craft or 1 scout cutter (2240s, typical)

Ships of historical interest:

USS Advance (NCC-1008), *USS Constellation* (NCC-1017)

SOURCES: (D SFC battle cruiser, ST:Legacy computer came *Yorktown*)
(N FSRC, SFC)
(H FSRC, HCE, own)



Although the heavy star cruiser was recognized as the mainstay of Starfleet's strategy of exploration and the *de facto* capital starship of the defense force early on, keeping the Fleet continuously supplied with even two dozen heavy cruisers of modern type seemed beyond the scope of the organization. In theory, resources would be very efficiently used in building these large, long range ships capable of independent action in all conceivable situations. In practice, allocating the required funds would beggar the rest of the Fleet, which still needed its destroyers, tenders and transports. Starfleet had to strike an undesirable balance between quality and quantity, stressing the former to an unhealthy degree, and to keep hoping that circumstances would eventually allow for improving the latter as well.

In the 2180s, as the careers of the wartime capital ship classes began their inevitable downturn, it was again time to develop a heavy cruiser of superior attributes. Despite the problems with the dilithium-regulated powerplants, the basic designs of the preceding cruiser generation had proven

completely satisfactory for both exploration and defense purposes. Yet there was a pressing need for more internal volume, which Starfleet felt could no longer be provided by increasing primary hull size.

A new approach called for new blood. Invited to participate was the newcomer Chiokis Corporation of Andor, a junior partner at this point. Wartime shipbuilders still did a lion's share of the work regarding both design and construction. When the first *Horizon* class heavy cruiser, NCC-1000, emerged from the dockyards in 2196, family resemblance to preceding capital ship classes was thus clear. Even to a casual observer, the two-hulled monster gliding out of the dock was obviously the old *Yorktown* battle cruiser – whether 'slightly reworked', or 'finally done right', opinions varied.

Standing in for the original primary hull was a leaner and meaner Geering saucer 117.1 m across and 8 meters thick on the rim, with a dorsal bridge superstructure offset to bow, and with a ventral torpedo tube bulge. Courtesy of Chiokis, the secondary hull was significantly enlarged in depth and width but at the same time streamlined with sleek, curving shapes and a stern undercut. The two short and broad pylons on the connecting section now sloped down for an improved positioning of the warp engine nacelles.

Internal arrangement took full advantage of the double hull configuration. Ten decks within the command hull held improved accommodation, uprated laser and particle cannon weaponry, high-tech laboratories, two computer cores, and a powerful navigational deflector backed up by steerable twin auxiliary units on the engineering hull. Protected conduits distributed power from the engineering section to these systems. The main phase cannon had two single retractable mounts aft of the bridge and two more aft of the ventral bulge; the main 120/1.2 laser mounts were paired ahead of the upper and lower protrusions. A twin-tube torpedo launcher with magazines for 80 shots could sustain a high rate of fire from the classic location at the bottom of the saucer. Two shield generators were also nested inside the saucer; the *Horizon* was the first major Starfleet vessel to be entirely protected by subspace/graviton fields and omitting armor altogether. The generators were of Andorian Raakuv LHH manufacture in the first three vessels to be built, but Hycor systems of Earth origin were introduced for all later units.

The secondary hull was organized much like the *Yorktown* one, save for the difference in scale; shuttle hangars, workshops, fuel tanks and reactor systems were in their familiar locations. The shuttlebay introduced precision tractor beams for approach control, yet the devices proved so unreliable at this point that their use was discontinued for flight safety reasons. The uncluttered landing deck, free of mechanical docking and securing aids, nevertheless represented a quantum leap in auxiliary craft operations. The extensive hangars and workshops allowed up to fourteen craft of various types to be operated from onboard the cruiser.

In addition to the thoroughbred 'Sternn' augmented fusion main reactor of 10:1 m/am ratio and peristaltic feed, two slightly more mundane auxiliary powerplants were housed in the secondary hull. Total power production was increased almost twofold over the *Achilleses*, 30% over the *Yorktown*. Fuel reserves provided an endurance of four years, and a theoretical maximum operational radius of some 400 lightyears. In practice, far longer missions could be mounted even in primitive fuel replenishment conditions, as the reactors were provided with filtering systems that could accept virtually anything from seawater vapor to gas giant upper atmosphere wisps.

The Scarbak GPM impulse engines cowled onto the lower secondary hull produced almost three times as much thrust as the contemporary *Caracal* impulse units, and avoided all the complications

and compromises of the two-stage *Enterprise* arrangement. The gigantic (200,000 tons, 163 meters) yet sleek and smoothly cowled PB-18 nacelles represented another drastic increase in propulsive power. New flux guide systems enabled vertical off-axis control of the field, and facilitated the change in nacelle positioning. Large tubular intercoolers were mounted in pairs atop nacelle aft ends, powerful deflectors in turn at the center of the forward domes. Hemispherical plasma exhaust diffusers astern could be retracted for rapid purging. In a 2199 test run performed by *USS Scotia* (NCC-1006), maximum power enabled warp 5.9 for two minutes, although a more reasonable warp 5.3 was set as the official limit. The fact remained that the *Scotia* had grazed warp six, and would indeed have exceeded it with just a 5% increase in power output, rather than the at least 45% suggested by contemporary engineering experience. However, the state of the art at the time did not allow for such power levels, so the slight but sudden drop in power requirements near warp 6 was not observed.

The Victoria *(NCC-1013) gets acquainted with a megesti swarm. The energy-hungry spaceborne creatures once numbered in the quintillions, yet their 'natural habitat' is anything but. The subspace disk around Algol was apparently constructed some 23,000 years ago by parties unknown, and has been rapidly degrading for the past millennia. The last megesti are expected to dissipate by the 40th century, unless means can be found to restore their unique habitat. Meanwhile, arguments on their possible collective sentience, first launched by the* Victoria *survey, rage on.*

The initial design was fielded in large numbers for a capital ship of this size, 12 more cruisers being completed after the prototype in 2196-99 and even more being planned. Independent exploratory deployments outside known space were typical assignments, even though the capable vessels were also called to perform various military duties. The *Horizon* herself had a distinguished career of exploration under the command of Captains Mann, Gatulla and Broderick. The three-year expedition under Captain Mann established first contact with no less than 12 civilizations, a feat no longer believed to be possible after the early days of *Enterprise* exploits on a virgin quadrant.

Yet this mode of heavy cruiser deployment brought up critique as well. The defensive commitments of Starfleet were as much compromised by block obsolescence as the exploratory ones, and the feline Xindi unrest of 2196-97 made 'Where Is Starfleet?' a burning question in mass media headlines. The Commission for Starfleet had no choice but to reconsider its procurement policy, and several *Horizon* contracts were pre-empted in favor of a type optimized for hearthworld security duty. On the positive side, the Council released significant funds for increasing the total number of cruiser hulls from eighteen to twenty-six, now evenly divided between exploratory and defensive types.

The *Advance* subclass (with a scattershot range of registries from NCC-1008 on the inaugural ship to NCC-1029 on the final vessel) made use of the *Horizon* design and even of some partially completed spaceframes, yet carried a completely rethought tactical suite featuring new targeting

systems, a heavier particle cannon fit and an additional dorsal torpedo launcher. Most of the laboratory facilities were displaced by the new weaponry, and the shuttle hangar was rearranged to accommodate a small flight of tactical craft. The battle cruiser designation could now openly be applied on this subclass, built in delightful quantity yet at a relatively leisurely pace as military threats once again receded. The type turned out to be something of a disappointment when finally pressed to battle; the loss of *USS Sentry* (NCC-1010) to newly belligerent Klingons in 2209 put construction on hold before numerous tactical shortcomings (mainly concerning secondary hull armament, protection and power routing) could be remedied for the final three vessels.

It would be very difficult to tell USS Whorfin *(NCC-1024) apart from the original* Advance *standard, or even the* Horizon *baseline, by looks alone. Yet sturdier internal structures and vastly improved rear hemisphere protection made a decisive impact in battle. The* Whorfin *survived this 2229 Kshatriyan ambush with light casualties and went on to serve the Federation as a deep space survey cruiser on three separate tours of duty, the last ending in 2297.*

At the resumption of the *Advance* run, the flawed original hull NCC-1023 was left uncompleted, yet in practice lacking little else besides warp propulsion and tactical systems. She was the ideal subject for an experimental upgunning when the Klingon offensive began: not pulled off the front lines at a critical moment, nor hogging any of the capacity used in construction of modern combatants, yet offering promise of revigorating a design that existed in decisive numbers. Key to the Chiokis/Armscor/CWD upgrade was PB-19, a 180 m monster engine capable of pushing a *Horizon* to supercruise. Changes to exterior included longer, stronger pylons that held the nacelles far apart, beyond saucer width; three nozzles per pylon for the impulse system; and significant expansion of the secondary hull, to 140 m total length. The latter was an absolute prerequisite for the major internal change, the installation of two *Mann* SSWR-IX reactors in parallel. Power aplenty could now be used to fire up enhanced shields and an increased number of main lasers. Some secondary weapons were replaced by phase cannon, and two more torpedo tubes added.

The weapon upgrade was an unqualified success, at least in test firings. However, the *Indomitable* (as NX-1023) did not get the chance to try the deadly arsenal on Klingon vessels. Trials of the drive system gave disappointing results, not so much because of design flaws but because of the disturbing unreliability of the overcharged power system. Starfleet dared not send the ship to the battlefield, even had the embarrassed powerplant provider relinquished her. Nevertheless, the steps forward in weapons integration proved useful in virtually all the following military ship construction and upgrade programs – including that of the *Horizons*.

Emergency shutdown! The Indomitable *downwarping hard after yet another test sortie is aborted by main powerplant failure. The chase ship is* USS Altay *(NCC-911), a* Texas *light cruiser extensively used as a range support ship between 2205 and 2220.*

In 2218-19, a thorough weapon system upgrade was performed on all members of the *Horizon* and *Advance* classes. The entire torpedo loader assemblies of the surviving ships were removed and replaced with ones compatible with modern forced-intermix warheads, for which the *Horizons* were priority recipients. Also, laser fire control was upgraded to *Indomitable* standard, and the particle cannon were given better surge suppressors for 20 % overcharging.

New units were added to Fleet strength as well, the lead ships *USS Essex* (NCC-1350) and *USS Archon* (NCC-1370) of the respective battle cruiser and heavy cruiser batches becoming further salutes to acclaimed *Daedalus* ships in 2222. These newbuilds incorporated the PB-21 engine, a rather minimally improved direct successor of the now dated PB-18. Yet thanks to adopting a version of the *Indomitable* secondary hull, with its vast volumes for fuel and supplies, they enjoyed an endurance and range advantage over the converted older cruisers, and represented a higher standard of accommodation as well. They are thus often considered subclasses distinct from the upgraded *Advances* and *Horizons*, respectively. For a few glorious years before the full operational introduction of the *Baton Rouge* class, they actually formed the defensive strongback of Starfleet. Yet when the more modern alternatives became available, production of both *Essex* and *Archon* types was cut short at seven vessels.

None of the armament changes would have transformed the venerable heavy cruisers into invincible fighting machines anyway, as power systems still were unable to feed terawatt lasers or rapid-fire particle cannon. Nor did the acceleration, agility, speed or range of even the latest *Horizon* variants quite meet modern military standards or ambitions. While the significant research capabilities of the *Horizons* did give them an edge against Klingon cruisers by providing high-quality intelligence and analysis of enemy tactics and capabilities, a further boost in power and propulsive performance was decidedly needed.

Even though the class was nowhere near the end of useful service life, Starfleet thus began considering a significantly more extensive upgrade option, mainly as an economical alternative to all-new dilithium supercruisers. In this prolonged process, modern hardware was mated to *Horizon* secondary hulls, as *USS Constellation* and *USS Republic* went through a series of experimental refits to find the ideal way of replacing the command hull with a larger and stronger concave-type saucer, and the old PB-18 or PB-21 nacelles with significantly more capable PB-3X series solid-state units. These refits are discussed in the *Constitution* entry in more detail.

On this foundation were laid the plans for innumerable later generations of ships. The basic design philosophy of the *Horizon* class has endured for almost 200 years now, both within Starfleet and among many foreign space forces. It is only fitting that no examples of the class survive in museums or surplus depots – the continuing influence of the *Horizons* on today's starship designers is heritage enough for the venerable design.

The last Horizon*? Although most surplus secondary hulls were dismantled when their application in* Achernar *production ended, this spaceframe was modified for Starfleet Corps of Engineers use, sporting a gigantic spherical workshop section and numerous additional tractor beam stations. The vessel survived till 2322, well beyond the retirement of* USS Sol*, succeeding a series of similarly anachronistic* Daedalus *conversions in the vital mission of 'deep space special repair and maintenance'.*

Sentinel / Armstrong

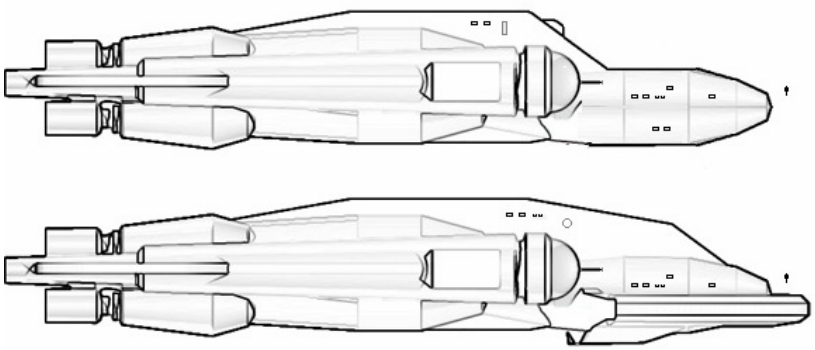
Scout cruiser / light cruiser
2194-2252 (*Sentinel*)
2197-2231 (*Armstrong*)

Completed:	20 total: 14 *Sentinel* scout cruisers built in 2194-2200 6 *Armstrong* scout cruisers (later light cruisers) built in 2197-2202
Length:	138.5 m (*Sentinel*) 129.0 m (*Armstrong*)
Beam:	70.0 m
Height:	25.1 m
Mass:	291,000 tons (*Sentinel*) 278,550 tons (*Armstrong*)
Officers:	18
Crew:	110 (*Sentinel*) 132 (*Armstrong*)
Cruise speed:	w 3
Max. speed:	w 6.5
Endurance:	3 years
Weapons:	<u>Original:</u> 2 laser emitters (200 nm / 750 MW) on port/stbd dorsal primary hull 2 laser emitters (200 nm / 750 MW) on port/stbd ventral primary hull 2 Type M phased particle cannon (900 GJ / 1.4 TW) on dorsal ridge (*Sentinel*) 1 fwd medium torpedo tube w/ 20 fusion torps (*Armstrong*) 4 plasma cannon (2.0 GW) on dorsal primary hull 4 plasma cannon (2.0 GW) on ventral primary hull <u>Refit 2228:</u> 2 laser emitters (170 nm / 2.2 GW) on port/stbd dorsal primary hull 2 laser emitters (170 nm / 2.2 GW) on port/stbd ventral primary hull
Shields:	1-layer graviton/subspace globular forcefield Navigational deflector on dorsal bow
Laboratories:	1 GP, 1 astrophysics, 1 planetary sciences, 1 life sciences
Transporters:	2 GP (4-pad), 2 emergency evacuation (12-pad); Mk I 2 GP (6-pad), 2 emergency evacuation (12-pad), 1 cargo; Mk II (refit 2241-46)
Auxiliaries:	2 light shuttles, 4 work pods

Ships of historical interest:

USS Bastion (NCC-811), *USS Fortune* (NCC-805)

SOURCES: (D 'Crew: The Bottle' comic/John Byrne, LUG)
(N LUG)
(H 'Crew: The Bottle' comic/John Byrne)



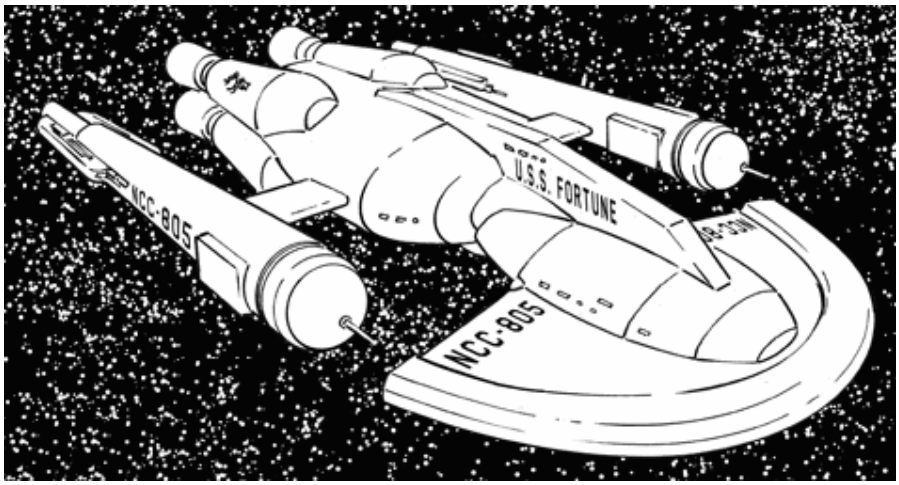
The careful and stepwise approach Starfleet took in refreshing its cruiser force was in retrospect the correct one. Investment in large numbers of, say, *Caracal* light cruisers during the transition stage would have held back experimentation on better technologies, especially high speed warp propulsion systems. Similarly, adopting but one warp engine would have limited the options of mission class refinement and diversification, needlessly locking cruiser doctrine when experience on the actual tactical environment was woefully lacking.

Starfleet's failure in the 2190s to commit to PB-14 for all its medium vessel needs may not have been the result of recognizing such threats, but it served the organization well. In 2190, an engine was needed for a dedicated scouting vessel, significantly larger in absolute and relative size than the reconnaissance units of the Romulan War. Design specifications included use of twin nacelles, cruise endurance of three years and warp six dash speed. The last condition ruled out PB-14 and gave an opening for PB-17, a downscaled version of CWD's monstrous PB-18 '*Perth*' engines.

Even the PB-17 nacelles were heavyweights compared with the scout and light cruiser engines of the immediate postwar period. The associated 5:1 reactor in turn was half again as massive and bulky as the 10:1 powerplants of the *Caracal* and *Venture* cruisers, yet the hull of the scout could still be compacted somewhat by omitting items unnecessary for the scouting mission. A flattened cylinder spaceframe was exactly scaled for the powerplant and fuel reserves for extreme deep space operations, and the GPM impulse engines were cowled outside. The mission hull in turn combined elements from a variety of recent designs: its core was an ovoid built according to *Caracal* principles, but it was surrounded by a mighty scythe of sensor arrays, giving the bow a rather *Triton*-like silhouette. Indeed, as reconnaissance, fleet spotting and rapid interdiction were to be the main tasks for the complementary cruiser class, emphasis was placed on sensor capabilities, and armament was pared down. A bay for two shuttlepods in the engineering hull was considered vital gear, but for example a torpedo launcher was not; shields also had to make do with small Type D generators of low performance.

The inaugural *USS Sentinel* was completed on schedule in early 2194 and at long last launched the 800 range of registries reserved for the scout cruiser mission class. Her designers and purchasers alike had originally considered her a technology demonstrator, and assumed low production numbers. Yet the seeming resurgence of the Romulan threat with the Beta Cersus altercation had

altered Starfleet's ideas on the composition of its cruiser force, and contracts for a total of fourteen vessels were eventually secured. Unlike the *Caracal*, which was found technologically lacking yet slated for mass production in a crisis nevertheless, the *Sentinel* was an immediate engineering success story but was never intended to outstep her operational niche.

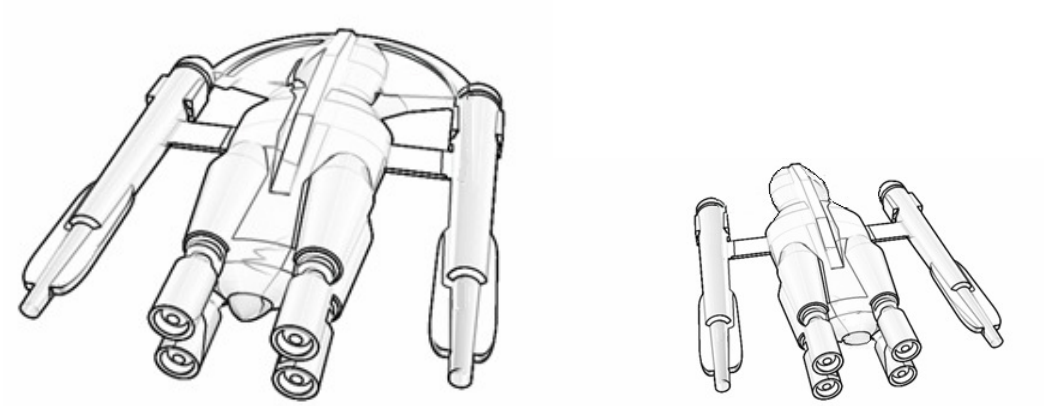


A bow shot of USS Fortune *undergoing replacement of impulse coil controls also showcases the PB-17 nacelles and their looping intercooler arrangement – in its time a significant performance booster, yet by the 2240s a maintenance nightmare only surpassed by the quirky GPM impulse propulsion system.*

In theory, the *Sentinel* was a formidable fighting vessel, with potent shielding and a powerful battery of lasers and phase beams. Lack of torpedo armament considerably reduced her potential as an independent frontier combatant, though. In an effort to hedge its bets, Starfleet soon purchased eight examples of a more combat-oriented variant, omitting the sensor scythe and replacing the phase cannon in the dorsal keel with a rather minimal twenty-shot torpedo system. *USS Armstrong* (NCC-814) was commissioned in 2197 as a scout cruiser, but had some difficulty finding an operational niche with the reduced sensing capabilities, and was soon redesignated a general light cruiser asset instead.

For the first decade of operations, there were few military challenges to existing doctrines and beliefs. The far-ranging voyages of the *Sentinel* fleet resulted in some exploratory feats of note, although Starfleet never could afford to deploy the vessels in missions of actual scientific emphasis; the successes were the result of chance encounters, and were seldom followed up with systematic surveys and assessments. The *Armstrongs* also exploited their speed in exploration tasks, but in addition put out bush fires, supported colonization efforts, and pestered pirates in sectors closer to the UFP core; *USS Tereshkova* (NCC-817) was an early deep space loss, at the time considered evidence of a misguided overextension of light cruiser operations.

The early years of the clash with the Klingon Empire frequently saw the scout cruisers fighting Klingon raiding groups they sensed from afar and engaged thanks to their superior speed. Of these one-on-many battles, none is as remarkable as the last stand of *USS Bastion* (NCC-811). Fighting against overwhelming numerical odds, she demonstrated rather the inferiority of Klingon preparedness than the superiority of Starfleet armament, eliminating five opponents before being lost. Yet by 2228, the date of the battle, Starfleet already had the option of engaging enemies in deep space with proper fighting vessels: high performance warp propulsion with warp four cruise capacity was rapidly becoming standard for the fleet. In light of the improvements, scouting duties could no longer viably be performed by vessels of *Sentinel* ilk.



A side-by-side comparison highlights the commonalities of Sentinel *and* Armstrong. *Shining through is the basic* Daedalus *configuration of ovoid and cylinder, with 'leaner and meaner' concretized. It was actually not commonplace to operate the ships in hunter-killer pairs.*

The scout and light cruisers could have been upgraded with more modern engines of comparable dimensions, such as the PB-24 or eventually even the PB-35. Instead, Starfleet opted to keep the sensor platforms operational in their existing guise, patching up holes in the survey operations with the slower design and introducing the *Hermes* class for the front lines; the light cruisers were duly retired. The scout cruisers continued to score discoveries and contacts in the less contested areas of frontier space, huddling under the protection of improved laser main battery, but unshipping the outdated plasma cannon defenses and particle beams.

The final *Sentinel* casualty was *USS Fortune* (NCC-805), self-destructing in 2243 to defeat raiders later assessed to have been of Ferengi origin or employ. The last members of the class were retired in 2252, with bountiful scouting resources available and a new wave of advanced surveyors about to assume operations. The scout cruiser category went extinct, and the 800 range of registries was given over to perimeter ships. It would not be until the late 2280s that reconnaissance would again be specifically burdened on vessel types mounting multiple cruiser-standard engines.

Tritium

Testbed
2199-2207

Completed:	1
Length:	202.0 m
Beam:	161.0 m
Height:	118.6 m
Mass:	437,600 tons
Officers:	15
Crew:	235
Cruise speed:	w 3
Max. speed:	w 5.3
Endurance:	years
Weapons:	Originally none 2 Type A phased particle cannon (500 GJ / 500 GW) in single banks on dorsal midhull 2 Type A phased particle cannon (500 GJ / 500 GW) in single banks on ventral midhull

	4 Type G phased particle cannon (700 GJ / 400 GW) in single banks on lateral nacelle upper and lower stern 2 fwd torpedo tubes w/ 250 photon torpedoes on port/stbd lateral sponsons
Shields:	1-layer conformal forcefield 2 navigational deflector emitters on port/stabd lateral sponsons 2 auxiliary navigational deflector emitters on primary hull bow
Laboratories:	1 propulsive technologies
Transporters:	2 GP (3-pad); Mk I
Auxiliaries:	None
SOURCES:	(D SFC) (N SFC) (H SFC)

By the end of the 22nd century, Starfleet was deeply committed to the path of high quality and regrettably low quantity. This placed heavy demands on Fleet R&D, especially as regarded the heaviest deep space vessels. By the time of *Horizon* class inauguration, SF Engineering Division was already thinking two generations ahead. A cruise speed of warp 4.75 and a dash speed of warp six was sought for a vessel that would eventually be twice as massive as the recently introduced heavy cruisers, and form the strongback of the Fleet for decades to come. Yet the so-called *Tritium* experiment, intended to verify a novel three-nacelle configuration for application on the future class, ended in spectacular failure, casting doubt on the entire silver bullet stratagem.

The single full-scale testbed, essentially a *Horizon* power system housed in a simple test rig hull and feeding three nacelles connected by cantilever supports, was largely built out of drive components of the cancelled *Horizon* cruiser NCC-1008. The nacelles were new models, however, sharing the 26 m diameter with PB-18 but measuring just 100 m on the long axis and mounting huge conical heat exchangers aft. The mass of the spool-type coils was some 120,000 tons per nacelle, while the nacelle structures and heat exchangers added another 10,000 tons. Thus, total warp propulsion system mass was roughly comparable to that of the *Horizons*.

For the *Tritium*, mass as such mattered little, as the testbed did not even mount a true impulse drive system. Instead, linear sublight accelerations were facilitated by primary plasma venting, and steering by standard RCS thrusters and momentum exchangers. Guidance was semi-autonomous, auxiliary craft not provided, life support only 90 % regenerative; in every respect, the *Tritium* was a typical test rig for a single aspect of technology. Yet the drive chain itself was a mature system, and could have been fitted aboard an operational cruiser with minimal effort once the three-lobed warp field concept was proven, the field characteristics established, and initial tuning performed.

Instead of achieving any of the test program goals, the *Tritium* (NCC-X1000) ran into what warp scientists later dubbed the 'Ishakawa-Dell barrier' – the power consumption curve shot up unexpectedly just below warp factor 6. Initial blame was naturally put on the novel coil setup: emergence of transient disruptive harmonics at high speeds was suspected, and signs of this indeed discovered soon thereafter. Fine-tuning and repeated attempts at altering the field configuration ultimately proved that the barrier was not just an artifact of the three-lobed field but a factor that would be present on twin-and single-lobed fields as well when approaching warp 6; the field configuration simply made the effect more clearly visible. Experiments with a further six testbeds of somewhat smaller scope and cross-comparison with Vulcan engineering and research efforts suggested an even more pronounced effect in fields of warp factor 7 or 'Tyme barrier'. There either was something seriously wrong with current warp theory, or then something in the engineering of ships as dissimilar as the *Tritium* and the *Suurok* was interfering with the warp fields in a disturbingly universal way.

Later research revealed the full extent of 22nd century misconceptions about warp propulsion. Warp factors beyond 6 were certainly attainable by technology of that era, if combined with hull shapes optimized for interaction with fine-tuned fields. Yet it took a century and a half of research to realize the true reasons for the power consumption maxima and minima coinciding with certain warp factors. The more profound understanding gained in the so-called 'warp renaissance' allowed for greatly improved cruise performance and necessitated a recalibration of the warp factor scale. However, the *Tritium* experiment failed to provide any of these positive results. While the test ship herself was equipped with stock weaponry (including a total of eight phased particle beam cannon on the hull and nacelles and two torpedo launchers on the lateral deflector sponsons) and commissioned for heavy fire support duties, the three-nacelle concept at large was abandoned as unusable.

The Tritium *parts company with the* Mann *class cruiser* Catullus *at the end of a spirited race, warp 3.7 on the average from the Bonneville Flats testing grounds to the Arcturus surplus depot. The speed that meant heroic struggle for the engineers of the experimental three-naceller was a somewhat sub-par performance for the operational cruiser.*

So serious was the political impact of the *Tritium* failure that scores of high-ranking officers and officials were discharged. This loss of competent personnel only deepened the R&D crisis that had befallen the cruiser development program. All plans beyond the second batch of *Horizons* were dropped, for the new propulsion system would have been the key to their realization. Continuing along the familiar two-nacelle path with the existing or foreseeable power systems would not allow Starfleet to maintain qualitative superiority for long. In desperation, Starfleet rerouted the heavy cruiser development funds into the classic black hole of R&D funding: revolutionary power technologies and drive systems.

To the relief of everybody, antimatter power production eventually took a leap forward with the adoption of Andorian total conversion reactor technology, and sustained Starfleet to the 2230s when dilithium regulation would re-emerge. Simultaneously, solid-state warp coils made out of cast vertenium cortenide took over from spooled coils, and made it possible for the raw power of total conversion to be efficiently transformed to warp speed. The fact of these breakthroughs having been made financially possible through the failure of gradual development was not lost on Fleet analysts, who were now more convinced than ever that the silver bullet stratagem was the future of Starfleet.

2200-2240 - Way of the Warrior

The beginning of the 23rd century signified an end to the organizing phase of the UFP. The political system was stabilized, diplomats had pacified the member states into cooperation, and Starfleet had provided protection against both internal and external threats ranging from piracy to small local political upheavals to interstellar plagues to planetary catastrophes. Federation citizens considered Starfleet a benevolent and efficient organization and supported further expansion.

But a deep space mission gone sour in 2209 changed the future of the UFP. The first tentative dealings between the Klingon and human empires had been amicable enough, yet a fatal gap in cultural understanding still remained. What looked like a simple little refugee crisis to the crew of *USS Sentry*, not unlike the first human contacts with the Klingons half a century before, turned out to be a matter of utmost religious importance to the followers of Kahless. The incident at γ Demetrius resulted in a display of brutality unseen even in the Romulan War. False confidence evaporated overnight when the Federation was pitted against its first true interstellar adversary. Panic spread like a wildfire across the UFP – heavily armored Starfleet ships had fallen to the alien disruptor beams of the enemies as if they had been completely unshielded, and lasers and phase weapons alike had glanced off the enemy shields, or so claimed the rumors. Klingon vessels warped around and through Starfleet formations with speed and audacity the technologically cautious Romulans had never demonstrated.

The reformed Klingon Empire, dedicated to the warrior mythos that its leaders had built to stabilize the Emperor-less reign, was utterly unreceptive towards diplomatic overtures. Nine years later, it was time for the Klingons to take the proactive role. Archanis, Cursa and Donatu fell to the expansionist rampage; after Amar had been annexed to the Empire, it seemed that Aldebaran would be the next Klingon target. Starfleet was faced with two options: fall back to defending small isolated systems, each wanting to secede for a better bargaining position with the invincible conquerors, or increase defensive strength to heed off the brutal adversaries. The politics of Starfleet and the whole Federation now centered on the handling of the Klingon threat and the internal difficulties caused by it.

All the skill and strength of UFP diplomacy had to be summoned to keep the interstellar alliance from collapsing. Yet even more crucial in the crisis was the role of new technology. This transcended mere technical advances and became a factor in interstellar politics, as phasers provided Starfleet with a weapon as powerful as the fearsome disruptors of the Klingons, and solid-state warp coils powered with dilithium-energized plasma propelled the ships to warp six and beyond.

A naming convention change prompted by the rapid developments resulted in the birth of a legend: with the launching of the groundbreaking *USS Bonaventure*, all interstellar spaceships in Starfleet service now officially became starships. The emotion-charged word had for some time been suggested as the general designation for Starfleet interstellar vessels. With the winds of change now sweeping through the organization, the time was deemed right for the transition.

Yet the Starship Project was in its time a controversial political issue, not only in terms of fund allocation, but also in terms of military balance. Some Federation members felt that the introduction of the *Baton Rouge* and *Icarus* classes and associated destroyer forces had already repelled the Klingon threat for good, and that further escalation would be unwise. Others said that even the brand-new starships would be impotent against the current and future threats, and that new ship

classes would only whet the appetite of the battle-hungry Klingons. Prior to the Babel conference of 2238, several core worlds and close allies of the Federation, including Altair, Izar and Melev, as well as numerous fringe worlds, had expressed interest in forming separate 'defense zones' inside the Federation. Even though this separatist movement received a cold shower when Klingons in the '38 Babel expressed no interest in separate peace with factions within the Federation, some worlds were so overtaken by this 'dissolution campaign' that they continued to pursue their goal for independence frantically – and sometimes even violently – for the next decade.

The dissidents stiffly boycotted two of the following Babels (none of which was to be held on Earth again). Melev briefly denounced the separatist movement and managed to qualify for Federation military aid; Izar never wavered, and exerted political pressure on Rigelians as well. The Council received conflicting communiqués from the Altairan system, teetering between dissolutionary and unionist factions. Finally, three months prior to the Babel of '41, Starfleet Intelligence decided to intervene, asking for the Fleet to be placed on yellow alert and preparing for disciplinary action.

Due to the approaching Babel, Starfleet was already heavily engaged in diplomatic courier and escort duty. Any attempt at bringing the dissidents to their senses would have to be performed on minimal starship resources, preferably in one limited-scale action. SF Intelligence analyzed recent reports on Klingon activity, and asked Starfleet forces near systems of questionable loyalty to discreetly report back on the local political situation. Among these forces was *USS Gulliver*, a *Sawyer* class scout visiting Axanar for a cultural study under the command of Lt Sharrir Th'saal. Although not the most vulnerably positioned of the dissident systems, Axanar was precariously close to the Klingons in terms of political views. The aggressive policy of expansion practiced by this individualist member system had already caused conflict within the Council. SFI expected a pacifying maneuver directed against Axanar to cause repercussions throughout the dissolutionary movement.

On June 5th, the elderly destroyer *Bonhomme Richard* was returning from Babel escort duty under the command of Cmdr Michael Walsh when she spotted a Starfleet recorder marker in deep space. Quick examination of the buoy log revealed that *USS Gulliver* had met a violent end, but no clues remained of the identity of the attacker. Being short on supplies, and scheduled for retirement in just two months, the *Bonhomme Richard* headed back towards Starbase 12. On July 9th, a follow-on mission was to be sent under the command of Capt Kelvar Garth, but his destroyer was badly damaged in a dockside explosion. Not believing in coincidences, SF Intelligence demanded a stepping up of Starfleet response, and on July 12th, Garth of Izar was given command of starship *Constitution*, at the time idle after extensive trial runs. The starship was deployed from Starbase 12 with orders to assess the overall situation in the Axanar system. Cruisers *Connecticut* and *Saint Louis* were ordered to stand by.

As the *Constitution* tried to approach Axanar on August 22nd, the local government hailed the ship, claiming full independence from the UFP and declaring confiscated all Federation or Starfleet equipment in the system. Three Klingon destroyers within the system assumed an intercept course at the starship. The *Constitution* immediately sent a Code One call for help, and a task force was scrambled to protect Federation sovereignty and integrity.

Had Starfleet counted on conventionally powered ships like the *Mann* and *Horizon* classes in 2241, reinforcements against the dissolutionary forces might have arrived at Axanar too late to prevent a total catastrophe. Although there were only relatively light covert Klingon forces in the system, the Klingon government was quick to recognize the Axanarian independence and to send a fleet of its own to assist. Conveniently, this fleet happened to be within less than a week's cruise of the system... But

scouts and destroyers from nearby space were quickly organized to blockade the system by Captain Garth. Commanding the small fleet from his starship, and using ingenious hit-and-run tactics to prevent the numerically superior Klingons from concentrating their fire or penetrating the thin blockade line, he managed to delay the Klingon forces until the Federation task force would arrive. And the timely arrival of the two *Baton Rouge* cruisers and four *Saladin* destroyers from SB 12 tilted the balance in what proved to be a crucial battle in preserving a united Federation.

As the main Klingon forces warped into the system, the full blockade was already in place. Federation torpedo armament from the destroyers and the heavy starship forced the Klingons to sublight battle, after which the balance of projected-energy weaponry decided the outcome. Rather than lose a major portion of the fleet, Klingons chose to retreat *en masse*. This surprising decision was hastened by the destruction of their command ship of new D6 type, IKC *Enforcer*, in a vicious and near-suicidal attack by the *Saint Louis*. Admiral Kkorhetza, commander of the Axanar expedition, was now isolated on the planet.

Although the victory is rightly attributed to the military genius of Captain Garth, it was made possible only by the availability of warp 6 ships. In fact, the antiquated *Marklin* class destroyer *USS Xenophon* to which Captain Garth was originally assigned could probably never have seriously threatened the Klingon forces – thus, the dockyard explosion that crippled the destroyer and forced Garth's transfer to the skeleton-crewed starship can actually be thanked for the victory at First Axanar! The reasons for the explosion from which Captain Garth was saved by the narrowest of margins have never been truly uncovered, but the most popular theory suggests a Klingon time-tampering mission gone wrong.

Due to the humiliating defeat, the Klingon master plan of conquest appeared to lose its chances of success. Yet Klingon archives reveal a different truth: the aim of Kkorhetza all along appears to have been to use Axanar as a base for extensive raiding of UFP space, not as a stepping-stone for expansion of Klingon territories. That ambition was relegated to different leaders after Kkorhetza's defeat and suicide in Second Axanar. A coup attempt by Admiral Kamato, a fierce rival of Kkorhetza, paved way for General Kharn to step in, but his position, too, was far from secure. Despite Kharn's tactical brilliance, Klingon military movements soon lost coherence as Wars of Internal Dissension ravaged the border sectors. Massive concentration of forces against targets like Inverness and Archanis still only amounted to raiding; Klingons only gained territory by virtue of Starfleet withdrawing from already destroyed colonial holdings, and made wholly insufficient effort at fortifying against recapture.

Out of the chaos, the Klingon propaganda machine created a curious mixture of fact and fiction, a saga of a 'Four Years War' against the Federation. From the UFP point of view, however, the 'war' was a series of brutal skirmishes, ranging from the ambush at Lea that left the *Constitution* unable to fight for the rest of the conflict to the Starfleet landings on Rudgur III that were defeated by the first major use of theragen. Between Kharn's breathtaking audacity and the efforts of the factions undermining him, Klingon strategy was impossible to decipher, and Starfleet was unable to devise a logical counterstrategy. The only way to prevent defeat by attrition was to create a trap no Klingon could resist. And by moving the battered *Constitution* and three of her half-finished sisters to the forward repair base at Axanar, Starfleet closed the circle on the four years of senseless fighting.

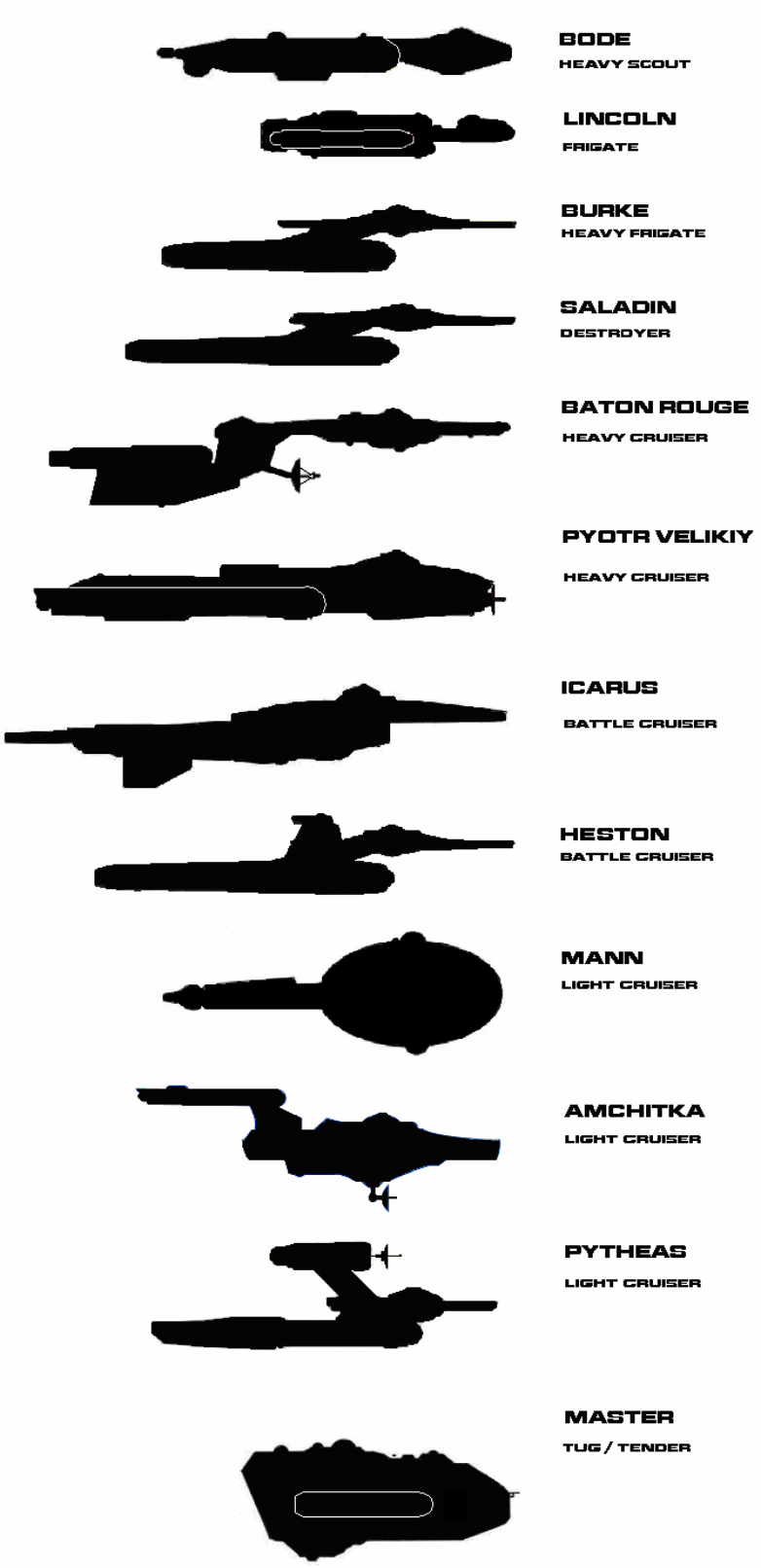
The active part of the conflict with the Klingons ended in early September 2245 when the attack against the Thranstor yards was repelled, Kharn captured alive (and branded Undying for his infamy) and the last Klingon cruiser was driven out of Axanar space. Mop-up actions at Grank and the Argelian Approaches are not normally included in the history of the Four Years War, although the

Marines still commemorate the taking of Kolm-an and the end of their bitter struggles over the former fleet base.

The dissident movement gradually calmed down so that Axanar was ready to rejoin the Federation in 2250, and Izar, Melev and finally the war-torn Altair followed suit in the 2260s. Hatred against the Klingons lingered on, however, and many veterans kept referring to the ongoing antagonism as the Klingon War, making no distinction between the events preceding and following Final Axanar. In terms of numbers of incidents and tonnage and personnel losses, they certainly had the right to their opinion.

The spectrum of ships created in the last decades of the 22nd century was now replaced in its entirety with modern designs utilizing the circumferential solid-state warp coil and the new flat saucer hull made out of trititanium. New understanding of warp physics dictated the shape of the ships and established the 'Starfleet look' for centuries to come. The development culminated in Project Starship, a hyperambitious effort to create a star cruiser that would mark the beginning of a truly new era in Starfleet history. Such was the success of this project that the very first vessels laid down dictated the course of the Four Years War, from start to end, even before being finished and commissioned. Yet their greatest contribution to Starfleet and the Federation would come after and outside the conflict.

The flux of technology, combined with the expansion of major political entities, made the early 23rd century one of the most hectic in the history of the Federation and its Starfleet. Klingon offensives were repelled, a major war only barely averted, and the new prime directive of non-interference put to a test of fire in many occasions. The integrity of the Federation was at stake, as a major dissolutional movement threatened to sever border worlds from the core of the UFP. More than ever before, Starfleet was the key to the future of the humanity – but would it be able to face that challenge without becoming a corrupted oppressor in the process?



The principal ship classes of the early 23rd century in comparison view. Warp engine standardization remains a distant dream, but certain primary hull solutions have been commonalized.

Bering

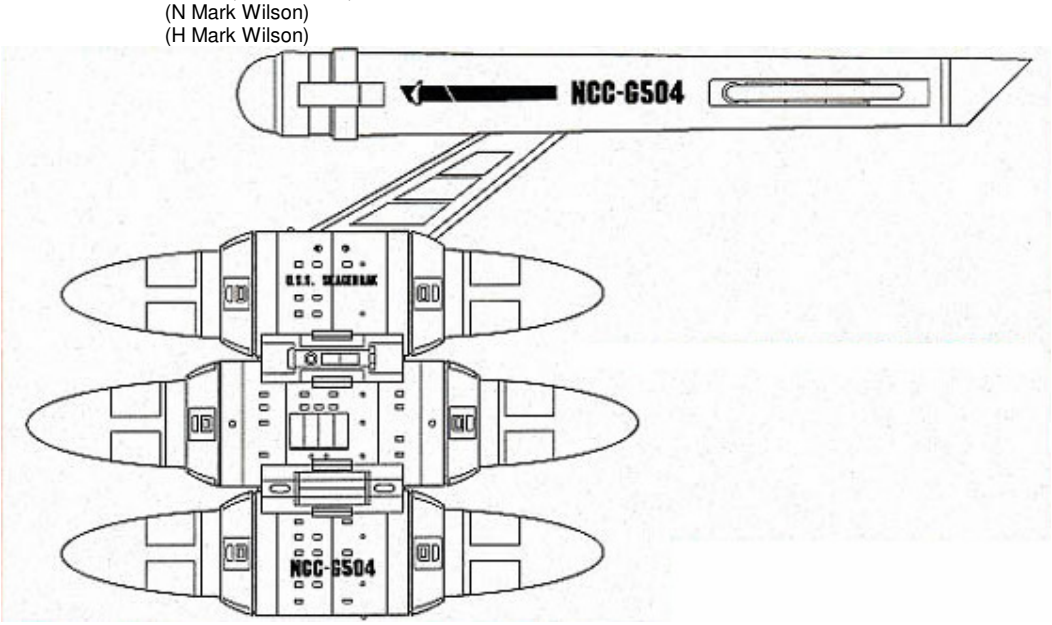
Cargo drone
2204-2267

Completed:	20
Length:	204.1 m
Beam:	54.4 m
Height:	115.5 m
Mass:	173,900 tons
Officers:	None (standard) 3 (crewed operations)
Crew:	None (standard) 45 (crewed operations)
Cargo:	33,000 tons
Cruise speed:	w 3
Max. speed:	w 5
Endurance:	10 years
Weapons:	2 laser emitters (200 nm / 200 MW), on upper port and lower starboard sections (original) 4 phaser IV emitters in two twin banks, on upper port and lower starboard sections (refit 2255)
Shields:	Navigational deflector on starboard pylon mount
Transporters:	None
Auxiliaries:	None; hangar for 2 medium shuttles

Ships of historical interest:

USS Skagerrak (NCC-G504)

SOURCES: D TAS (Mark Wilson)
(N Mark Wilson)
(H Mark Wilson)



The range and speed of the *Horizon* exploration and defense cruiser force set requirements for the entire logistics chain of the modern Starfleet. The operators of the vessels at Defense and Exploration Commands would have preferred a flock of high speed tenders, repair ships and tankers

to accompany the new cruisers in fleet maneuvers of the sort that had characterized all deep space action in the past decades. Obvious propulsive engineering problems precluded this, however: there was no way Logistics Command could afford to equip its entire force with the massive and expensive PB-18 or even its recent, much more compact and affordable PB-21 derivative. Yet there was nothing technologically impossible about equipping at least a few key support ships with the engine and its power systems. And at the very top of the wishlist was a high speed, long range tanker for frontline replenishment.

The *Watt* units were in theory a propulsive near-match for the cruisers, yet they were far from ideal platforms in supplying individual starships or outposts. By 2202, the Office of Operations had specified its desired field refueling system: a conical tank some 40 meters long and 20 meters in diameter, with four internal compartments that each could be accessed by a separate fillport. One such load of some 5,500 tons of neutronic hydrogen could keep a starship in action for several months; other fuel types or fluid consumables could also be carried.

The *Bering* (NCC-G500) high speed tanker designed around this system came to feature six tanks, mounted at the forward and aft ends of three cylindrar hull sections. These sections were each seven decks high, and stacked with the longest one in the middle and the engine nacelle atop. The topmost pod held warp engineering systems, a transporter room, a navigation bridge, a fire control station for the vessel's defensive armament of two 200 MW lasers (mounted at upper port and lower starboard), and various navigation computer systems. The latter were a key feature of the design, advanced enough to pilot the vessel uncrewed even through relatively demanding flight profiles, such as precision delivery of fuel to a passive starship two star systems over, or automated swapping of tank modules.

Between the upper two sections was a horizontal impulse block, mounting propulsion nozzles to each side aft and navigational sensors forward on stub wings, plus a main deflector/sensor dish on a starboard support pylon. The central section housed workshops and fabricators for *in situ* repairs; operating and repair crews could board the section through a shuttlecraft hangar and stow their craft in comfort.

The next section juncture again featured a stub wing structure, this time housing port and starboard fuel transfer booms. The lowermost section was dedicated to cargo, which could be loaded via the shuttlebay using a centrally mounted variable-gravity shaft. Were the ships to be operated on crewed mode, up to 48 personnel could also be accommodated in this section. From the beginning, Starfleet also prepared for a mode of operations wherein the deep space drones could act as safe havens for stranded crews of other vessels; the computers had extensive protocols for receiving distress calls, altering course, rendezvousing with survivors and giving them entry access. *USS Skagerrak* (NCC-G504) put this mode to test when rescuing a Tellarite crew in 2261, but subsequently was claimed by the same calamity that had distressed the Tellarites in the first place – the Delta Triangle otherspace anomaly.

Protocols also existed for evasive maneuvering and defensive use of onboard weapons, but in practice a drone in a combat zone would quickly be outwitted and outgunned by a hostile force. Thus, strict rules of engagement were adopted and readily accepted: in practice, combat shipments were escorted by crewed starships from frigate size up, and the escort crew would closely control the use of drone weapons for convoy defense via dedicated if somewhat rudimentary datalinks. Thanks to the cautionary deployment doctrine, no actual combat losses were suffered. Two convoys did engage the enemy with their newly refitted twin dual phaser IV banks in 2255, in practice

contributing little to the barrage fire from the escorting light cruisers but still validating the system and surviving the respective engagements.

Despite showing initial promise, the frontier fuel tank module failed to attain much popularity or longevity. Introduction of dilithium-regulated antimatter power systems threw fuel consumption rate calculations into chaos, and ended up favoring larger shipments than were possible by a *Bering*. The tank modules remained in use on assorted orbital outposts which featured compatible docking adapters, but their role in starship replenishment diminished quickly. Retirement of the drones began in the mid-2260s, as fully crewed and relatively heavily armed *Ishinomaki* and *Arcadia* fleet tanker-transports now met frontline replenishment needs. The de-engined hulks saw further use as sub-impulse fuel barges, constructed by welding together three or four *Bering* drones and stripping all but the starboardmost one of internal systems; the barges were referred to as the *Adriatic* class, after the starboard hull of the first bundle completed.

Mann

Light cruiser
2206-2244

Completed:	16
Length:	185.0 m
Beam:	101.7 m
Height:	40.0 m
Mass:	334,000 tons (original) 376,300 tons (refit)
Officers:	14
Crew:	280
Cruise speed:	w 4
Max. speed:	w 4.5
Endurance:	8 years
Weapons:	<u>Original:</u> 2 laser emitters (180 nm / 1.4 GW) on dorsal hull 2 laser emitters (180 nm / 1.4 GW) on ventral hull 4 Type L phased particle cannon (800 GJ / 1.2 TW) on fwd ventral hull 2 fwd torpedo tubes w/ 46 photonic torpedoes <u>Refit 2218:</u> 2 laser emitters (170 nm / 2.2 GW) on dorsal hull 2 laser emitters (170 nm / 2.2 GW) on ventral hull 4 Type M phased particle cannon (900 GJ / 1.4 TW) on fwd ventral hull 2 fwd torpedo tubes w/ 22 photon torpedoes
Shields:	1-layer graviton/subspace globular forcefield 3 navigational deflector emitters on bow
Laboratories:	2 GP
Transporters:	2 GP (3-pad), 2 emergency evacuation (22-pad); Mk I (original) 1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk I (refit 2227)
Auxiliaries:	4 work pods

Ships of historical interest:

USS Endurance (NCC-767), *USS Leonides* (NCC-772), *USS Mann* (NCC-765), *USS Sagan* (NCC-768), *USS Singer* (NCC-777)

SOURCES: (D SFC)
(N SFC)

(H SFC)

The turn of the 23rd century was a time of introspection for Starfleet. The auxiliary cruisers that had kept the exploration program afloat were rapidly becoming unserviceable, and the wisdom of equipping new vessels in this category was questioned. Fleet scouting capabilities were still grossly insufficient. Research on faster drive systems was making no headway, as both the theoretical understanding of the Tyme barrier phenomenon and the practical engineering solutions of better powerplants were lacking. Amidst these troubles, few paid attention to the perhaps most obvious gap in Starfleet's credibility: its combat strength in relation to the size of its theater of operations was at an all-time low. With the potent but expensive *Horizons* largely dedicated to the constantly expanding exploration mission, the defensive fleet lacked both the tactical muscle of effective armament and the strategic freedom of high speed propulsion.

After the failure of the *Tritium*, funds would have been well spent on speeding up *Horizon* and *Advance* production. Unfortunately – due to what was considered a colossal strategic oversight by some, an inevitable limitation of general economic facts by others – the dockyards of the early 2200s simply weren't up to the task of building the numbers of heavy cruisers required. When the production capability wasn't there, allocation of the resources that did exist was an issue of hot debate. The Federation Council made it very clear that no further defensive cruisers would be built in large numbers at a time when there were no external threats worth mentioning. To make up for the inevitable shortage in quantity, Starfleet again chose to field a design of superior quality, even if this meant even lower procurement figures than with lesser, cheaper designs. To satisfy Council-imposed limitations, Starfleet officially specified the project as a light cruiser of no more than 50,000 tons of hull mass.

Several designs were considered, many of them simply miniature versions of the heavy *Horizon* cruisers. In 2200, Chiokis Corporation presented the most attractive plan so far: a cruiser in the warp 4.5 speed range, well within the 50,000 ton mass limits, yet with a hull ten times as voluminous as that of the classic saucer-hulled cruiser designs. The ovoid main hull of the ship, made of extremely lightweight pure trititanium, had a height to width ratio of 1:2.5425. This shape maximized available volume: the warp field would wrap tightly along the surface of the hull. No notch in the field existed to accommodate a secondary hull, and indeed none was needed, given the significant volume of the ovoid section. Warp engines of the ultramodern 'Twenty Series' would be mounted symmetrically, aft on the hull centerplane. No pylons would be used; as was typical of Andorian designs, the all-new engines were closely spaced and mounted directly and sturdily to the primary spaceframe.The forwardmost 40 meters of the 130 m, 140,000 ton PB-20 assemblies would actually be buried deep inside the hull ovoid.

Main power was to be provided by a SSWR-IX total conversion reactor, a system heretofore never applied on non-Andorian spacecraft. Without the benefit of dilithium regulation, fantastically complex containment and intermixing systems were required to support the 1:1 m/am ratio. Indeed, up to 40% of internal volume had to be dedicated to power production, meaning that every cubic centimeter of the large ovoid would be needed to allow the ship to carry the required mission gear.

The Mann *(NCC-765) at speed. The intricate hull-field interaction combined with total annihilation power production made possible the impossible: warp 4 could be sustained until fuel exhaustion. Great leaps were made in 'supercruise' capability thereafter, with warp 5 and 6 introduced for the* Baton Rouge *and* Constitution *classes, respectively.*

The design still triumphed over competitors on its elegance of operation, although experienced Fleet designers expressed doubts on its practicality, especially on the structural strength of the vast yet featherweight hull. In a major break from the Not Invented Here tradition, Earth-dominated Starfleet finally accepted the Andorian design and authorized the construction of ten light cruisers of *Mann* class, beginning in 2201 and aiming at a 2206 first launch. This order was later changed to twelve vessels as the number of *Titan* carriers was cut down from ten to eight – highlighting the practical problem of Starfleet possessing only ten dockyards capable of processing tritanium-hulled vessels of this size and complexity at the time! The registry allocation system in fashion at the time resulted in numbers NCC-765-780 being assigned, although several other alternatives were also suggested.

The ships initially featured a centrally mounted twin torpedo launcher with a rapid-loading system and spacious magazines for modern, precision-guided photonic torpedoes. Four powerful phase cannon capable of penetrating the strongest of shields known to Federation gave the ships their major offensive power, while four warp-accelerated lasers of immense power provided defensive strength along with the best shields Starfleet could muster. Two compression fusion reactors powered the warp engines, while the impulse engine between the nacelles was powered by four smaller reactors that also delivered power to the particle cannon. Sensor suite was exceptionally diverse and capable as well, since the voluminous hull decreased the number of compromises the designers had to make in this respect. Calling these vessels 'light' cruisers began to sound less and less fitting, despite the fact that the original hull mass limit had been exceeded by mere 4,000 tons.

This generosity of design quickly ate up the available volume, though. Very little room was left for laboratories, and shuttle hangars were omitted, with four standard docking ports installed to compensate. Clearly, a purely combat-oriented mission profile was intended for the cruisers. Thanks to the potent directed energy armament, the design actually outperformed even the heaviest variants of *Caracal* light cruisers in battle. With their groundbreaking capacity for sustained warp 4 cruising, the *Manns* also were the first warship type capable of 'strategic redeployment', the prerequisite to territorial control on interstellar scale. In several polls, UFP citizens considered themselves safe from Romulan aggressions, alien intrusions or space piracy; the Federation was becoming a true empire, no longer huddling around essentially isolated star systems, but actually in charge of the volume of space connecting the member systems.

But not everybody was happy with the growing military power of UFP, nor with the continuing expansion of this new empire. A movement known variously as 'Earth First', the 'Terra-return League' or the 'Back-to-Earth movement' was born at this time, with the goal of ending space exploration and returning humans to the Sol system, and ultimately to Terran surface. Leading figures in the movement were colony leader Gwendolyn Illisen of Benecia and industrial tycoon

Maxwell Grandisson III of Earth, but several other influential people were also attracted to the ideas of the league. In 2218, the movement gained new support and spawned similar groups across the UFP – in the naturally reclusive and isolationist Andorian population, on Tellar, and reputedly even among some Vulcans. The rampage of the Klingons led to interstellar panic, of a magnitude completely different from the minor anxiety caused by the distant Romulan War in the 2150s. The existing fleet of warp three spaceships would be no match to a determined enemy of equal technology: the mechanics of space warfare heavily favored the attacker, since intruders warping in could not be intercepted before they were within bombing range of planetary targets.

USS Singer *(NCC-777, here seen with a typical false registry of the early years of Klingon conflict) being escorted by two* Kovaris *destroyers, all in the briefly popular Starfleet livery of white and red. The dorsal laser emitters are clearly visible, as are the peculiar flat ramscoop cowlings on the bow and bloated thermal sinks on the engine nacelles. The atypically large internal volume of the vessels, quite equal to that of the secondary hulls of the heavy* Horizon *cruisers, later barely sufficed in accommodating the many modernizations that were needed to keep the class a credible defense against Klingon forces.*

While the homefront considered the possibility of surrendering space to the Klingons and returning home, Starfleet took a different approach. According to Vulcan calculations, the two alternatives for the defender were to build *sixteen to twenty times* as many ships as the attacker could field, or to introduce ships with a 30% speed advantage and warp intercept weapons. The less impossible of the two alternatives was chosen.*

Beginning in 2218, *Mann* class ships were upgraded with experimental modern torpedo systems. Loaders for forced-intermix photon warheads were installed on Deck 7. Heavier defense lasers were fitted, and the warp engines of Vickers manufacture uprated to the so-called third generation standard to squeeze out the promised top speed of warp 4.5 not quite attained by the original design. Humungous intercooler pods had to be substituted for the original sleek tubes to cope with increased power levels on the 160,000 ton engines. The uprated configuration was sometimes called the CT or 'Cruiser Tactical' upgrade; four final hulls were completed out of existing spares at this dire hour before attention switched to the improved *Ranger* class. Together, the light cruisers formed Starfleet's main defense against the Klingons in the early 2220s, 'holding the fort' until ships designed from the outset to oppose the warrior empire were fielded.

In retrospect, the fleet of *Mann* ships was quite insufficient for effective defense. What apparently saved the UFP from an early conquest was a series of cosmic coincidences, as is the case with most major historical turning points. The Klingon Empire, never quite united and always at war on several fronts, could not concentrate its forces against the newly found and attractive resources base because of troubles with other political entities; a race known as Kinshaya is mentioned in what little remains of Klingon historical records of that time. While almost nothing of this Beta Quadrant

race is known to Alpha Quadrant cultures, it apparently managed to challenge the technologically advanced Klingon military for decades. Also, the Klingons were cautious not to harm their then-delicate trade relationships with the Rigel area cultures, while at the same time trying to prevent the UFP from gaining too much of a foothold in the region. Finally, a minor race known as the Willall provided the Klingon scientists and politicians with a fascinating challenge, the significance of which would not be revealed until the 2240s. Until then, the two empires coexisted in an uneasy equilibrium behind their fleets of warp four cruisers.

Map: Early areas of conflict with the Klingon Empire and other threat forces of the early 2200s. The vicinity of Rigel was contested not only by the Klingon forces but also by Orion pirates, local navies and their privateers. Skirmishes with Klingons extended from the Orion nebulae to γ Hydra, and a dozen new starbases were founded and hundreds of thousands of surveillance buoys sown along the long border. Note the conspicuous lack of activity near the Dilithium Belt; at this time, the full value of this region was not realized by any of the competing factions, even though the Orions had strong interest in the worlds for other reasons.

Famous *Mann* class vessels include *USS Endurance*, the flagship of Adm. Okuru Nelson in the herculean spacelift evacuation of ten million people from Bayard's planet in 2217; and *USS Leonides*, which in 2212 intercepted a group of pirates ransacking the armed transport *Flying Fortress*, and thus unknowingly threw a challenge to the Sta Mura dynasty that was to plunge the secular elements of the Klingon Empire to a heated conflict with the Federation as well. *USS Sagan* was the first Earth-built cruiser-sized ship to be adopted by the Andorians, with a fully non-human crew, in 2213. After this, several founding cultures began to adopt Earth-built ships for their local navies, initially leading to greater uniformity of Fleet equipment, but ultimately also to the relative scarcity of ships named after nonhuman persons or events.

Starship crew members will also fondly remember *USS Poseidon* which in 2219 discovered the paradise planet Hydra II in sector 16C, a fountain of enthralling shore leave stories, poems and songs. Reputedly, a Klingon opera on the subject was censored out of existence in the early 2250s, as its ridicule of the *Poseidon* crew was deemed not harsh enough – but another, highly popular romantic opera emerged in its place after the Khitomer peace, and has enjoyed widespread success wherever it performs. Few are the warriors today who cannot sing the part of Captain Marvin D. Goodwell by heart (in the original Klingon, that is).

*Actually, the impossible-sounding multiplication of Starfleet strength by a factor of twenty was also done – or so it was supposed to appear to the Klingons. Several ships operating near the border received temporary NCC numbers far higher than their real ones, suggesting a far larger Starfleet than actually existed. Thus, many *Advances* sported numbers in the 700 range, and some *Horizons* got registries of over 1500. Each time the registry was changed, the engines were also tuned to emit a slightly different warp signature. Klingon archives uncovered in the 2310s revealed that the trick was effective – Klingon naval strategists or 'thought masters' of that time had briefly estimated Starfleet to be 1,500 capital ships in strength, while the actual number was nearer to 300!

Lincoln

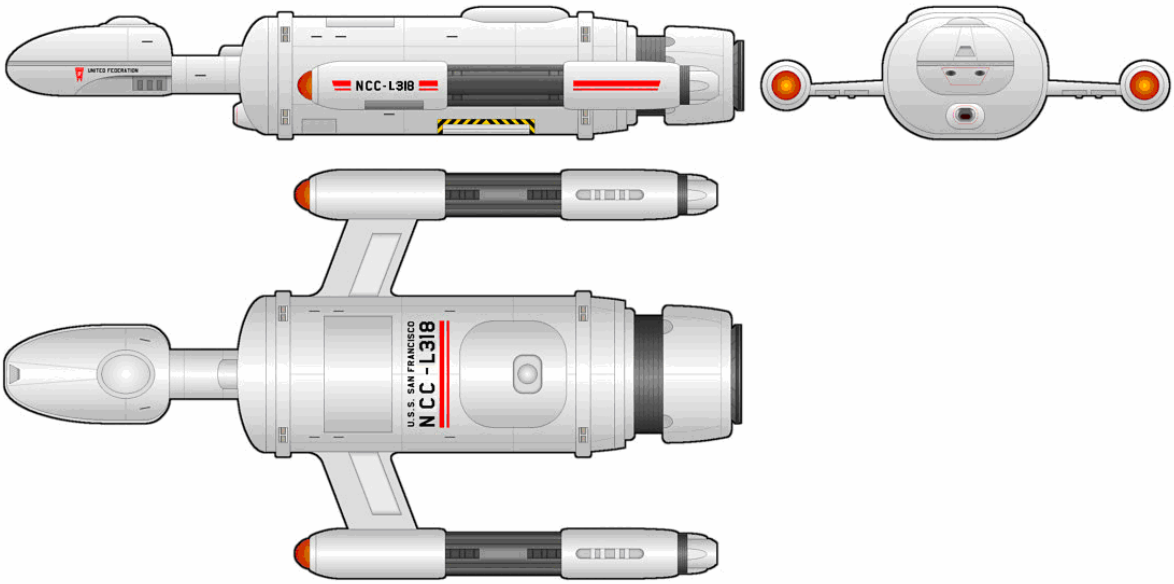
Frigate
2207-2238

Completed:	10
Length:	129.0 m
Beam:	70.0 m
Height:	22.2 m
Mass:	118,500 tons
Officers:	10
Crew:	38
Cruise speed:	w 3
Max. speed:	w 4.9
Endurance:	1 year
Weapons:	2 laser emitters (200 nm / 1.0 GW) on fwd primary hull 1 Type G phased particle cannon (700 GJ / 400 GW) on dorsal secondary hull 1 fwd medium torpedo tube w/ 46 photonic torpedoes on lower secondary hull bow
Shields:	1-layer graviton/subspace globular forcefield Navigational deflector emitter on primary hull bow
Laboratories:	1 GP (select vessels)
Transporters:	1 GP (3-pad); Mk I (original) 1 GP (6-pad), 1 cargo; Mk I (refit 2227)
Auxiliaries:	2 light shuttles

Ships of historical interest:

USS San Francisco (NCC-L318)

SOURCES: (D Bernd Schneider and Masao Okazaki)
(N LUG)
(H LUG)



The somewhat exotic approach taken with the *Mann* class light cruisers did not find immediate

favor elsewhere. During the idle years of the first decade of the 23rd century, Starfleet had to ponder the procurement of various secondary and support units, including destroyers and frigates. Modest updating of the *Placido* class into the *Trent* sufficed for the first requirement. The matching *Drexler* frigates were too outdated for like treatment, though. With some reluctance, Starfleet in 2203 initiated the development of a replacement design, refusing to adopt the *Mann* design philosophy quite yet and going instead for a minimal upscaling of the half-century-old predecessor.

The *Lincoln* class embodied Starfleet's classic idea of frigate as an errand ship – operating where larger vessels could not be bothered to go, bringing additional sensors, analysis systems or firepower to situations normally handled by local light units, and shoring up the battle lines where dedicated combat types were in short supply. The design also followed the *Drexler* lead in featuring a detachable forward hull, although this time for emergency rather than operational use. Armament was mostly contained in the cylindrar secondary hull, and included a potent photonic torpedo tube firing past the bottom of the forward command section and a heavy phase cannon mounted atop the stern section.

Another feature now included in the secondary hull was a shuttlebay of practical size. To accommodate this facility, the hull was doubled in length vis-á-vis the *Drexler*, to some 70 meters without the impulse block astern. It was also flattened somewhat to create advantageous surfaces for the ventral space doors of the shuttlebay, and for the dorsal phase cannon mount. Beam was retained at 26 meters, excluding RCS rings at both ends and two PB-12 nacelles of 73 m length on lateral, swept pylons. Between the pylons sat the 20:1 intermix ratio antimatter/fusion reactor, with a prominent dorsal access panel and a pair of ventral antimatter pod ejection hatches. Clustered around this were workshops and either a small general purpose laboratory or, more commonly, a holding area for captives or valuables; the upper decks held accommodation, the lower ones various crew utilities.

Connecting the two hulls was a tube some six meters in diameter and twelve in length. Emergency separation would leave the tube attached to the secondary hull, bringing to play two sets of reaction engines at the lower corners of the command section. Controlled planetfall would also involve laterally emerging stabilizing wings and a belly landing; additional evacuation capacity would be provided by the two light shuttles carried, or by inflatable lifepods deployed from the shuttlebay. The undivided ship could also in theory ease herself down to a planet more or less intact, or make brief dips into atmospheres, but there was scant reason for doing so. A three-pad transporter was provided for tactical surface forays and logistics, and a cargo unit was later added adjacent to the shuttlebay.

This was to be the last time when frigate would be a vessel inferior to destroyer in dimensions or performance – not because of a changing definition of the respective roles of the mission classes, but because of the disproportionately growing practical demands on the former type in comparison with the latter. The return of the Klingon threat in 2209 cut short an order for thirty-five *Lincoln* frigates, at just six units built and four nearing completion. In their place emerged a new breed of troubleshooters and patrollers, as the *Burke* class of deep space frigates was executed in light cruiser dimensions and loaded with weapons and systems to surpass any destroyer in performance. The ten *Lincolns* remained in local patrol duty till the 2230s.

Some sixty units of *Lincoln* design but omitting the torpedo tube and replacing the phase cannon with a tractor beam were instead completed for traffic control and customs use by the civilian sector. The surviving Starfleet *Lincolns* were transferred to FCS as well, eventually meeting their

Drexler predecessors in a curious family reunion. The class name *San Francisco* was sometimes applied on the high endurance cutters after the oldest surviving original frigate; the *Drexlers* in turn went by the name *Masterson* after a radical engine upgrade.

The last revenue cutters were scrapped in the 2260s when various modern corvette designs in their turn began their second careers as law enforcement vessels.

Trent / Apache / Kovaris

Light destroyer / scout
2205-2246 (*Trent*)
2210-2235 (*Apache*)
2210-2250, 2287-2295 (*Kovaris*)

Completed:	60 total: 10 *Trent* phase gun destroyers built in 2205-08 10 *Trent* torpedo destroyers built in 2206-08 10 *Apache* scouts built in 2210-11 20 *Kovaris* phase gun destroyers built in 2210-12 20 *Kovaris* torpedo destroyers built in 2210-12 12 *Kovaris* refitted in 2287-89
Length:	139.4 m (original) 144.9 m (refit 2214, 2287)
Beam:	75.0 m
Height:	37.5 m (original) 39.9 m (refit 2214, 2287)
Mass:	132,000 tons (*Trent* phase gun type) 134,500 tons (*Trent* torpedo type) 130,000 tons (*Apache*) 222,200 tons (*Kovaris* phase gun type) 224,800 tons (*Kovaris* torpedo type) 238,200 tons (*Kovaris* refit 2287)
Officers:	11
Crew:	80 (phase gun type) 75 (torpedo type) 61 (*Apache*) 72 (*Kovaris* refit 2287)
Cruise speed:	w 4 (original) w 5 (*Kovaris* refit 2287)
Max. speed:	w 6.0 (*Trent*, *Apache* original) w 6.3 (*Kovaris* original) w 7.1 (refit 2214) w 8.8 (*Kovaris* refit)
Endurance:	2 years
Weapons:	<u>Phase gun type:</u> 2 laser emitters (130 nm / 700 MW) on dorsal saucer hull port/stbd 2 laser emitters (130 nm / 700 MW) on ventral saucer hull port/stbd 3 Type L phased particle cannon (800 GJ / 1.2 TW) on ventral saucer hull <u>Torpedo type:</u> 2 laser emitters (130 nm / 700 MW) on dorsal saucer hull port/stbd 2 laser emitters (130 nm / 700 MW) on ventral saucer hull port/stbd 1 laser emitter (130 nm / 700 MW) on aft propulsion hull 1 fwd medium torpedo tube w/ 30 fusion or photonic torpedoes on ventral saucer hull <u>*Apache*:</u> 2 laser emitters (130 nm / 700 MW) on dorsal saucer hull port/stbd 2 laser emitters (130 nm / 700 MW) on ventral saucer hull port/stbd 1 laser emitter (130 nm / 700 MW) on aft propulsion hull <u>*Kovaris* refit in 2287:</u> 2 phaser V emitters on dorsal saucer hull port/stbd

2 phaser V emitters on ventral saucer hull port/stbd
1 fwd medium torpedo tube w/ 20 photon torpedoes on ventral saucer hull

Shields: 1-layer graviton/subspace globular forcefield
Navigational deflectors on propulsion hull ventral bows
3 auxiliary navigational deflector emitters on saucer hull bow

Laboratories: None

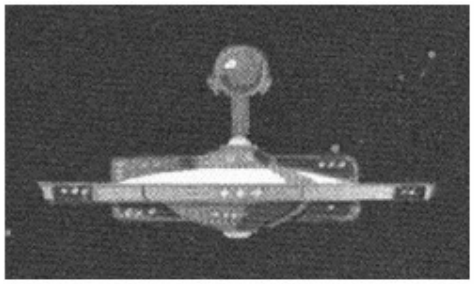
Transporters: 1 GP (6-pad), 2 emergency evacuation (22-pad); Mk I (*Trent*, *Apache*)
1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk II (*Kovaris*)
1 GP (6-pad), 2 emergency evacuation (22-pad); Mk IV (*Kovaris* refit 2287)

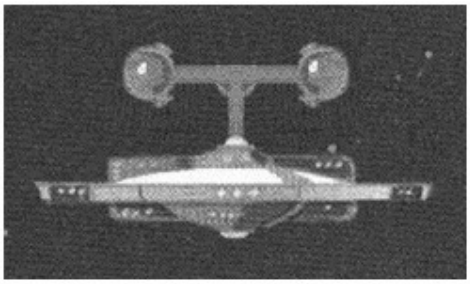
Auxiliaries: 2 atmospheric shuttlepods (*Trent*)
1 light shuttle, 1 atmospheric shuttlepod (*Kovaris*)

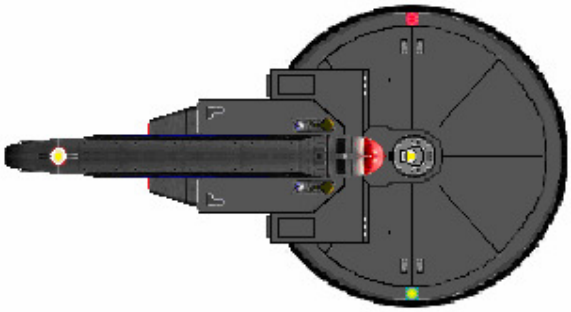
Ships of historical interest:

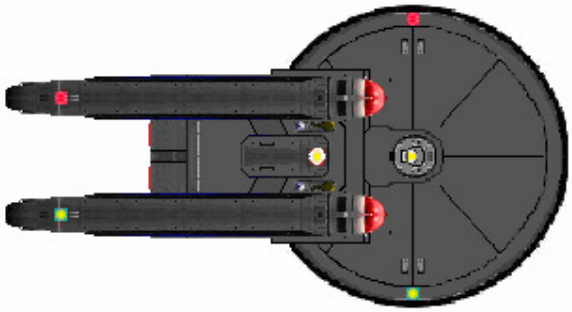
USS Apache (NCC-I340), *USS Jacoubet* (NCC-479), *USS Kovaris* (NCC-460), *USS Kwajalein* (NCC-406), *USS Targa* (NCC-467), *USS Trent* (NCC-400)

SOURCES: (D SFB, FASA *Denial of Destiny*)
(N *Kovaris* SotSF/SFB, *Apache* SFB, LUG)
(H SotSF, SFB, own)









The Defense Command arsenal was in the early 2200s deemed adequate for present Federation defensive needs, even if insufficient were any expansion of Starfleet's area of responsibility to take place. While great attention was given to keeping the cruiser fleet up to the demands of the day, little in the way of advance planning and virtually nothing in terms of contingency plans existed for the destroyer force. The vaguest motion for procuring two or three dozen modern heavy destroyers to succeed the *Marshall* was waived on cost-effectiveness basis – such behemoths would merely directly compete with the light cruisers that were already struggling with affordability issues. As pressure gradually mounted for creating a viable defense for the outer holdings of the UFP, it thus was the lighter destroyer designs of yore that Starfleet pondered as templates for the necessary attrition units. Yet by 2204, two rounds of requests for proposals had yielded little of consequence.

There were several inherent limits in the aerodynamic hull form, even when its warp-dynamic characteristics were well known and its manufacturing technologies perfected. Modern total

conversion powerplants required considerable interior volume, which in the classic lifting body could only be provided by overall upscaling. This in turn would result in wasted volume and mass elsewhere on the ship, especially when the high output powerplant would allow the impulse engines to be run with less propellant than ever before. Supercruising warp engines would be too massive to cater for practical atmospheric operations anyway, and the optimal placement of coils should be dictated by warp field geometry concerns rather than center of gravity.

The new priorities in mind, Empress pointed out the obvious advantages of a separable space propulsion section, as employed in the *Placido*. All the shortcomings of the aerodynamic hull could be remedied simply by installing an all-new, volume-optimized element in its place! Once given a tentative go-ahead, Empress engineers modified the upper half of *USS Neudorf* to accommodate a Fairey total conversion main powerplant, and installed a single vertical pylon to sturdily mount a PB-17 warp nacelle. Its powerful coils, even if far from being state of the art, nearly doubled the field output from the *Placido* standard and brought cruise speed up to full warp four. Top speed would eventually be set at warp 6.0, there being potential for more but at the risk of excessive wear and tear. Impulse propulsion for the resulting bulk of nearly 100,000 tons was provided by SSMW's C-2 engines, little modified from the previous century.

The propulsion hull was neatly plugged into a rectangular 'socket' segment of the new 75 m saucer hull (although in theory it could be attached to a *Placido* spaceframe as well, practical arguments against this were legion). The blocky structure held secondary power systems as well as supplies and support systems for detached, emergency-only operations. Twin shuttle landing bays and hangars flanked the drive section. Aft-facing rolling doors and full precision tractor beam approach control represented the most modern technology, finally in a working combination. The two shuttlepods were intended to give the type some *Placido*-like flexibility in replenishment and reconnaissance operations – a necessary expansion of capabilities considering the miserly procurement policies and the unlikelihood of any dedicated scouts or supply ships being fielded in the near future. Yet the ships were to feature transporter systems as the primary method of ship-to-ship or ship-to-surface transfer, and carried two twin-pad Mk I systems plus novel 22-pad, demat-only evacuation units inside their primary hulls. Despite the saucer's modest diameter, modern life support gear, sensors, command and control spaces and weapons systems could also effortlessly be accommodated there, as no propulsive or power generation machinery intruded to the mission-dedicated part of the vessels.

But what kind of actual mission equipment should the new destroyers carry? Forced-intermix torpedo technology was not yet reliable in the early 2200s, so a conventional fusion and photonic torpedo launcher was selected as the main long range armament. Yet advances in Federation shielding technology (no doubt mirrored by similar developments in Klingon and Romulan fleets, or so Starfleet Intelligence insisted) had made fusion and even antimatter warheads of dubious worth in combat. Cruisers like *Mann*, *Caracal* and *Horizon* could carry heavy and complex phase cannon for ripping apart the enemy shields and letting the torpedoes in, but the modern destroyers had no room for such dual gear. Thus it was decided to equip a certain number of the new destroyers with Type L phased particle guns only, along with the associated power loops and batteries, while others would instead carry the torpedo launcher and its magazines. Common armament would include warp-accelerated nanometer lasers for close combat. In addition to port and starboard banks with good forward hemisphere coverage, the torpedo destroyers would feature a tail 'stinger' to compensate for the more restrictive cone of fire of their main weapon.

Starfleet's first supercruising destroyers in a parade formation around the cruiser Moravia *(NCC-774). The scene combines reality and propaganda in an interesting mix. In combat missions, a greater separation would naturally be maintained, yet a tetrahedron of destroyers around a light cruiser was indeed the preferred tactical formation of the time. On the other hand,* Trent *operations in border space required the presence of a tender vessel, none of which were supercruising as of the late 2210s. The illusion of defensive task forces able to redeploy at warp four was still a potent deterrent, and false information was often given on the range and solo endurance of the destroyers.*

The destroyer program now crawled forward with decided unenthusiasm. In the next three years, twenty *Trents* split evenly between the subtypes were completed in what was optimistically considered the initial batch, allowing the *Marshall* to finally retire. The next ten units were shunted to alleviating the scout shortage; they were armed with lasers only so that tactical sensors could be fitted in place of the heavy armament. The tooling was already being mothballed for 'potential future needs' when the altercation at γ Demetrius put haste to destroyer procurement again. Rather than produce more *Trents*, Starfleet opted for a preplanned upgrade wherein the I pylon was replaced by a T one, and two PB-17 engines were mounted, less for the slight increase in dash speed and maneuverability and more for redundancy in case of deep space mishaps.

Forty of the (by new standards) lightweight vessels were ordered by Starfleet. *USS Kovaris* (NCC-460) at 52,210 tons of hull mass was the first of twenty to be launched with phase cannon armament in October 2210, *USS Dace* (NCC-462) at 59,255 tons of hull mass the first of twenty to carry the torpedo launcher in March 2211. Yet there was more to escalation than the mere construction of ships. How should the art of flotilla operations be reintroduced to Starfleet whose last real attrition units had been retired in the 2170s? Simulations and drills would only make the crews competent in waging the last war – how had the threat environment changed in the intervening half a century?

Rather than wait for an opportunity for meaningful flotilla action, Starfleet decided to create one: in 2211, a heavy military and diplomatic task force was sent to β Rigel to secure the key strategic region from 'piracy', the conventionally expected opening move of a hostile star empire. In claiming control of the Rigel system, Starfleet brought about more confrontations than it could have imagined. Mere firepower could not uproot the Nausicaans, Orions and Elasi from their positions of power at Rigel. Even less feasible were attempts to challenge the anarchy of what had been the Delphic Expanse. Yet the strategic decision had been sound: beyond the veil of chaos, a mighty enemy from the past was indeed formulating its own designs on the future of the region. The Klingon Empire was finally recovering from the aimlessness and internal discord brought about by the prolonged interregnum and the Vulcanian misadventure. Examples of strong leadership had emerged, plans of conquest had been drawn, and representatives of the Empire once again approached the Rigelian despots in hopes of securing the funds that would make these plans a glorious reality.

The Orionite rulers were fully aware of the possibility of another destructive war, were the economic interests of the empires to come to an open conflict. Later studies of Rigelian archives

have revealed that Rigel X in fact arranged an ingenious system of 'alternate parking hours' to keep the ships of the two empires from meeting each other and still allow for trade relationships with both regimes!

An expeditionary reinforcement flotilla on approach to Rigel V in 2221 consists of eight Kovarises*, two scouts of the* Apache *subclass (not to be confused with the more famous subclass of destroyers from a decade later) and a single cruiser-tender of* Texas *class. Having abandoned the deep space solo sortie doctrine for good, the destroyer force readily adopted a deployment mode where support assets were never far away. This was for the best also considering the decreasing reliability of many onboard systems.*

The fears of the Rigelian despots soon turned into grim reality. Even though the Rigel region was not to be the focus of the conflict launched in 2218, it would be touched by the war nevertheless. The battle of Arquin Pillar in 2223 was typical of the border skirmishes fought between expeditionary fleets of the empires, in which both sides tried to inflict damage on the enemy forces without endangering their precious cruisers. It was also something of a swan song for the *Trent* destroyers, which had become grossly outdated by the new threat. The battle serves as an excellent example of the radical changes in space warfare that took place during the lifetime of the *Trent* class.

The very fact that there were *Trent* and *Kovaris* vessels present at all is attributable to an engine refit effected in 2214-15. The Pleshun PB-25, a lighter counterpart to the *Mann* PB-20 propulsion system that had opened the warp four cruising era, was a supercruising engine destined for future greatness. Alas, the feeble powerplants of the refitted destroyers did not allow the engine to demonstrate its full potential. Despite the greater safety margins of PB-25, two out of nine *Trents* sent to Arquin had to perform an emergency venting en route, falling behind and missing the action.

The primary Starfleet offensive weapon in the battle was the warp torpedo, armed with an antimatter charge. First adopted by the UESF in 2148, the weapon had behaved erratically for the first fifty years of operations. For the *Trent*, though, it was nothing short of a *raison d'être*. Far less dependent on a ship's power output level than lasers or particle cannon, a torpedo launcher could keep an aged ship apace with an escalating threat simply by introducing newer and deadlier types of warhead. While the *Trent* retained some of the directed energy weaponry of the original design, this was of little use against modern Klingon shields. Thus, everything in the design was in practice dedicated to bringing the photon torpedoes to bear: the spectrum of sensors installed in the refit, the allocation of power and computing resources, the scope of the impulse drive and reaction control system upgrades. In other words, every tactical choice from engagement range to approach vector was already built into the ship.

Klingons taught Starfleet the hard way that inflexibility and dissimilar combat equal disaster. The preferred weapon of the Klingon forces, the disruptor bolt, had shorter range than the Starfleet torpedo, but engagement range was not for Starfleet alone to decide. It also had a higher rate of fire; it cost a fraction of the torpedo per shot or per target destroyed; and while it could be evaded at long ranges, it could not be shot down by lasers or particle beams, knocked off course by jamming, or

blocked by destroyer-level shields. The disruptor bolt could only be defeated by an 'all-round' warship, not one relying on a single superior weapon system.

Two Kovarises *emerge from the Arquin Pillar to unleash their torpedo fire on Klingon advance forces. The superior sensor capacity of the Federation vessels is believed to have been a decisive factor in the poor sensor conditions of the Pillar, a rare superdense nebula created by a passing star within the χ Arquin system. Qualitative advantages like this kept the Federation ahead of the Empire in the escalation contest, even though Starfleet was constantly outnumbered by the Klingon forces in the many border battles of the early 23rd century. Note the slightly longer PB-25 engines on the destroyers, the telltale modern detail in the otherwise anachronistic silhouette. Note also the plated-over laser ports on the saucer hull; at this point, the only laser retained was the tail stinger, for psychological rather than tactical reasons.*

Another milestone in the battle was the first massed use of sublight fightercraft by a Starfleet task force. The first of Starfleet's gambles with unconventional fighting techniques was a dismal showing indeed. Mainly deployed from the brand-new carrier *Queen Christina*, the various fighters were unable to inflict any damage on Klingon vessels, or even mount an effective defense. Using their traditional strafing attack technique, the Klingon forces simply warped in, fired disruptors and warped out before the fighters could react and gather for a strike. The captains of the destroyers *Kwajalein* (NCC-406) and *Jacoubet* (NCC-479) received posthumous Medals of Honor for their valiant protection of the cruisers of the task force when the fighter cover failed, having mounted daring ambushes for the Klingons and forced them to perform complex sublight maneuvers to get a clear shot at the Federation cruisers. By exploiting these moments of sublight movement, the Federation fighter force finally managed to cripple a Klingon cruiser of D4 type and, with the help of the Starfleet cruisers, to kill two Klingon destroyers. The prolonged and ultimately indecisive battle left a bitter taste in the mouths of the fighter doctrine proponents, yet was not enough to condemn the concept altogether.

A third important turning point in the Arquin Pillar battle was the realtime communication with Fleet headquarters made possible by the improved subspace radio. The *Trent* class was fitted with the device and its adjoining relay buoy layer in conjunction with the engine refit, enabling the ships to contact starbases as far as 50 lightyears away with minimal delay. Smaller ships were still unable to carry the bulky and energy-hungry device, having to resort to subspace radio types that did not appreciably exceed 2150s performance. Still, the expanding relay network was gradually bringing realtime communications capacity to all UFP space.

In addition to *Kwajalein* and *Jacoubet* of Arquin Pillar fame, two other *Trents* made it to the history books. *USS Targa* (NCC-467) managed in 2222 to disperse a magnetic storm threatening Balaka III by using her experimental pulse wave warheads – a Vulcan technology briefly toyed with by Starfleet, as the efforts to perfect the antimatter torpedo stumbled. On a grimmer side, *USS Enderbury* (NCC-480) became Starfleet's first pulse wave torpedo 'kill' when a defective warhead

detonated right after leaving the launcher. The explosion ripped open the pressure hull of the destroyer and killed most of the test crew immediately; radiation took a further death toll, as hyronalyn treatment was still unknown to Federation science in early 2219.

After some five years during which the *Trent* and *Kovaris* flotillas desperately fought back the Klingon battle cruisers where they could, Starfleet was finally able to field destroyers properly armed with forced-intermix antimatter torpedoes. The large *Detroyat* and *Saladin* classes quickly replaced the older types in all frontline operations; the lighter destroyers were relegated to Activation Class Two and sent to the now blessedly silent Romulan border. The nimble yet hardy combatants never saw action against Klingon forces again, to the great disappointment of their commanders and crews. Official retirement for the last Starfleet *Kovarises* came in the 'big sweep' of 2250.

A Kovaris *pair performs a textbook interception of a lone D5 in 2226. The more maneuverable phase gun destroyer weakens the ventral shielding of the cruiser, then breaks off to lure the enemy into the desired orientation for the clumsier torpedo destroyer to send in her projectiles. The image is from a simulation only: in reality, the enemy typically operated in three-ship formations, against which 2:1 odds were not sufficient even if Starfleet managed to summon three plus three destroyers in time. A typical engagement between multiple cruisers and light destroyers was a battle of wills, with the Starfleet units trying to goad a Klingon captain into breaking formation and exposing him- or herself to the double thrust.*

* * *

In the era of paranoia and overescalation after Organian disappearance, a handful of *Kovaris* destroyers were in 2287-88 reactivated and equipped with phaser V emitters. A single Common Claw torpedo tube similar to the *Larson* refit units was installed on each ship, to make better use of the effort put into developing these weapons. The hull modifications needed were minimal, since the Mk 8 assembly took only 35% of the space needed by the old *Saladin*-era launchers. Propulsion systems were refurbished and uprated for warp 5 cruising and warp 7.8 dash speed, the former achieved by respooling the coils with modern materials, the latter simply by reprogramming the limiters.

The reactivated if not revigorated *Kovaris* ships served in light destroyer duty during the height of the Klingon crisis, protecting the similarly anachronistic fusion-powered *Titan* carriers in one simulated planetary assault mission after another but luckily never seeing true action. The ships were mercifully decommissioned and scrapped in 2295.

Ranger

Light cruiser
2215-2269 (*Ranger*)
2217-2236 (*Triumphant*)
2222-2259 (*Jidai*)
2222-2291 (*Pytheas*)

Completed: 75 total:

29 *Ranger* built in 2215-18
25 *Triumphant* built in 2217-20
10 *Jidai* built in 2222-25
11 *Pytheas* built in 2222-26

Length: 178.5 m (*Ranger*, *Triumphant*)
181.8 m (*Jidai*, *Pytheas*, *Ranger* refit)

Beam: 101.7 m (*Ranger*, *Triumphant*)
95.0 m (*Jidai*, *Pytheas*, *Ranger* refit)

Height: 63.2 m (*Ranger*, *Triumphant*)
55.9 m (*Jidai*, *Pytheas*, *Ranger* refit)

Mass: 356,000 tons (*Ranger*)
351,000 tons (*Triumphant*)
342,500 tons (*Jidai*)
349,000 tons (*Pytheas*)
350,000 tons (*Ranger* refit)

Officers: 16 (*Ranger*)
13 (*Jidai*)
12 (*Triumphant*, *Pytheas*)

Crew: 271 (*Ranger*)
187 (*Triumphant*)
201 (*Jidai*)
190 (*Pytheas*)
254 (*Ranger* refit)

Cruise speed: w 4

Max. speed: w 4.8 (*Ranger*, *Triumphant*)
w 6.1 (*Jidai*, *Pytheas*, *Ranger* refit)

Endurance: 6 years

Weapons: *Ranger*:
2 laser emitters (180 nm / 1.4 GW) on port/stbd dorsal primary hull
2 laser emitters (180 nm / 1.4 GW) on port/stbd ventral primary hull
2 Type M phased particle cannon (900 GJ / 1.4 TW) on fwd ventral primary hull
2 fwd medium torpedo tubes w/ 75 photonic torpedoes on secondary hull
4 plasma cannon (2.0 GW) on dorsal primary hull
4 plasma cannon (2.0 GW) on ventral primary hull
Triumphant:
2 laser emitters (180 nm / 1.4 GW) on port/stbd dorsal primary hull
2 laser emitters (180 nm / 1.4 GW) on port/stbd ventral primary hull
4 fwd medium torpedo tubes w/ 120 photonic torpedoes on secondary hull
Jidai:
2 laser emitters (180 nm / 1.4 GW) on port/stbd dorsal primary hull
2 laser emitters (180 nm / 1.4 GW) on port/stbd ventral primary hull
2 fwd medium torpedo tubes w/ 75 pulse wave torpedoes on secondary hull
Pytheas:
2 laser emitters (180 nm / 1.4 GW) on port/stbd dorsal primary hull
2 laser emitters (180 nm / 1.4 GW) on port/stbd ventral primary hull
Ranger refit 2228:
2 laser emitters (170 nm / 2.2 GW) on port/stbd dorsal primary hull
2 laser emitters (170 nm / 2.2 GW) on port/stbd ventral primary hull
2 fwd medium torpedo tubes w/ 38 photon torpedoes on secondary hull
Ranger refit 2253:
2 phaser VI emitters on port/stbd dorsal primary hull
2 phaser VI emitters on port/stbd ventral primary hull
2 fwd medium torpedo tubes w/ 50 photon torpedoes on secondary hull
Pytheas refit 2259:
2 phaser VI emitters on port/stbd dorsal primary hull
2 phaser VI emitters on port/stbd ventral primary hull

Shields: 1-layer graviton/subspace globular forcefield
Navigational deflector on secondary hull bow
2 auxiliary navigational deflector emitters on bow

Laboratories: 1 GP (*Ranger*)
1 GP, 1 astrophysics, 1 planetary sciences, 1 life sciences (*Pytheas*)

Transporters: 2 GP (3-pad), 2 emergency evacuation (22-pad); Mk I (*Ranger*, *Triumphant*, *Jidai* original, *Pytheas* original)
1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk II (refit 2241-46)
1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk III (*Pytheas*, some *Ranger*, refit 2262)

Auxiliaries: 6 light shuttles, 4 work pods (*Ranger*, *Triumphant*)
8 to 14 light shuttles or 4 medium shuttles, 4 work pods (*Jidai*, *Pytheas*)

Ships of historical interest:

USS Coronado (NCC-788), *USS Ibn Rustah* (NCC-1409), *USS Yamato* (NCC-1305), *USS Valiant* (NCC-1223)

SOURCES: (D FSRC/aridas sofia *Pytheas*, LUG/Randy Asplund *Ranger*)
(N FSRC, LUG, Decipher, FASA et al.)
(H LUG, own)

The destruction of *USS Sentry* in 2209 came as a rude surprise to Starfleet, in more ways than one. Clearly, some basic assumptions of the Klingon psyche now had to be abandoned; also puzzling was the lack of a wider Imperial reaction to the altercation. On a more concrete note, the weak showing of the modern *Advance* class battle cruiser had not been anticipated. Nor had Starfleet had any idea that Klingon territorial claims extended this far spinward, enforced with such irrational vehemence that SF Intelligence could but conclude that crucial industrial resources were hidden on the stormy surface of γ Demetrius – or Boreth, as the refugees had called the planet before the fateful exchange of fire.

Starfleet's only effective countermeasure to unrest in this distant part of space would be its supercruising fleet. Unnervingly, this force at the time consisted of just twelve *Mann* light cruisers; in light of the continuing inactivity of the Imperial fleet, funds were released neither for further construction, nor for the desired propulsive uprating of the *Horizon* and *Advance* force. Yet by 2212, it had become clear that something was amiss in the Empire. The incidence of Klingon-on-Klingon combat engagements, even if never zero, appeared to be increasing drastically. A pattern of defections and secessions, followed by punitive expeditions, swept through observable borderspace. Clearly, the seat of the Emperor no longer was in complete control of the Klingon fighting urge.

Federation Council could not dismiss the signs of bellicose intent indefinitely. Grudgingly, six further *Manns* were promised, then just four procured after a bitter interpartisan battle. Frustrated with the complete inadequacy of the measure, Starfleet in late 2212 shunted almost 40% of its maintenance budget into the development of a mass-produceable supercruising light cruiser. Self-evidently, the contract went to Chiokis Corporation, keeper of the secrets of supercruise propulsion and affordable manufacturing of trititanium hulls. Actual construction was mainly performed by Star Fleet Division at Sol IV. Against expectations, the crash program was a complete success. In June 2215, dockyard mooring clamps first released *USS Ranger* (NCC-781) to Martian orbit, and to two months of greatly expedited testing.

Although retaining the 101.7 m diameter of the *Mann* hull, the *Ranger* primary structural frame was trimmed down on the ventral side to just 20 m thickness (or 27.1 m when including the dorsal superstructures and ventral sensor dome). The 140,000 ton, 113 m PA-100 engines were mounted on short pylons beneath the stern, where they enjoyed greater freedom of field shapes and duonetic emission levels. Total conversion power and propulsive systems still took a lion's share of the primary hull, yet major mission systems were now moved to a wholly new secondary structure, dangling above the stern. The advantageous combining of *Mann* and *Horizon* features solved the problems of internal volume allocation, and further held promise of modular and efficient mission gear upgrades. Initially housed in the six-deck secondary hull – a tapering cylinder of smoothly curving shapes – were a medium-power navigational deflector at bow; an adjoining deep space tactical sensor suite; two Maximpact medium torpedo launchers flanking the deflector/sensor dish; a

dorsally accessible cargo hold; and a stern hangar mainly reserved for maintenance auxiliaries. Within the eight-deck primary hull lay berthing and all manner of long duration physiological and psychological support for the 287 crew. Again, minimal laboratory facilities were included in the mission suite: the *Ranger* was built with a specific mission in mind, yielding not a cubic meter to idle scientific curiosity.

Even if the Rangers *sported virtually no exploration gear, random discoveries could befall any vessel, including one providentially named* USS Coronado *(NCC-788). The arid surface of the distant Cestus III was an ideal location for an observation outpost and local stronghold, right at the rimward flank of Klingon expansion, yet seemingly in uncontested space. Had the* Coronado *been better equipped for survey duty, signs of Gorn mining activity would have been obvious to her, and heated future conflict might have been avoided.*

The service career of the *Ranger* proved short, culminating ignominiously in Klingon boarding as the Empire in 2218 overran Archanis for the first time. Starfleet had been able to get its escalation program started, however, and response was swift. Twenty-eight sisters to the *Ranger* as well as twenty-five stepsisters of the marginally more modern *Triumphant* (NCC-1200) class were completed by 2220, by expanding the production base of tritanium-hulled ships from Sol to Procyon and Alpha Centauri. Armed to teeth with latest-standard lasers, the light cruisers ventured out to meet the tidal wave of Klingons, achieving by careful coordination and superior tactics what they could not manage by strength of numbers or armament alone. In terms of technology, the *Rangers* were by the 2220s already obsolescent and stressed well beyond their limits.

Thankfully, the same was true of the Klingon fleet, which had been logistically utterly unprepared for war in 2209 and had made little progress since. In an acclaimed engagement in 2228, scout cruiser *USS Bastion* (NCC-811) was able to reduce to scrap in a single engagement five of her Klingon counterparts before succumbing; the targeting systems of some of the adversaries could not attain lock no matter what, while others were armed with short-ranged disruptors only and were outclassed in a warp laser fight. Clearly, the might of the Klingon war machine was a relative concept, based more on great aggression than on great skill or strength. The multi-front assault was held at bay, and enough time was bought to field a modern range of Starfleet combatants.

In the 2220s, *Baton Rouge* heavy cruisers and *Detroyat* and *Saladin* destroyers sailed out against a flow of homebound *Manns* and *Rangers*. There was little to be done for the veterans, which no longer were combatworthy even in the broadest sense of the word. Converting the ships for homefront duties was patently impossible due to the cramped and inflexible internal arrangements. Yet the basic *Ranger* design was sound enough, the two-hull arrangement preferable for many mission profiles. A simple replacement of the primary hull with a proper saucer would yield warp-dynamic advantages, offsetting the performance loss from necessary total conversion reactor downscaling.

Rather than get sucked into yet another primary hull replacement quagmire, Chiokis relinquished the *Ranger* modernization work to Harbin. Funding for the ships, now comparable to destroyers in size, was less of a hurdle than a decade prior. Fifty contracts in total were secured, chiefly by Empress and Nunin yards, resulting in the *Jidai* (NCC-1300) and *Pytheas* (NCC-1400) classes of reconnaissance and exploratory light cruisers. Yet in 2227, production was halted at just ten and eleven units, respectively. According to Starfleet, the classes were now meeting their respective support commitments, allowing the rest of the cruiser force to carry on the fight.

The sole survivor of the Sol defense force at the Battle of Ganymede, USS Yamato *(NCC-1305) juts out of the side of the Klingon flagship. The audacious ramming and boarding counterattack saved Earth from the equally cheeky deep penetration raid of Adm. Kesslok's force, and ensured immortality to the name* Yamato *in Starfleet history.*

The new primary hull was 95 meters in diameter, and featured seven decks in all. Little was retained of the original besides the ventral sensor array, now compatible with improved planetary survey instrumentation. As only 202 crew would be needed for the exploratory or military reconnaissance missions, accommodation standards actually went up despite the reduction in volume. Further berthing was provided in the secondary hull, which in the *Pytheases* omitted the torpedo launchers, in the *Jidais* converted them to fire pulse wave rather than photonic torpedoes, and in both replaced the aft hangar with a sensor dome. The forward sensor array was also downscaled and modernized, and the dorsal cargo doors were adopted for launching and recovering the larger exploratory shuttles or scoutcraft the ships now carried.

Even the torpedo-less *Pytheas* was not completely without teeth, of course. Four laser banks were provided in the primary hull, and shielding met the requirements of the modern battlefield. Still, no frontline missions were envisioned. The light cruisers could not maintain fleet speed with *Saladin*, *Detroyat* or *Baton Rouge* forces, and freely gave the *Hermes* class monopoly to fleet coordination systems and facilities. Independent exploration and judicious old-fashioned spying at a more leisurely pace would serve Federation strategic interests just as well.

Entering standard orbit, USS Annôn *(NCC-1403) flips her shuttlebay towards ζ Ursae Majoris II. Planet Mizar lay well within the survey range of the modestly performing light cruiser, but proved a challenge in tactical terms, as the Tzenkethi occupying forces did not look favorably to their subject world having interstellar contact.*

While the *Pytheases* went to interstellar fame with discovery after discovery, paving way for future generations of deep space cruisers, financial realities back home changed to the better, and the original *Ranger* fleet gradually received a corresponding upgrade. The first ship to be converted in 2228 was *USS Spann* (NCC-790), followed by twelve out of the surviving sixteen by 2233. Fitting the Harbin saucer into a preexisting spaceframe was more demanding than newbuilding, and the experienced Vickers took over from its Selenite and O'Ryanite competitors. Externally, a modernized *Ranger* looked very much like a *Pytheas*, save for the secondary hull: the stern hangar was retained, as were both torpedo embankments, even though modern systems were naturally substituted in these positions. The SAB impulse engines were a definite improvement over either the original M-2196 units or the *Pytheas* SAA standard, and heavier lasers were also substituted for the antiquated Tesla units. Overall, the new *Rangers* were competent combatants, even if lacking in flexibility and joint operations capability.

The surviving *Triumphants* received no refits and were swiftly scrapped at the introduction of modern heavy destroyers, vessels that made utter ridicule of the tactical abilities of the light cruisers. In turn, propulsive performance proved to be the stumbling block of *Jidai*, *Pytheas* and *Ranger* alike. A fine engine for its day, the PA-100 had little patience for engineers who attempted gradual uprating, and began to leak from all seams when pressed beyond its inherent limits. Anything larger, such as the PB-29 of the modern destroyer fleet, would have broken the back of the light cruisers; anything smaller would fail to yield the desired improvements. When even the compact PB-35 proved too heavy for successful installation, the *Rangers* were deemed unfit for modern combat tasks, and underwent a humiliating withdrawal from frontline service in favor of the reborn *Texas* light cruisers. Many were cut into components for Liberty transports. The *Jidai* fleet was spared the disgrace by virtue of having died a warrior's death: by 2259, every last of the spyships had been eliminated by the enemy, the heroic struggle of *USS Yamato* (NCC-1305) guaranteeing longevity to her name in Starfleet history. The *Pytheas* fleet in turn bowed to *Constitution* heavy cruisers as Starfleet's primary instrument of independent deep space exploration.

The last *Ranger*, *USS Duncan* (NCC-793), was retired from spacelane patrol in late 2269, her torpedo launchers long since removed. The *Pytheas* class kept going longer, even in face of major attrition due to maintenance problems. *USS Ibn Rustah* (NCC-1409) remained in active service until the Khitomer peace, scoring planetary survey successes till the very last.

Valkyr

Shuttlecarrier
2219-2266 (*Valkyr*)
2228-2270 (*Titan*)

Completed:	14 total:
	6 *Valkyr* medium carriers built in 2219-26 8 *Titan* heavy carriers built in 2228-34
Length:	224.0 m (*Valkyr*) 271.1 m (*Titan*)
Beam:	118.0 m (*Valkyr*) 165.2 m (*Titan*)
Height:	41.2 m (*Valkyr*)

	38.0 m (*Titan*)
Mass:	1,640,000 tons (*Valkyr*) 1,920,600 tons (*Titan*)
Officers:	167 (*Valkyr*) 178 (*Titan*)
Crew:	482 (*Valkyr*) 679 (*Titan*)
Cruise speed:	w 3
Max. speed:	w 4.3 (*Valkyr*) w 4.6 (*Valkyr* refit) w 3.9 (*Titan*) w 4.3 (*Titan* refit)
Endurance:	2 years
Weapons:	*Valkyr*: 2 laser emitters (200 nm / 650 MW) on command pod top 2 laser emitters (200 nm / 650 MW) flanking shuttlebay doors *Valkyr* refit: 2 fwd light torpedo tubes flanking connecting dorsal 2 laser emitters (200 nm / 650 MW) on command pod top 2 laser emitters (200 nm / 650 MW) flanking shuttlebay doors *Titan*: 2 laser emitters (120 nm / 1.2 GW) atop nacelle fwd ends 2 laser emitters (200 nm / 650 MW) on command pod top 2 laser emitters (200 nm / 650 MW) flanking shuttlebay doors 32 plasma cannon (2.0 GW) in twin mounts on secondary hull (removed in 2224) *Titan* refit in 2234: 2 laser emitters (120 nm / 1.2 GW) atop nacelle fwd ends 2 laser emitters (200 nm / 650 MW) flanking shuttlebay doors 4 fwd light torpedo tubes flanking connecting dorsal
Shields:	Conformal 1-layer combat shields Navigational deflectors on nacelle forward ends
Transporters:	2 GP (6-pad), 6 emergency evacuation (22-pad), 4 cargo; Mk I (*Valkyr*) 6 GP (6-pad), 8 emergency evacuation (22-pad), 4 cargo; Mk I (*Titan*)
Auxiliaries:	Up to 10 shuttles and 14 tactical craft (*Valkyr*) Up to 18 shuttles and 28 tactical craft (*Titan*)

Ships of historical interest:

USS Hercules (NCC-454), *USS Queen Christina* (NCC-446), *USS Valkyr* (NCC-442), *USS Titan* (NCC-448), *USS Hypsipyle* (NCC-444), *USS Hamilton* (NCC-452)

SOURCES:	D TNG, ST3, Ralph McQuarrie (SFC) (N Diane Duane, own) (H SFC, own)

When first faced with the reality of the Klingon threat, UFP Council was at loss of possible responses. It seemed impossible to build the thousand-ship war fleet requested by Starfleet within the next five years – the UFP economy could not have sustained a war effort of this scope. Instead, UFP Committee of Starfleet decreed that new technological solutions be sought, on the lines of the recent introduction of forced-intermix antimatter torpedoes and accelerated lasers. Whatever resources were available would then be poured on these untested designs; the resources would do no good if wasted on insufficient numbers of tested but outdated ship types.

The success of the *Mann* class seemed to justify this initial decision. While the economy was being geared up for mass production of these at their time very modern cruisers, Starfleet next chose to go ahead with supermodern warp carriers for sublight fighters, hoping to pit the Klingons against an unexpected type of opponent. The warp carrier had been a primary weapon in the Romulan War, but mainly on the side of the Rihannsu. Starfleet thus did not have much war experience to draw from, which was seen as a blessing of kinds: whatever technologies or tactics would be chosen, they would assuredly take the enemy by surprise.

Scorning the bulky and slow-moving Romulan carriers, Starfleet chose as its goal a warp-dynamic design that combined the proven concept of primary and secondary hulls with new spaceframe shapes. Geering Space Structures was a natural choice for a primary hull provider, having offered stiff competition to veteran yards in recent projects, and representing Earth's economic interests at a time of crisis where support from outside Sol was far from granted. Geering's large saucer hull was a simple, lenticular structure relying on internal bracing rather than on the Chiokis stressed-skin techniques, and very much to Starfleet's liking. Also adopted was an angular secondary hull flattened to the extreme, the prototypes of which had been tested by Geering since 2211. After brief experimentation with subscale prototypes, Starfleet moved on to the full-scale *USS Robuste*, an ultimately abortive experiment that in her two years of service evaluation (2214-16) nevertheless established valuable facts about the warp dynamics of extremely large structures.

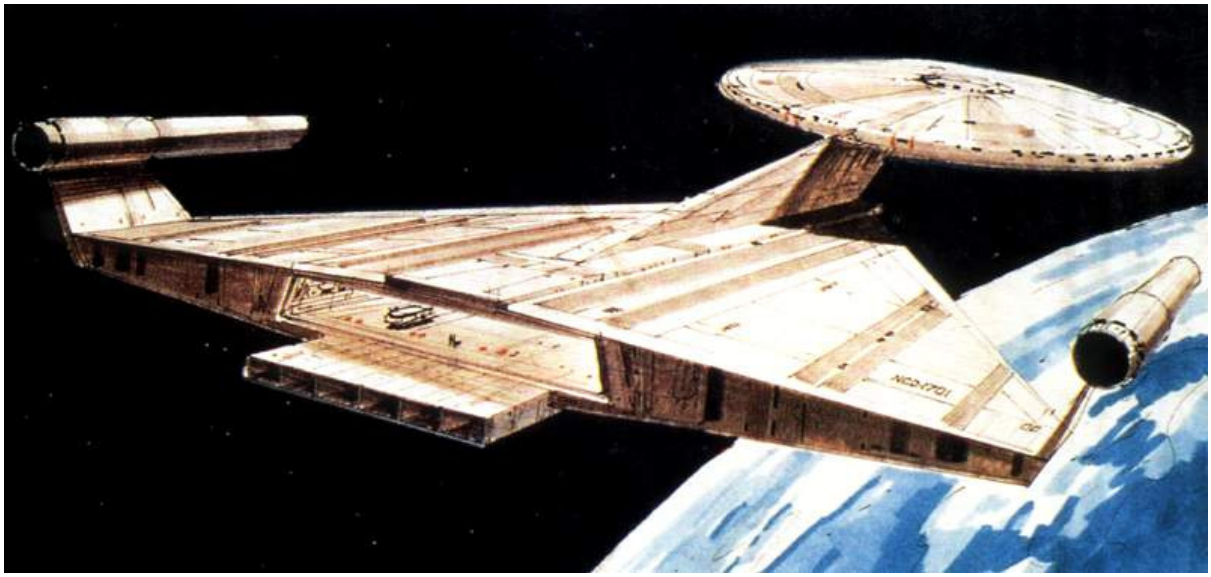
Encouraged by the *Robuste* results, Starfleet proceeded with procurement of no less than eight vessels. The secondary hull would be extensively trimmed down, whereas the primary one would be adopted unaltered from the *Robuste* – literally so in the case of the first carrier to be completed. *USS Valkyr* was laid down in 2217; thanks to the use of modular building techniques and the pre-existing primary hull, she was ready for launching and final arming and equipping in barely two years, despite undergoing further design chances throughout the construction phase. Predictably, this haste in construction led to many early problems in operations.

The secondary hull of USS Robuste *(NX-397) takes shape in Martian orbit. The nearly 2,000,000 ton vessel was by far the most massive piece of military hardware assembled at Utopia Planitia prior to the introduction of* Excelsior *class starships, and engineering resources were stretched to their limits in completing the carrier. Her operational siblings would be scaled down somewhat, mainly through the adoption of a sleeker triangular secondary hull.*

The ‘heritage’ primary hull of the *Valkyr* was welded of tritanium and plasteel into a perfect lenticular shape, with a bridge module inserted into a cutout at the top and a navigational sensor array into the bottom. Six decks were erected within the 92 m lens, and separate bays built for the computer core, two large flight control centers and a fusion reactor complex for auxiliary power. While the shape was nowhere as stable as the primary hulls of destroyers and light cruisers, Starfleet still judged it sufficient to withstand the aerodynamic stresses of an emergency landing (a ventral-first entry and deceleration followed by transition to edge-on gliding).

The secondary hull was as wide and almost twice as long as the primary lens, but tapered into a small auxiliary navigational deflector and sensor mount in front. The trailing edge featured a large opening for the flight deck, situated between the impulse engine nozzles; three fightercraft or shuttles could take off or be recovered side by side here. Six fighters could be launched at a time from dedicated launch tubes below the opening, even when the mothership cruised at warp. Inside, the cavernous flight deck some 50 m across flared into a series of service docks port and starboard. Elevators aft accessed the launch tubes; elevators forward, a vehicle deck for a broad assortment of ground combat gear. Modular multi-person and cargo transporters were installed forward of the vehicle deck, so that Marines and their vehicles could be beamed down to combat as efficiently as possible. Marine accommodation was above the transporter complex. The outer flanks of the hull were reserved for fuel tanks and ammunition magazines plus flight crew quarters. Two huge cylindrar engine nacelles were mounted on sturdy pylons at the tips of the hull, dubbed the PC-300 and sporting somewhat exotic shrouding systems around the ramscoops, navigational deflectors and field windows to better hide this inherently vulnerable vessel from enemy sensors.

To maximize useable hull volume, main warp machinery was located within the nacelles, with a linear fusion reactor in each nacelle bow, resulting in a very bulky and service-unfriendly system. Secondary power systems were routed through the connecting neck from the saucer auxiliary power units and along plasma conduits on the top surfaces of the secondary hull, to feed the impulse engines and to boost warp plasma feed. While the system worked adequately, Starfleet nevertheless began pouring resources into a system that could combine the warp dynamics of the new carriers with the more practical powerplant systems of the earlier generations of cruisers. One direct result of this research was the *Baton Rouge* class of advanced cruisers. Improved fusion power/solid-state warp coil propulsion technology was also utilized in the upcoming destroyer generations, and was rapidly becoming the most advanced warp propulsion system of its time in the known space when it got superseded by dilithium power systems in the 2240s.



Dwarfing her twin cruiser escort, USS Resolute *(NCC-455) thunders towards Melev in a show of force after the secession crisis of the 2240s. Obsolete as an anti-ship weapon system, the carriers were deployed only when risk of interception by enemy capital ships was close to zero. Nevertheless, they formed the most efficient (and certainly the most dramatic) way of deploying troops for planetary assault and power projection, and were expected to form the second wave in any offensive action against the Klingon empire. The* Resolute *never saw such action: she was retired years before the abortive war of 2266, and scrapped before the brief reactivation of her sisters* USS Hamilton *and* USS Ark Royal *in 2285.*

For close-in defense, the secondary hull was originally dotted with rapid-fire plasma cannon. These were soon removed as inefficient, whereas the big laser cannon atop the nacelles, on both sides of the landing bay door and on saucer top were retained and modernized several times. Electronics were also upgraded no less than eighteen times between 2221 and 2260, when the last of the eight vessels was taken off active duty and partially replaced by modern through-deck cruisers of *Coronado* class. No shipwide duotronic systems were ever installed, nor were phasers substituted for any of the laser mounts. However, in 2234, two light photon torpedo tubes were added to both sides of the connecting dorsal, and the required antimatter handling systems installed within the dorsal. In an associated power system revamp, plasma conduitry was reinforced to essentially allow the auxiliary reactors to perform as main propulsive powerplants, while the nacelle reactors accepted auxiliary status in cruise mode. The patchwork arrangement was an engineering nightmare and required heavy surface armoring to be battleworthy, but did increase top speed by 0.4 warp factors and gave an appreciable power surge reserve.

In 2228, the emboldened Starfleet added an enlarged, up-engined variant of the *Valkyr* design to its inventory. The *Titan* class of eight featured a drastically lengthened secondary hull that possessed twice the fighter-carrying capacity of the original design. The PC-400 warp engines, mounted lower and closer together atop stronger pylons, received larger if fewer coils in a somewhat more cumbersome nacelle structure. Plasma conduitry was significantly simplified and better buried within the armored hull. Warp acceleration and sublight maneuvering was greatly improved with this modification; even though top speed was reduced, the new ships demonstrated far greater survivability in planetary assault operations. This design underwent a refit similar to the *Valkyrs* in 2236, and was retired at the same time with the original class.

A fleet of twelve carriers was a formidable deterrent thanks to its impressive planetary assault and siege capacity, and in the previous century would have been an effective anti-starship force as well. Unfortunately, the rules of the game had changed. While all ships of both subclasses saw extensive action in patrol duty at the Klingon front, none actually managed to engage enemy capital ships in combat. To the contrary, a minor raid by three Klingon Raptor corvettes easily crippled *USS Hercules* (NCC-454), a *Titan* carrier in maneuvers near Donatu, in late 2229. The fighters deployed by the carrier provided scant protection, and only the intervention of a nearby Andorian missile cruiser and her escorts forced the Klingons to break off their attack. Starfleet's desperate gamble with the carriers had failed: the offensive might of the carrier fleet was not the answer to the problem of defense. More than 130 lives aboard the *Hercules* were lost and the ship put into mothballs awaiting possible later repairs and reactivation.

It was to be a long wait. In 2285, in preparation for possible Marine maneuvers against Klingon forces during a period of heightened tensions, two *Titans* were finally called to duty. The *Hamilton* and the *Ark Royal* received minor upgrades to their communications and transporter systems, some fuel lining and power conduit overhauls, and a full if hasty refurbishing of main powerplants. Fusion power specialists had to be drafted from local defense fleets utilizing less advanced propulsion systems than Starfleet main forces, to run the antiquated engines; for example Tellarite engineers were extensively employed in the reactivation program. All weapons were removed as obsolete, and modern tactical craft and fully equipped Marine platoons stacked aboard. No assaults were actually performed, but both ships practiced fleet operations for such a contingency.

Even these two ships were re-mothballed in 2287. Scrapping orders followed in the early nineties; the first ships to go where the ones closest to operational readiness, to comply with Khitomer treaty limitations. The *Hypsipyle* (NCC-444) of *Valkyr* class and the *Hamilton* (NCC-452) of *Titan* class were spared from scrapping only because they proved practical as orbital storage facilities at the Qualor II fleet depot.

Burke

Frigate
2221-2267

Completed:	66 total: 42 *Burke* nearspace frigates built in 2221-26 24 *Aldrin* deep space frigates built in 2222-25 8 *Magellan* scout cruisers refitted from *Aldrin* in 2244-45
Length:	183.0 m (original) 179.0 m (refit 2244)
Beam:	122.0 m
Height:	35.5 m (original) 38.8 m (original, w/ weapons pod) 32.2 m (refit 2244, nearspace configuration) 34.0 m (refit 2244, deep space configuration)
Mass:	320,000 tons (original) 360,700 tons (refit 2244, nearspace configuration) 361,200 tons (refit 2244, deep space configuration)
Officers:	25
Crew:	214
Cruise speed:	w 4 (original) w 5 (refit 2244)

Max.speed: w 6.5 (original)
w 8.0 (refit 2244)

Endurance: 2 years (nearspace configuration)
3 years (deep space configuration)

Weapons: Original:
2 laser emitters (180 nm / 1.0 GW) on dorsal primary hull
1 laser emitter (180 nm / 1.0 GW) on ventral primary hull
6 plasma cannon (2.0 GW) on dorsal primary hull
Refit 2235-37:
4 Type L phased particle cannon (800 GJ / 1.2 TW) in 2 twin banks on dorsal primary hull
2 Type L phased particle cannon (800 GJ / 1.2 TW) in twin bank on ventral primary hull
6 plasma cannon (2.0 GW) on dorsal primary hull
2 to 4 fwd medium torpedo tubes w/40 photorps (various dorsal modules, optional)
Refit 2252-54:
4 phaser VI emitters in 2 twin banks on dorsal primary hull
2 phaser VI emitters in twin bank on ventral primary hull
4 fwd medium torpedo tubes w/40 photorps (dorsal module, optional)

Shields: 2-layer conformal forcefields
Navigational deflectors on nacelle bows (original)
Navigational deflector dish under hull (refit 2244, nearspace configuration)
3 auxiliary navigational deflectors on bow

Laboratories: None

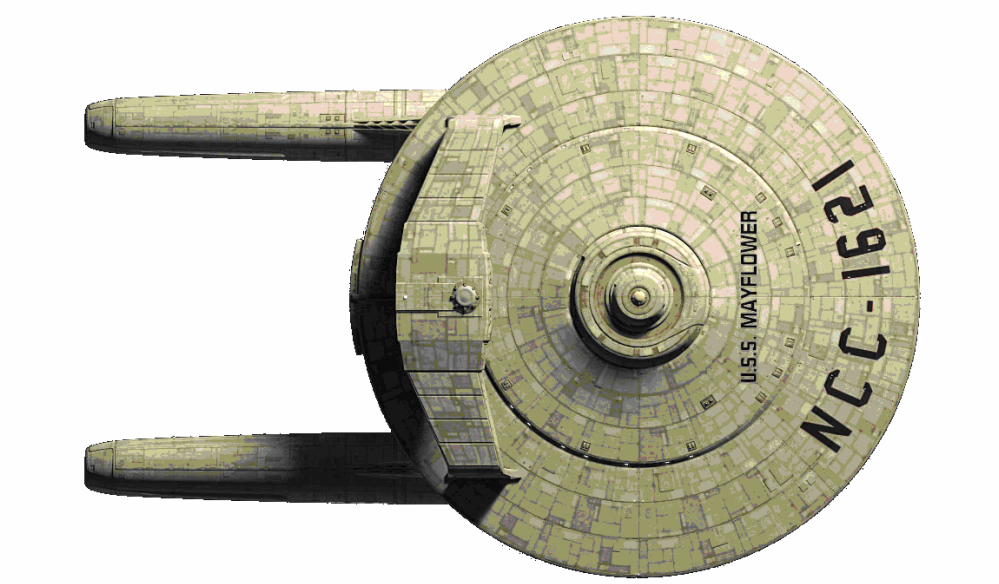
Transporters: 2 GP (6-pad), 2 emergency evacuation (22-pad); Mk II
All ships brought to Mk III standard in 2257-59

Auxiliaries: None

Ships of historical interest:

USS Magellan (NCC-1462), *USS Mayflower* (NCC-1621)

SOURCES: D STXI (SFB, ST:Axanar/Tobias Richter)
(N SFB, LUG)
(H SFB, ST:Axanar)



The nearspace patrol frigate. The arch mount for torpedoes did exist in stock and simply was never applied on this ship type; it is the lack of a dorsal centerline booster package that actually visually separates the nearspace patrollers from their deep space sisters. The original PB-21 engines were installed without aft field visors, as opposed to most other applications of the engine.

The successes of the *Mann* generation of capital combatants had not only increased the Federation's chances of survival in a war against the Klingons – they had provided Chiokis Corporation with an excellent commercial reputation as an independent spacecraft designer. Yet the *Manns* and *Rangers* were a dead end for an ambitious company: saucerlike hulls of refined warp dynamics were the future of starflight. In 2219, Chiokis still remained but a junior partner in such projects, and the contract for the *Burke* class patrol ship went to Geering. While the nascent Andorian enterprise was asked to modernize the *Rangers* for a slimmer hull structure, the competing Earth company in turn launched its inaugural saucer hull, taking advantage of the fact that the specifications did not dictate a bulky total conversion powerplant.

Despite the seeming modesty of the patrol ship project, this was a major coup for Geering, and a decisive loss for Chiokis. The *Burke* class frigate (a bold new definition for the time-honored mission class) would have been the best possible way to make an entry to the market as an independent contractor: a spaceship already conceptualized, visualized and all but designed. This was what the *Ranger* would look like, once a more compact powerplant could be found for her. Yet without a number of the light cruiser's mission-specific complications, the new design could be a clean slate for future expansion and eventual greatness. The significance was not lost to Geering's designing team, which began drafting the shape of a ship far larger than her physical dimensions.

The saucer hull in all its simplicity held the crew accommodation, weapons systems, computing gear, sensors, fuel and impulse propulsion systems, all neatly modularized and sectored. The SAA impulse drive took up the aft centerline, its structures extending somewhat above the level of the widest deck of 122 m diameter. To both sides were main fuel tanks, then crew and support system spaces. On two dorsal positions and a single forward ventral one were the single laser cannon that formed the main armament of the class; six dorsal berths held standard defensive plasma cannon underneath their trapdoors. Even in the modern and ambitious definition of 'frigate', there was no mention of torpedo armament. Still, Geering was thinking ahead and introduced dorsal structural hardpoints for possible future installation of weapons modules.

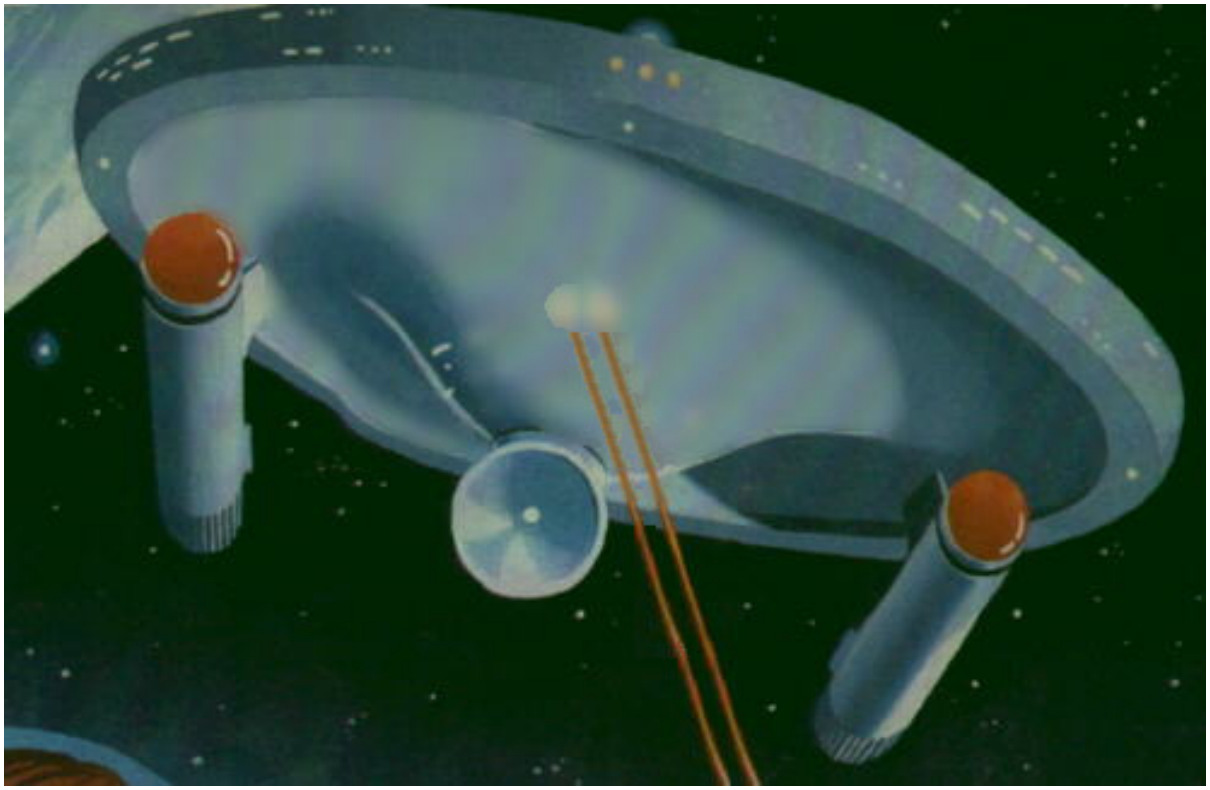
Two stubby pylons underneath would house the PB-21 engines, complete with their built-in power systems. Each also held an integrated navigational deflector, although the saucer bow section was already provided with three auxiliary deflector beam emitters. The performance, or lack thereof, of the engines was no concern of Geering, and the company could deliver the first of the planned fifty hulls on schedule, for trials starting in 2221. Registries were allocated in *Ranger* fashion, starting out a whole new 'century'; the 1600s would be a local patrol combatant range for the time being.

A deep space Burke *riding shotgun to a* Proxima*, a rare 2250s action shot from just before warp entry. The dissimilar warp performances of the two types made combined operations uncommon; even when carrying the endurance booster package, the* Burke *was predominantly a patrol vessel of limited spatial reach, not a hunter like the battle cruisers. Note the aft-facing field windows of the PB-21 engines, matching the equally archaic PB-28 pair on the* Proxima*.*

Satisfied with the results so far, Starfleet also gave the go-ahead for a Mk II version of improved endurance. The main difference was to be found at the aft dorsal hull: a spinal protrusion housed extended fuel tanks, consumables storage, and a workshop and hangarette for repair pods. Adding a year to total patrol time was a largely theoretical exercise, as engine performance was unchanged and did not allow the vessels to deploy particularly far. Minor improvements in sensors, targeting systems and computers nevertheless contributed to Starfleet assigning registries in line with contemporary deep space cruisers, in the 1400 'century', right after the *Baton Rouge* and the (much delayed and eventually re-registered) *Rochester* Mk IV.

The *Burkes* proved sturdy and dependable in most respects. Unfortunately, propulsion was not one of them. Through the latter half of the 2220s, Starfleet struggled to find a suitable replacement for PB-21, the failure rate of which kept the 42 plus 24 completed *Burkes* from efficiently contributing to Federation defense. It was only in the early 2240s that PB-45 rose as a credible contender, bringing the *Burkes* to the solid state era and increasing their military potential. At that point, the baton had been passed; it would be Chiokis' turn to give shape to Starfleet's future. Select ships received a modern phased beam arsenal with twin emitters, their impulse engines were brought to SAD standard, and a wholly internal warp core was installed. The nearspace units were also equipped with a destroyer-type underbelly sensor dish plus boosted shields. Chiokis crafted a ventral bulge to mount the former; the latter called for the customary downward extension of the saucer rim and removed the last traces of the original Geering shape.

The high endurance vessels remained truer to the origins externally. Eight of them received improved C^3I facilities and had a host of new sensors bolted onto the spine. They were dedicated to deep space reconnaissance tasks and in theory were considered *Magellan* class scout cruisers, as per the lowest-registry conversion (NCC-1462). In this role, they saw sterling service in the Four Years War.



An upgraded Burke *fires her ventral phasers. Lack of a ventral aft emitter, combined with limitations in fire control sensor arcs and agility, made the frigates vulnerable from their six, a problem never quite addressed. The SAD impulse engine was said to live down to its name, and saw no other applications. The two major structural changes visible here, the shield emitter rim and the sensor dish bottom bulge, were exclusive to the patrol ship modification.*

Timing wasn't on the side of the dependable little ships, however. The Great Awakening brought up the possibility of much more capable frigates in this size range, and directed the attentions of Chiokis elsewhere. Further extension of the *Burke* hull to house a multilinear dilithium-focus powerplant was considered futile, especially considering the very recent investments that would keep these frigates a useful force until full transition could be made to *Loknar* and *Miranda* types. In practice, even these investments were cut, leaving almost a third of the *Burke* force unmodernized (save for a 2250s phaser upgrade) and stationed near the core worlds. Retirements began with laying off a dozen vessels immediately, then followed apace with *Loknar* and *Miranda* commissionings. Hulls from both the modernized blocks persisted until the mid-2260s, and the last such unit was stricken from records as late as in 2267.

Up-engined for deep space action, the Vasco da Gama *(NCC-1482) boasts the full booster package at the dorsal module station. Little else has changed since her 2223 launch; little would change before her 2250 loss to the Klingons.*

Despite falling a tad short of longevity, the *Burke* class was elemental in ushering in the era of the saucer-hulled combatant. The tentative steps taken with *Ranger* light cruisers would soon be followed by the decisive onmarch of *Baton Rouge* and *Proxima* cruisers, *Detroyat* and *Saladin* destroyers and *Ptolemy* armed transports, projects directly benefiting from work done on the *Burke* program. There would be no turning back now; no further lifting-body ships would be procured, and even the results of major modernization programs on such designs would be sent directly to second-rate assignments. Ever since the introduction of the *Burke*, the archetypal image of Starfleet has been the silhouette of the saucer-hulled starship.

Baton Rouge / Nordenskiöld

Heavy cruiser / light cruiser
2222-2277 (*Baton Rouge*)
2252-2290 (*Nordenskiöld)*

Completed:	20 total: 20 *Baton Rouge* heavy cruisers built in 2222-2224 6 *Nordenskiöld* light cruisers refitted from *Baton Rouge* in 2252-53
Length:	245.0 m
Beam:	153.0 m
Height:	64.6 m (original) 65.1 m (dilithium refit) 77.3 m (*Nordenskiöld*)
Mass:	432,500 tons (original) 441,000 tons (dilithium refit) 460,850 tons (*Nordenskiöld*)
Officers:	59 (original; figures vary from ship to ship) 43 (dilithium refit) 46 (*Nordenskiöld*)
Crew:	285 (original) 180 (dilithium refit; figures vary considerably according to weapons fit) 192 (*Nordenskiöld*)
Cruise speed:	w 4

Max. speed: w 4.7 (fusion power; original)
w 5.0 (fusion power; upgraded)
w 6.2 (dilithium refit)

Endurance: 4 years (original, dilithium refit)
8 years (*Nordenskiöld*)

Weapons: *Baton Rouge* 2222:
2 laser emitters (130 nm / 1.0 GW) port and stbd of bridge
2 laser emitters (130 nm / 1.0 GW) port and stbd of phased particle cannon
2 laser emitters (280 nm / 600 MW) on ventral secondary hull
4 laser emitters (280 nm / 600 MW) on aft secondary hull (not NCC-1411, 1413, 1416)
2 Type L phased particle cannon (800 GJ / 1.2 TW) in ventral primary hull (NCC-1411, 1413, 1416)
2 Type I phased particle cannon (800 GJ / 900 GW) in ventral primary hull (NCC-1412, 1415, 1417-1420, 1422-1425)
16 plasma cannon (2.0 GW) in twin mounts on dorsal hull
16 dual plasma cannon (2.0 GW) in twin mounts on ventral hull
dilithium refit 2238:
2 laser emitters (130 nm / 1.0 GW) port and stbd of bridge
2 laser emitters (130 nm / 1.0 GW) port and stbd of phased particle cannon
2 laser emitters (280 nm / 600 MW) on ventral secondary hull
2 laser emitters (280 nm / 600 MW) on aft secondary hull
2 Type I phased particle cannon (800 GJ / 900 GW) on ventral primary hull
2 fwd medium torpedo tubes w/ 40 photonic torpedoes in dorsal primary hull
refit 2246:
4 laser emitters (130 nm / 1.0 GW) port and stbd of bridge, in twin banks
4 laser emitters (130 nm / 1.0 GW) port and stbd of particle cannon, in twin banks
2 laser emitters (280 nm / 600 MW) on ventral secondary hull
2 laser emitters (280 nm / 600 MW) on aft secondary hull
2 Type I phased particle cannon (800 GJ / 900 GW) in ventral primary hull
4 fwd medium torpedo tubes w/ 50 photorps in dorsal primary hull
Nordenskiöld 2252:
2 laser emitters (130 nm / 1.0 GW) port and stbd of bridge
2 laser emitters (280 nm / 600 MW) on ventral secondary hull
2 laser emitters (280 nm / 600 MW) on aft secondary hull
Nordenskiöld refit 2276:
4 phaser VII emitters port and stbd of bridge, in twin banks
2 phaser VI emitters on aft secondary hull

Shields: 1-layer conformal forcefield
Navigational deflector on secondary hull bow
Navigational deflector on ventral primary hull (*Nordenskiöld* refit)
2 auxiliary navigational deflectors on primary hull bow

Laboratories: 2 GP, 1 planetary sciences, 1 astrophysics (original)
1 GP, 1 planetary sciences (dilithium refit)
2 GP, 2 planetary sciences, 1 astrophysics, 1 life sciences (*Nordenskiöld*)

Transporters: 4 GP (3-pad), 2 emergency evacuation (18-pad), 2 cargo; Mk I (NCC-1417, 1418, 1422)
2 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II (dilithium refit)
1 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk III (refit 2246, *Nordenskiöld*)

Auxiliaries: 2 atmospheric and 2 spatial shuttlepods, 14 work pods (original)
2 atmospheric shuttlepods, 10 work pods (dilithium refit)
2 medium and 4 light shuttles, 8 work pods (*Nordenskiöld*)

Ships of historical interest:

USS Hampton Roads (NCC-1412), *USS Glasgow* (NCC-1414), *USS Savannah* (NCC-1420), *USS Bremen*/*Savannah II* (NCC-1424)

SOURCES: (D SFC, FSRC)
(N SFC, FSRC, SotSF)
(H SFC, John M. Ford 'The Final Reflection', FSRC, SotSF, own)

In the early decades of the 23rd century, it was no foregone conclusion who would get to give Starfleet's large cruisers the performance edge they needed against Klingon aggressions. The supreme performance of the single-piece tritanium saucer hull spawned many follow-on projects and involved several shipbuilding companies. To successfully compete on this considerable market, Chiokis made grandiose promises on heavy cruiser modernization. Geering in turn exploited its seniority and continued the development of its saucer variant for newbuild frontline applications.

The new school of warp dynamics had easily convinced Starfleet that the only possible future for the cruiser fleet lay in saucer-shaped hulls. Refitting of *Caracals* or other older monohull designs with saucers was of course impossible, and a refit of *Mann* cruisers would likewise leave nothing of the original spaceframe. The *Rangers* in turn offered virtually no margin for propulsive or tactical improvements. And since Starfleet already had designs on the future of the *Horizon* class, dependent on Chiokis, meddling in the production of the type now would be poor investment. Riding on these arguments, Geering in the 2210s actively marketed the construction of an all-new cruiser class, utilizing the so-called third generation warp propulsion technology yet unrelated to the still secret Project Starship. Initial Fleet reluctance changed into desperate interest after 2218, and in 2219 a deal was signed for no fewer than 25 *Baton Rouge* class cruisers, with an option for an equal number of additional units.

By mid-2220, the internal configuration for the first saucer hull was fixed. This structure was the largest of saucers offered so far by Geering – a diameter of 153 m was chosen for the cruiser application. Accommodation would be provided for some 350 crew, as well as extensive facilities for their needs, including galleys and synthesizers for the mess halls, two gymnasiums and saunas, a versatile sickbay, and a separate life support system for protection in the event of emergency hull separation. Also housed inside the saucer would be four gigawatt-strength accelerated lasers, a selection of sensors, and four well-equipped laboratories for research use.

The topmost deck of the seven-deck assembly was a small dome consisting of the bridge and its life support machinery. The second, much wider deck housed laser systems and their control rooms, officers' quarters, plus a small airlock and armory aft of the bridge. Deck three originally carried more laser-related hardware as well as some sensors, but was always intended to provide room for upgrades. Below this deck, the saucer rapidly flared into its full width, which allowed the next two decks to house the entire crew and all the required support functions. Decks six and seven were dedicated almost completely to machinery, including short-range sensors and a powerful 1.2 TW twin phased particle cannon, the intended main weapon of the heavy cruiser. Two 0.9 TW cannon were fitted to most production models, however. Aft of Deck 5 was the impulse engine assembly with twin auxiliary fission reactors and a wide, forcefield-vectored nozzle.

A new type of connecting structure was created to join the saucer to the engineering section, as the *Daedalus* and *Horizon* solutions did not scale up very well. Five decks high, the connector was much broader and more angular than the modern Chiokis fin. To give sufficient strength but minimal extra mass, construction techniques very similar to those of the saucer were employed, including load-bearing duranium skin and deck structures.

Below and aft of the connecting structure sat a six-deck engineering hull, an oblong, angular block housing the four main total-conversion reactors, fuel tanks and a power distribution system. The stern area of these decks was dedicated to workshops, monitoring rooms and a fair-sized shuttle hangar that some Fleet R&D directors considered unnecessary in view of the increasing capabilities of teleportation technology. The navigational sensor and deflector dish was housed at the bow on a pivoting arm, a feature soon to be introduced to destroyers and frigates as well.

Most importantly, all-new nacelles of PB-24 model were introduced. The engine was similar in dimensions to the pathfinding PB-20, merely a tad larger in diameter. Yet the vast, ribbed radiator panels on the aft segments, used instead of podded intercoolers, revealed the far higher power levels the newer engines were designed for. Endless testing allowed Geering experts to coax a cruise speed of warp four out of the design, using far less complex power arrangements than what the warp-

dynamically inferior *Manns* and *Rangers* needed to reach similar speeds. Still, some creative PR work was needed to declare the result a breakthrough. True quantum leaps in warp performance would have to wait for future innovations.

Minding the vast scale and central role of the vessels, Geering took a design approach opposite to Chiokis' gapfiller cruisers. Each deck was built with possible future upgrades in mind, their corridors, dataways and tunnels for free-flying turbolifts being the only real constants in the internal configuration. Room was left for possible engine uprating, especially in the mid-section and upper levels of the secondary hull. Modularity in interior design helped with maintenance and later refits. The interior layout was standardized, with clean panels and straight angles replacing the earlier maze of protruding spars and exposed pipes and conduits. Light blue, green and brown were selected as the psychologically most beneficial interior colors.

The impulse systems of the *Baton Rouges* were fitted on the saucer, allowing for a fully controlled atmospheric entry, with deorbit burns performed by the impulse engines, and atmospheric maneuvering controlled by RCS rockets and the aerodynamically stable spaceframe itself. Alternate means for crew evacuation included a series of lifepods on Decks 4 and 6. Propellant for the impulse engine was provided by a single fusion reactor, the helium exhausts of which were also looped into the primary plasma system for drive plasma replenishment. An auxiliary fission system was in use aboard the saucer hull for the sustained power needs of separated operations.

The first completed ship was commissioned in 2222, and given a consecutive registry in the deep space cruiser scheme, following the last of the projected *Pytheas* light cruisers. Yet at 192,500 tons plus nacelles, the *Baton Rouge* (NCC-1411) definitely was a heavy cruiser in size, and no slouch in frontline combat, either. At first, Starfleet still considered a more modest designation based on relative capabilities – it was not yet known that Project Starship would be delayed by two decades, leaving the *Baton Rouge* the highest-performing type in the Fleet. After six months of operational trials, the inaugural ship was pulled back to drydock and her engine pylons slightly lengthened for better warp field matching. At this point, six dockyards across the Federation were already busy completing six more *Baton Rouges*. Although a total of twenty-five vessels was specified under the initial contract, two fell under the budgetary axe, in a somewhat premature shifting of resources to Project Starship.

The cruisers soon became the fastest vessels in Starfleet as the engines were tested and fine-tuned. Ten of the *Baton Rouge* cruisers were fielded for multi-purpose instead of purely defensive missions, their speed ensuring that they would be available to counter any and all attacks across the Klingon frontier or the Romulan neutral zone. Two ships of *Baton Rouge* class were also fitted with wholly new teleportation hardware. The Mk II transporter exceeded the performance of the original Erickson technology in several key respects. In 2226, *USS Moscow* (NCC-1423) became the first ship to transmit and *USS Tehran* (NCC-1419) the first one to receive a living human being intact through a warp-to-warp transport – an impressive achievement considering that only fifteen years earlier, the very concept had been deemed impossible by the Vulcan Science Council.

But secretly, Starfleet was preparing for an upgrade of wholly different scope. In all innocence, the sleepy little former freight hubworld Deneva had recently reported on peculiarities in recent gemstone shipments. It appeared that a lithium-iron compound found in so-called red coral crystals had subatomic bonds strong enough to withstand energies in the petaelectronvolt class, plus a curious crystalline structure that was in effect 'porous' to antimatter up to antihelium scale: in effect, a naturally occurring dilithium crystal was being prospected from within UFP borders. An

ultra-secret project was begun under Doublet Regal seals to exploit this new and fascinating possibility of harnessing m/am energies. Tentative engine designs were created for the *Baton Rouge* class, as well as for other concurrent spaceships.

Natural dilithium engine tests were at first performed on drones converted e.g. from long-retired but not yet scrapped *Daedalus* class survey ships. Then followed the *Bonaventure*. The first series-production dilithium regulation engine was installed on *USS Sawyer*, a scout design created specifically with this type of antimatter power in mind, and was considered moderately successful. But the first operational refit was performed on *USS Glasgow* (NCC-1414) of *Baton Rouge* class in 2238, and proved an instant success. Further *Baton Rouges* received the 'dilithium drive' upgrade after 2239, and fourteen of the twenty ships ultimately re-entered active frontline service in 2243 with dilithium-regulated engines. All ships were also given the new warp transporters; their starboard shuttle hangars were converted to extended engineering facilities in the process. Docking ports for courier vessels were added aft of the bridge and in place of the former shuttlebay doors in partial compensation.

Non-refitted ships, six in all, were retired and mothballed by 2250. Great strides in construction techniques, weaponry and propulsion had already largely outdated the design, and further upgrading let alone major newbuilding was considered superfluous after the first *Constitution* class starships had entered service. There was still quite a bit of fight in the older heavy cruisers, however. Their primary hulls were some 25% larger than those of most Geering vessels from the 2220s, and this could be put to good use by doubling the number of main lasers and by fitting an array of warp torpedo launchers onto Decks 2-3. An initial two-tube arrangement proved insufficient, and four tubes were ultimately carried on all vessels. The preferred ammunition mix consisted of 10 regular and 40 forced-intermix antimatter warheads, the latter reflecting growing Starfleet faith in the quirky weapon after more than 25 years of disaster-ridden development. Officer accommodation was moved out of the way of the ordnance to Deck 5. The combat effectiveness of the uprated variant was deemed almost doubly that of the original *Baton Rouge* design, and the deployment of these units to frontier starbases allowed Starfleet to retire large numbers of older designs or to reassign them to internal protection and local defense duties.

Even the mothballed six units of the original *Baton Rouge* class, from *USS Philadelphia* (NCC-1425) to *USS Astrakhan* (NCC-1430), got a new lease of life through a major refit initiated in 2251. Their connector necks were stretched by almost ten meters in order to provide clear field of view for the huge Zenith sensor array, housed in a bulged ventral extension of the primary hull. Minor modifications in the dorsal superstructures and lower secondary hull further altered the height of the ships, yet other dimensions remained unchanged. Armament was drastically reduced, though, with the ventral laser emitters on primary hull, and any hope of fitting torpedo armament aboard, lost to the Zenith system. The limited combat potential no longer justified a heavy cruiser designation, even if hull mass (at more than 220,000 tons the highest in the entire cruiser fleet) somewhat conflicted with Starfleet's decision to assign a light cruiser identity to this subclass. The vessels were also all renamed thematically for post-Columbian, pre-Carterian Earth explorers: relaunched in 2253, the *Nordenskiölds* were the last cruisers to be armed with laser weaponry, at a time when the rest of the fleet was already making a transition to pure phaser armament.

Old-fashioned weaponry was no real operational shortcoming for the mission profile of the ships. The *Nordenskiölds* initially performed sensor picket duties in support of major fleet movements, but soon found themselves out of work due to the lack of activity on the Klingon side. However, the Zenith array had its uses in scientific survey and charting work as well, and the *Nordenskiölds*

adapted well to this type of deep space duty. In the fifties, they logged more star hours than any of the regular units.

* * *

By 2255, a number of operational losses had decisively deprived the *Baton Rouge* of the role it had fruitlessly aspired to: the type had never become a true mainstay of the fleet, even when the *Horizons*, the *Archons* and all older ships in the heavy cruiser category were decommissioned. Project Starship had redefined Starfleet's expectations on ships of that category, and not even the most modern *Baton Rouge* variants fully met them. After Axanar, the ships rarely saw military action, save for endless anti-piracy operations in the Rigel region. In 2262, *USS Atlanta* (NCC-1440) fought against Orion forces in a mission of apprehending suspected as well as known and convicted pirates. Although the mission was a complete success from the military point of view, hitting hard on the Orion piracy and slave trade with zero casualties and with all of the suspects located and detained, the provocation apparently prompted the Orion cartels to launch their infamous and unscrupulous attack at the dilithium-rich world of Ghioghe. After a rapid escalation, the conflict resulted in the loss of another *Baton Rouge*, *USS Levant* (NCC-1442), as well as the light cruiser *Sutherland* (NCC-1010), in what was later known as the Battle of Ghioghe. The late Commodore Sieren of the *Levant* was freed of charges concerning the destructive outcome, but the Orion political situation was further complicated. Ultimately the UFP was forced to recognize Orion neutrality and sovereignty on issues that had formerly been considered criminal activity and automatically fallen under Starfleet jurisdiction.

In missions of colony support, the veteran ships attained more positive publicity, serving as the main Federation representatives for the large number of cooperative colonies founded at the time. Settlements long kept isolated by poor communications were effectively brought back to the Federal fold by visits of the elderly yet readily available heavy cruisers, followed by establishing of steady supply lines.

A final upgrade planned for all the *Baton Rouges* in 2263 would have removed the field guide rods in favor of more efficient fully encapsulated ramscoops, introduced a new navigational deflector, and reopened the starboard hangars. The ships were also to be given new survey gear and research facilities for extended exploration missions, but no space could be found in the hulls for the equipment. In the absence of a now desperately needed complete engine and weapon modernization, the changes could be considered cosmetic at best. Rather than waste resources on the elderly cruisers, Starfleet in 2265 ordered all *Baton Rouges* stricken from its strength.

Although the orders initially also encompassed the *Nordenskiölds*, four of the explorers were saved from dismantling, paradoxically because Starfleet no longer needed their services. Faster and more modern vessels were surveying the galaxy now – yet trouble was again brewing on the Klingon front, and the sensing abilities of a deep space explorer were sorely needed on the potential battlefields, not at the far fringes of the exploration zones where much of the *Constitution* fleet served. The very weaknesses and shortcomings of the *Nordenskiölds* made them available to Defense Command at the crucial hour; partial C^3I system upgrades were effected, and the cruisers were sent to help coordinate fleet maneuvers along the Eridani Gap.

Even though the Klingon confrontation proved short-lived, the stay on dismantling orders for the converted *Nordenskiölds* remained in force. Even in the environment of lessened tensions, all four continued service, ostensibly as exploration vessels, in practice as Fleet pickets. Yet their equipment

and technology was rapidly becoming antiquated, hindering both types of mission. Two units were retired in 2274, and remaining resources concentrated on *USS Barents* (NCC-1427) and *USS Diaz* (NCC-1430). In an attempt to offer a lower-cost alternative to the purpose-built *Balson* class, they in 2278-79 underwent an extensive internal furbishing into command ships, taking advantage of the existing sensor berths and connections if not of the outdated sensors themselves. The conversion was not a success, and the two vessels retained their light cruiser designation and 'quayside queen' mission profile until their March, 2290 retirement.

Due to Starfleet's desire to artificially keep up heavy cruiser numbers for better bargaining positions in the Organian treaty negotiations, the remaining *Baton Rouges* also enjoyed the hospitality of nearspace starbase piers between the mid-sixties and mid-seventies. As they had even less to offer to the Fleet than the *Nordenskiölds*, they were among the first to be scrapped when the UFP began to withdraw from its commitments to the treaty. A single vessel, the *San Diego* (NCC-1441), was preserved for posterity. She features a permanent exhibit of her odyssey to the heart of the Romulan Star Empire in 2276, first unveiled in the early 2350s.

Two Baton Rouges*,* USS Brandenburg *(NCC-1413) and* USS Adelaide *(NCC-1424), flying past Mars after the launch of the former to* Glasgow *specifications in 2240. The distinct nacelle radiator configurations quickly identify the variants even from this angle, which hides most of the engineering hull extensions of the* Brandenburg*. The torpedo launcher of the newer ship is more difficult to spot, hidden behind protective hatches in the upper primary hull. Early-model retractable lasers are also evident through their absence on both ships; later in their service lives, these ships would have their emitters fixed in the extended position, and ultimately replaced by fixed twin mounts. Retractable beam weapon emitters were still installed on e.g. the early* Constitution *models, but their role was strictly aesthetic now that hull armor had become outdated. The use of 'gunports' of this kind was finally discontinued in the early 2260s.*

Detroyat

Heavy destroyer (later heavy scout)
2222-2255 (*Detroyat*)
2255-2291 (*Miramar*)

Completed:	10 total:
	10 *Detroyat* heavy destroyers built in 2222-24 9 *Detroyat* converted to *Miramar* heavy scouts in 2255
Length:	190.3 m (*Detroyat* original) 258.7 m (*Detroyat* refit, *Miramar*)
Beam:	178.1 m (*Detroyat* original) 180.0 m (*Detroyat* refit, *Miramar*)
Height:	54.9 m

Mass:	380,000 tons (*Detroyat* original) 538,000 tons (*Detroyat* refit 2230) 532,100 tons (*Miramar*)
Officers:	64 (*Detroyat*) 52 (*Miramar*)
Crew:	252 (*Detroyat*, *Detroyat* refit 2230) 226 (*Detroyat* refit 2245) 190 (*Miramar*) 182 (*Miramar* refit 2264)
Cruise speed:	w 4
Max. speed:	w 5.2 (original) w 5.7 (refit 2234)
Endurance:	1 year
Weapons:	*Detroyat*: 4 laser emitters (130 nm / 1.0 GW) in 2 twin banks, port and stbd of bridge 2 laser emitters (130 nm / 1.0 GW) in twin bank, fwd of torpedo tube 1 fwd heavy torpedo tube w/ 20 fusion or photonic torpedoes (original) 2 fwd medium torpedo tubes w/25 photon torpedoes (refit 2230) 12 plasma cannon (2.0 GW) in twin mounts on dorsal hull (removed in refit 2230) 12 dual plasma cannon (2.0 GW) in twin mounts on ventral hull (removed in refit 2230) *Miramar*: 4 phaser VI emitters in 2 twin banks, port and stbd of bridge 2 phaser VI emitters in twin bank fwd of ventral sensor array
Shields:	1-layer conformal forcefield Navigational deflector on structural support 2 secondary navigational deflectors on fwd hull
Transporters:	1 GP (3-pad), 1 emergency evacuation (18-pad); Mk I (original) 1 GP (6-pad), 1 cargo, 1 emergency evacuation (18-pad); Mk II (refit 2245) 1 GP (6-pad), 1 cargo, 1 emergency evacuation (18-pad); Mk III (*Miramar*)
Auxiliaries:	2-4 work pods

Ships of historical interest:

USS Miramar (NCC-1102), *USS Niantic* (NCC-1105), *USS Resolution* (NCC-1101)

SOURCES:	(D Aurora/Michael Morrisette) (N Aurora/Michael Morrisette) (H Aurora/Michael Morrisette, SotSF)

The emergence of the Klingon threat was a major divider in the history of Starfleet in many ways. The heritage of the Romulan War had turned the trend toward large, self-contained and heavily defended ships of cruiser class. This in turn led to very independent operational procedures and the neglect of the art of fleet action. Furthermore, dedicated scoutship development met delay after delay, as cruiser programs kept the fleet yards busy. Small warship types were let to age and were only very slowly replaced by modern yet underarmed types.

But when Klingon cruisers began to amass at the fringes of Federation, Starfleet was in grave need of ships dedicated to crippling capital ships at lowest possible cost. The frigate and destroyer categories were revigorated, and a more balanced battlefleet put into drawing boards. When fielding of light *Kovaris* vessels proved insufficient, Starfleet R&D initiated two destroyer development programs featuring the latest innovations in propulsion and weaponry on a grander scale.

The programs both utilized a flat saucer hull, at 122.0 m and 140.2 m diameter, respectively. Beyond this, the designs diverged both in terms of propulsive technology and combat doctrine. The *Saladin* program, given to Geering Space Structures, used an engine configuration optimized solely for high sustained speed. A single hypermodern PB-29 engine was to deliver the ship rapidly to a

battlefield, letting her then fight a conventional sublight battle augmented by the use of short range warp torpedoes. The project was delayed by engine troubles, and the *Detroyat* program of Aurora Design Bureau thus reached completion earlier. This vessel utilized a less radical engine design with two lateral PB-25 nacelles, mated to the saucer hull with a ventral extension for enhanced engineering systems. High speed was in this case sacrificed for inherently greater warp maneuverability, making better use of the destroyer's all-new weaponry.

USS Troden *(NCC-1103) goes to warp. Cruiserlike warp performance was the main reason Starfleet chose to fund the* Detroyat *class. Numerical inferiority against Klingons was already so severe that there was no point in trying to seek parity by mass-produced light destroyer units. 'Silver bullets' like* Detroyat *offered greater return for the investment in every respect.*

At first, even the *Detroyat* project proved incredibly expensive, due to the fitting of largely experimental weaponry and fire control hardware into the warp-efficient yet cramped saucer hull. This forced Aurora to modify the hull several times during the design process and made the company teeter on the verge of bankruptcy. But ultimately, the design offered better performance and more potential for further development than the *Saladin* class, prompting the creation of *Icarus* battle cruisers and *Apache* heavy destroyers and later the *Miranda* and *Surya* dilithium frigates and their *Avenger* successors. All of these spawned subcontracts for the primary *Detroyat* builder Starfleet Division; alas, the role of Aurora in frontline starship design ended here.

As can be surmised from the pedigree, the basic model was a potent warship in her own right as well. The *Detroyat* featured three twin laser banks, in the layout familiar from *Baton Rouges* and also chosen for *Saladin* and other later designs, although with space for fitting three more units if needed. Smaller barbettes held twin plasma cannon for point defense, there being six evenly spaced mounts on both saucer surfaces. Finally, there was a heavy Keindoffer-Klaatsen warp torpedo launcher aboard – or more properly, the hull was built around this hypermodern weapon. A long accelerator tube ran along the ventral surface of the saucer, its power systems and loaders mounted within the dorsal extension. Twenty unwieldy 'Long Shot' warp torpedoes some 1.86 m in diameter were carried, each capable of sustaining warp for more than twenty seconds and delivering a guided fusion or antimatter warhead deep into the bowels of an enemy ship, ignoring shielding and hull armor by virtue of its sheer speed and inertia. No particle beam weapons were incorporated into the design, although there were some early plans of mounting twin 160 GW phase cannon of *Kovaris* type atop the primary hull. Concerns of significant overweight halted these plans of quadruple armament. The energy sources for both systems would have been equally bulky and complex; and while the antimatter tanks of the torpedo loader were potentially more dangerous than the auxiliary fusion reactor required for a phase cannon, the risks were considered worth taking. Ultimately, the plasma cannon were removed as well, leaving close-in defense solely to shields.

A single total conversion powerplant with its support gear was fitted in a keel-like assembly at the rear of the primary hull. Directly behind the compartment on Deck 7 was the impulse engine with three nozzles, using fusion exhaust deuterium-helium for propellant as usual. Flanking the engineering keel were the Pleshun PB-25 nacelles, with tapering aft segments and relatively conservative spool coils. The engines were fed plasma through long support pylons, jutting from Deck 7 but angled down to meet the nacelles at the level of Deck 8. On the forward surface of the engineering section was a parabolic navigational deflector and sensor beam projector of a new design. This device, initially lacking from the competing *Saladins*, featured combined subspace fields, shields and tractor beams for more complete protection from high-impulse/warp debris, as well as for long range, FTL sensing of forward sector threats and targets. Three secondary deflectors of a more traditional type were mounted on the saucer bow.

Despite the multiple cruiserlike features and their associated major crew requirements, facilities like fire control and crew quarters were much more primitive and smaller in size. This made the destroyers rather unpopular ships to serve aboard. Partial relief came from the omission of all research equipment, including laboratory spaces. Shuttle stowage was also minimized; just two work pods were typically carried in the service bays. In a tactical half-measure, *Tycho* fighter kits were adopted for these as soon as they became available.

Similar standards of equip were available on the *Saladin* project initially, leaving the two types fighting neck to neck. The most important advantage of the *Detroyat* design lay in her warp field configuration. The total conversion powerplant could squeeze a cruise speed of warp factor four out of the engines, and an impressive ultimate top speed of warp 5.7 proved correct Starfleet's decision to avoid the major investment in solid-state warp coils. In addition, warp maneuverability was superb, enabling full use of the rather guidance-limited torpedoes. Combined maneuvers of *Detroyats* with various other destroyers and cruisers at the Procyon firing range established the optimal firing ranges for the different types of torpedo, laser and particle beam armament, and revealed their comparative strengths and weaknesses. In one-on-one engagements, the *Detroyats* invariably triumphed, even against cruisers carrying heavy phase cannon.

Had the Klingon-Federation conflict ever reached the scope feared by Starfleet strategists, these ships would undoubtedly have been invaluable to the Federation forces. They clearly had a 'threshold weapon' status – a Klingon opponent would simply *have* to take these ships into account when planning for an invasion, and dedicate part of his forces to crippling the destroyers. However, the high cost of these ships slowed down acquisition so that only ten ships out of the planned 26 were completed. Competing designs emerged e.g. from the *Icarus* battle cruiser lineage, the final *Apache* batch of which was configured specifically for the heavy destroyer mission and greatly resembled the *Detroyats*.

Parallel to the *Apache* acquisition, a refit of the *Detroyats* was funded in 2230. The heavy torpedo launchers were replaced by the Selenia Mk 1 medium system, with twin tubes and with magazines for up to 40 shots. The more obvious change, from PB-25 to the almost twice as large and more powerful PB-27, was to be followed by the installation of dilithium power, but the less than disastrous solution to the Axanar crisis led to the abandoning of most destroyer programs at their early stages, and ultimately ended the story of the *Detroyat* class as well.

In the thirties and forties, the heavy destroyers still served in the niche between the regular destroyers and the battle cruisers, with 'century' registries from NCC-1100 to NCC-1109 allocated. It could be argued that such a registry range was still very appropriate for a *de facto* 'light battle

cruiser', as Starfleet had inserted the *Proxima* and *Icarus* classes in the same numbering slot. In practice, the selection of these numbers was more or less random, and not even permanent: the concept of mission-specific registry ranges would soon be dropped for good, whereas SF Intelligence now believed in the obfuscation of true Starfleet strength by misleading registry numbers and other identity-concealing trickery. Some success could be verified through signals intelligence. For example a major Klingon offensive at Zibal was held back in 2236 because of the perceived proximity of four squadrons of destroyers, or some 26 starships. Apart from a deliberately oversized tender group, ships actually present were limited to half a squadron of *Saladins* and *Detroyats* each; a fictional *Kovaris* formation had also been stationed in the system by Starfleet, but the Klingons apparently added another in their analysis.

Instead of upgrading the *Detroyats* to dilithium standard, Starfleet gradually replaced them with the more advanced and marginally less expensive *Larson* destroyers in frontline duties. The engine systems of the *Detroyats* were still sound if somewhat difficult to maintain, and the adequate cruise performance and endurance prompted the adoption of the ships for deep space escort duty in the early 2250s when no other assignments could be found. Still, by 2255, all *Detroyats* were already set for decommissioning.

One ship was saved by a Starfleet R&D decree: *USS Resolution* (NCC-1101) was adopted as a testbed for the fully dilithium-compatible *Surya* class of frigates. This frigate family actually ended up inheriting the heavy escort role of the *Detroyats* – a perfect example of a revolutionary design being eaten by its children. In an unexpected gesture of mercy, the other nine original destroyers were converted to special sensor platform role; their torpedo armament was deactivated and their fire control equipment changed into signal processing systems. Their role in intercepting Klingon transmissions and observing Klingon scanner and weapon system emissions from a distance proved almost as significant as their original combatant role. Starfleet was so satisfied with the results that the development of dedicated signal intelligence platforms was initiated, ultimately leading to the *Soyuz* and *Endurance* class 'survey frigates'. On the other hand, the story of Starfleet heavy destroyers was declared ended with the *Detroyat* class, having been found an evolutionary dead end.

Currently, even the Fleet Museum maintains no examples of *Detroyat* class. Out of the original batch, just *USS Niantic* (NCC-1105) was lost in action, going missing in 2267 on the hunting grounds of a planet-eating alien device. Her sigint sisters were retired and scrapped between 2282 and 2290 as *Endurance* and later *Bragg* vessels took over their role.

However, a group of starship enthusiasts managed to salvage the major components of *USS Miramar* (NCC-1102) and refurbished her as a navigating and piloting schoolship for their Starship Society, marking the first time a Starfleet vessel capable of breaking the warp four barrier was resold to a civilian user. In all fairness, it has to be admitted that the Society was not allowed to restart the warp powerplant, and the ship only utilized her impulse engines in her new role. The *Miramar* still sails once or twice a year out of the Arborian Spacedock, now refitted with a mock torpedo launcher and laser cannon and redecorated to her full 2220s glory (save for the heavy Arborian black oak pool table and three matching armchairs which still reside in the old torpedo magazine, reserved for Society Elder use).

* Even though the Selenia launcher in the 2220s was dubbed a 'heavy' weapon, this work systematically follows the practice introduced in 2271, where weapons of this caliber are know as 'medium' systems. Actual 'heavy' weapons by current standards would be first introduced in the 2280s, while 'light' systems would remain comparable from the 2220s to the 2370s. The introduction of mini- and microtorpedoes has further muddled the waters during the past century. Yet the remarkable degree of standardization in Starfleet torpedo weaponry warrants the continued use of this simplistic-sounding, now five-tiered system.

Saladin

Destroyer
2224-2297

Completed:	59 total: 21 *Syracuse* destroyers built in 2221-2224 20 *Saladin* destroyers built in 2224-2227 3 *Einstein* destroyer leaders / observation ships converted from *Saladin* in 2230-32 10 *Siva* destroyers built and 16 converted from *Saladin* in 2239-42 28 *Siva (II)* destroyers converted from *Siva* in 2249-53 8 *Siva (II)* destroyers converted from *Monoceros* scouts in 2250
Length:	209.4 m (*Syracuse*, *Saladin*, *Einstein*) 242.5 m (*Siva*, *Siva (II)*)
Beam:	122.0 m (*Syracuse*, *Saladin*, *Einstein*) 127.1 m (*Siva*, *Siva (II)*)
Height:	33.2 m (*Syracuse*, *Saladin*) 48.0 m (*Einstein*) 60.3 m (*Siva*) 60.0 m (*Siva (II)*)
Mass:	310,000 tons (*Syracuse*) 325,000 tons (*Saladin*) 338,000 tons (*Einstein*) 350,600 tons (*Siva*) 352,300 tons (*Siva (II)*)
Officers:	40 (*Syracuse*) 42 (*Saladin*) 49 (*Einstein*) 37 (*Siva*, *Siva (II)*, typical)
Crew:	162 (*Syracuse*) 158 (*Saladin*) 120 (*Siva*, typical) 116 (*Siva (II)* typical)
Cruise speed:	w 4 (*Syracuse*, *Saladin*) w 5 (*Siva*) w 6 (*Siva (II)*)
Max. speed:	w 5.1 (*Syracuse*) w 5.5 (*Saladin*) w 5.8 (*Siva*) w 8.0 (*Siva (II)*)
Endurance:	2 years (*Syracuse*) 3 years (*Saladin*, *Siva*, *Siva (II)*)
Weapons:	*Syracuse*: 8 laser emitters (130 nm / 1.0 GW) in twin banks, on dorsal and ventral fwd quarters 4 fwd light torpedo tubes w/ 60 fusion or photonic torpedoes on dorsal pod 4 aft light torpedo tubes w/ 60 fusion or photonic torpedoes on dorsal pod 8-12 plasma cannon (2.0 GW) in twin mounts on dorsal hull 8-12 plasma cannon (2.0 GW) in twin mounts on ventral hull *Saladin* original: 8 laser emitters (130 nm / 1.0 GW) in twin banks, on dorsal and ventral fwd quarters 2 fwd medium torpedo tubes w/ 60 fusion or photonic torpedoes on dorsal pod 12 plasma cannon (2.0 GW) in twin mounts on dorsal hull 12 plasma cannon (2.0 GW) in twin mounts on ventral hull *Einstein* original: 8 laser emitters (130 nm / 1.0 GW) in twin banks, 2 fwd of ventral sensor array, 4 fwd port/stbd 12 plasma cannon (2.0 GW) in twin mounts on dorsal hull 12 plasma cannon (2.0 GW) in twin mounts on ventral hull *Einstein* refit: 8 phaser V emitters in twin banks, 2 fwd of ventral sensor array, 4 fwd port/stbd 12 plasma cannon (2.0 GW) in twin mounts on dorsal hull 12 plasma cannon (2.0 GW) in twin mounts on ventral hull *Siva*, *Saladin* refit: 6 phaser VII emitters in twin banks, 2 fwd of ventral sensor array, 4 port/stbd of bridge

2 fwd medium torpedo tubes w/ 75 photonic torpedoes on dorsal hull
Siva (II):
6 phaser VII emitters in twin banks, 2 fwd of ventral sensor array, 4 port/stbd of bridge
2 fwd medium torpedo tubes w/ 70 photon torpedoes on dorsal hull

Shields: 1-layer conformal forcefield
Navigational deflector on dorsal pod (*Einstein*)
Navigational deflector on ventral structural support (*Saladin*, *Siva*, *Siva (II)*)
3 secondary navigational deflectors on fwd hull

Transporters: 2 GP (3-pad), 2 emergency evacuation (18-pad); Mk I (*Saladin*)
All ships brought to Mk II standard after 2230
1 GP (6-pad), 1 cargo, 2 emergency evacuation (18-pad); Mk II (*Siva*)
1 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III (*Siva (II)*)
Select ships brought to Mk IV standard after 2272

Auxiliaries: 2 light shuttles, 2 work pods (*Syracuse*)
2 shuttlepods, 1 work pod (*Saladin*, *Siva*, *Siva (II)*)
18 light shuttles or 6 heavy shuttles, 2 shuttlepods, 4 work pods (*Einstein*)

Ships of historical interest:

USS Alexander (NCC-511), *USS Pompey* (NCC-506), *USS Rahman*/*USS Kelvin* (NCC-514/NCC-O514)

SOURCES: D STII/Franz Joseph, STXI (ST:Axanar)
N STXI (FJ, Goodman *Federation: The First 150 Years*)
H STXI (FJ)

As Geering continued to provide Starfleet with its most powerful modern ships in every category, Chiokis was forging a reputation as the most dependable designer of affordable warships to be produced in large numbers. This was actually quite contrary to the company's aims and ambitions, but helped support the company while it waited for its big break in the *Horizon* upgrade program where its true hopes were placed. Starfleet in turn benefited from having two parallel sources for saucer-hulled ship designs, in addition to always keeping at least two different engine manufacturers and shipyards sufficiently employed and funded.

When the upper-tier *Detroyat* destroyers were ordered from Aurora, Geering for once had to settle on the parallel lower-tier contract. There was little cause for disappointment, as the lighter destroyer was intended for an at least fourfold production run. By 2221, the first two vessels for a planned inaugural batch of 26 were undergoing impulse tests and establishing beyond doubt the structural integrity of the new destroyer workhorse. The primary hull was of obvious *Burke* pedigree, with a flat, single-deck main disk topped by a terraced superstructure and an aft spine featuring a small shuttlebay above the centerline SAB impulse engine.

Yet an angled ventral 'neck' now supported a single PB-29 nacelle – the last although, at 148 meters and 170,000 tons, not the largest of the third generation spooled engines to be designed. At the bow of the nacelle, a Hycor deflector system provided a FTL graviton stream that could sweep clear the flightpath of the ship up to a speed of warp eight – a safe margin in terms of true maximum speeds in the 2220s. The beam was effective up to forty-seven light seconds against 5,000 kg objects, and up to two light minutes against smaller obstacles. The nacelle also contained most of the warp machinery of the ship, and distributed power to various other systems, including a booster feed to the impulse system. A lift and ship's ladder connected the lower engineering levels to the primary control facility in the main hull, and an airlock complex halfway along the neck provided EV access. Also included in the neck area were workshops and some temporary bunking and rest facilities for the engineering crew.

Armament, while still geared for frontal offense at the deliberate expense of all-around defense, was intended to be quite different from that of the *Detroyats*. A dorsal pod would house four paired

torpedo launchers of small caliber but high rate of fire. The saucer was to be provided with four berths for laser cannon, two dorsally and two ventrally, as well as up to three plus three point defense plasma cannon, even though filling of all the berths was never considered the preferred option. Centralized production commenced at Almaz factories on the required weaponry, as various dockyards completed the initial ten hulls. Names honoring ancient cities that had successfully resisted assaults and sieges were chosen; registries for the *Syracuse* class began at NCC-420, as these lighter vessels were in no way cruiserlike and had no place next to the *Detroyats* in the registry charts.

A Syracuse *of debatable identity sports a Four Years War false registry and a PB-45 nacelle, bringing antiquated weaponry to bear against a distressingly modern enemy. The eight-barrel "peashooter" torpedo mount was despised by the crews, yet installing a more potent system was well beyond the resources of the frontier fleet in the 2240s.*

After the first combat engagements, it became evident the ship type should not be positioned next to *Detroyat* formations in more concrete terms, either. Delays in delivery of torpedo systems were not the major problem. Rather, the smaller single-engine configuration resulted in range and maneuverability shortcomings that hindered strategic deployment and made Starfleet re-estimate its needs. Valuable dockyards could not be wasted on inferior products in this time of ever-heightening crisis. Thus, even though *Syracuse* production continued within the bounds of already allocated resources, an order was placed on an improved model - a vessel that would become the definitive single-engine destroyer for the better part of the century.

Being slow to reach the thick of battle, the *Syracuse* group could be expected to suffer lighter combat losses than its successors. Yet Starfleet was positively surprised that the 2220s and 2230s went by almost without casualties. A second batch originally intended for attrition replacement was nevertheless funded and likewise managed to avoid both combat and wear and tear for the next decade (there being tongue-in-cheek references to divine protection as the vessels in the batch were named after classic Terran gods and demigods). The class thus was deemed fit for receiving the hypermodern PB-45 engine - just in time for the next major Klingon offensive. Lamentably, little else could be modified under the tight schedule and tighter funding, and casualties now began to mount.

Among the first to fall was the *Triton* (NCC-I539), blown up by a Klingon privateer in an early test of Starfleet mettle in 2241. The *Troy* (NCC-423) and the *Hellas* (NCC-426) succumbed in 2246 to

Klingon forces at Delta Leonis, but helped evict the fleet of Admiral Kkorhetza from Federation space for good, rendering its Axanar expedition null and void; the destroyer names were honorably assigned to brand-new *Loknars* soon thereafter. Ten years later, *USS Alexandria* (NCC-422) was destroyed and the *Carthage* (NCC-428) and *Massilia* (NCC-432) damaged in an audacious ramming attack by Klingon special forces at SB 19; losses of personnel were light, but material damage too great to warrant repairs of the crippled destroyers. Finally, *USS Pompeii* (NCC-424) was in 2270 destroyed with all hands by heavy cruiser *Enterprise*, as part of the 'dreadnought incident' that was among the first Starfleet counterreactions to the onset of relative peace.

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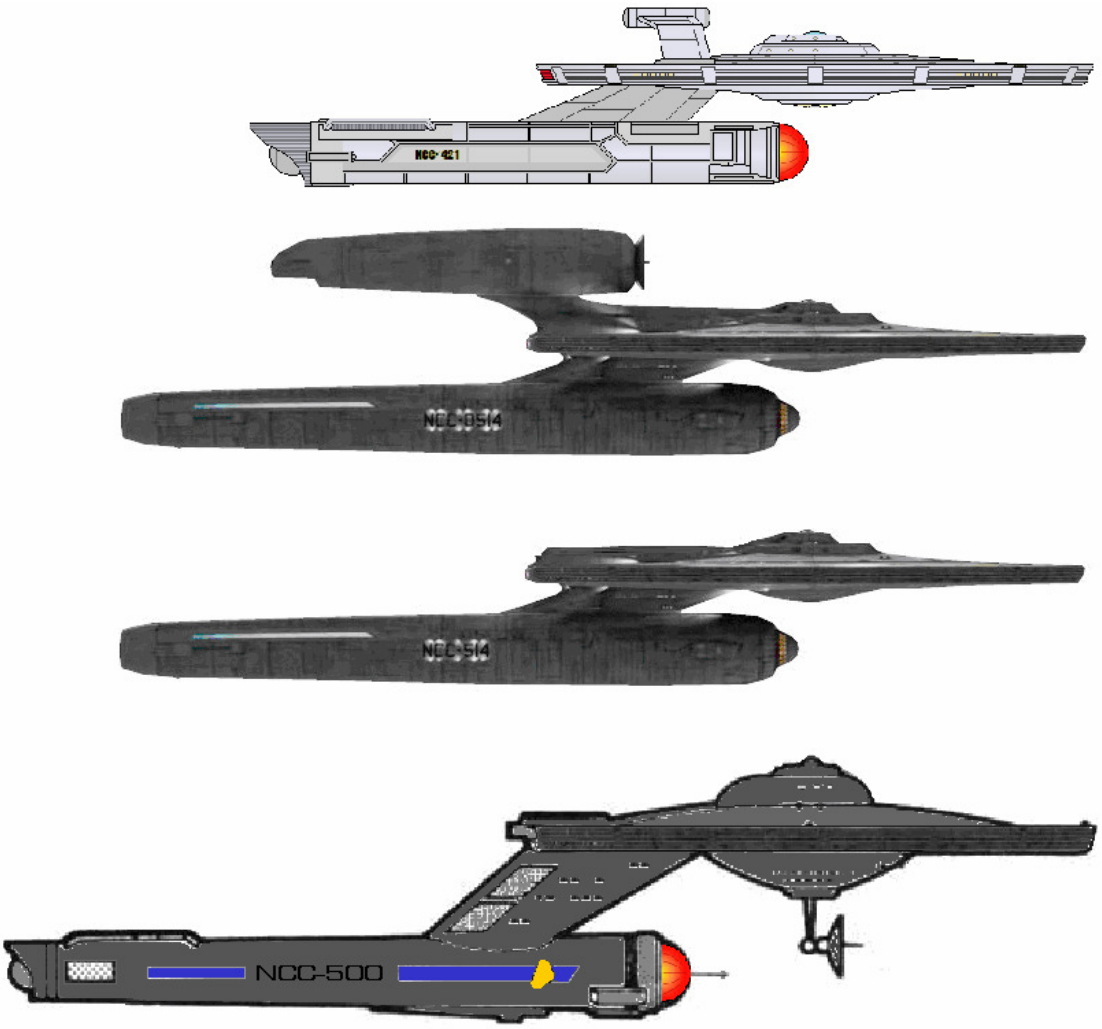


Back in the 2220s, modification work on the *Syracuse* design had proceeded with rearranging of the primary hull stern. Former shuttle handling spaces were now taken over by additional power generation machinery and fuel tanks. The light twin torpedo launchers had been found disappointing, yet continuing shortages of the heavy Keindoffer-Klaatsen torpedo launchers prevented their adoption at this stage. The existing dorsal pod was thus fitted with a twin-tube unit of novel design and 700 mm caliber instead. The projectiles were still much humbler than the *Detroyat* torpedoes, no different in dimensions from the 22nd century ordnance and sustaining warp

for just four seconds. Yet it was to be this design and not the *Detroyat* or *Syracuse* ones that would be further developed for fleetwide use. Built by Selenia of Rome, Earth, the weapon soon propelled its manufacturer to success and fame, and was grandiosely known as the Mk 1 heavy photon torpedo system.*

Within the saucer hull proper, there still were four twin laser emitters, two firing from above and two from below the hull. This austere arrangement proved very efficient in comparison with the previous multi-port configurations, a development analogous to that of Earth nautical warships in the 1970s. Also in line with the historical precedent was the armchair expert reaction to the innovation: the gigantic saucer hull was declared 'underarmed' and 'excessively sized' for its task. Yet the rationale for this was also to be found by a retrospective look. At the threshold of major technological and tactical breakthroughs, Starfleet wanted to invest in vessels that could easily be fitted with the newest equipment – even when nothing was known in advance about the nature of this yet to be invented gear. The 'oversized', internally easily reconfigurable Class 1A hull was to become a Fleet standard for ships varying from scouts to heavy cruisers.

Test runs established a top speed of warp 5.5 for the inaugural modified destroyer *Saladin*, allowing her to be commissioned in 2224 for full military service. Her performance still lagged behind that of the *Detroyat* class, but not so badly that Starfleet wouldn't have taken advantage of the lower acquisition price of the single-naceller. A final distinction from the original, less than stellar design came with the adoption of a registry number somewhat higher up the range, NCC-500.

Several batches of *Saladin* class destroyers were completed to boost the *Syracuses*. Twenty ships, all named after Earth warrior leaders, were built to the original standard with conventional total conversion powerplants, and 26 more were originally planned. Yet construction was halted at this point, pending the introduction of the radically new dilithium-regulated antimatter propulsion system. Sixteen ships of the *Saladin* standard were converted to this type of power in 2239-42. Instead of the mediumweight PB-45 used in the comparable *Syracuse* update, sophisticated PB-31 nacelles with either FWD-1 or FWD-1A solid-state coils were introduced in the conversion that turned the sluggish *Saladin* destroyers into high speed war machines of unprecedented power – worthy stablemates to the emerging heavy cruiser and heavy frigate classes which also utilized this futuristic warp engine type. The more powerful engines were not larger as such, and only increased the overall dimensions of the vessels because their mounting neck was almost tripled in length, for proper coil placement and for housing externally those power systems no longer fitting inside the nacelle. They also increased mass by mere ten percent, despite the greater density of the new coils.

In the end, the original flat saucer proved incapable of accommodating the required internal refits, and Chiokis was called in to perform the necessary modifications. The upper and lower superstructures had to be extended to house an improved, internally carried torpedo system with enlarged magazines, an all-new fire control system, and a sensor array within a prominent dorsal dome. In a further volume-adding move, the saucer was bulged more extensively on the dorsal side, and acquired an additional semi-deck around its ventral rim for the field guides of the Hycor DS-20 shield generator, the combined effect being to give the hull a distinct ventral concavity. This hull form was quite deliberately chosen for its advantageous aerodynamic properties, allowing for increased stability during emergency landings. Within the externally unchanged hull areas, armament was revamped from four pairs of lasers to three pairs of phased particle guns. The plasma cannon were removed, as the improved shields already provided superior defenses against proximity threats.

The navigational deflector was remounted on a ventral support strut. A limited mechanical steering capacity allowed for sweeps of 15 degrees in each direction, compared with the maximum 5 degrees of the earlier fixed installations, or the 28 degrees of the *Detroyat* sensor/deflector dish assembly. However, the whole assembly could also be made to slowly swivel for special purposes, like close-quarters debris sweeping. This modernized system was once again a non-vital item tested for future use. The power output of the destroyer's total conversion reactor (or even that of the later dilithium powerplant) was not sufficient for the use of the pressor beam as a weapon at warp speeds, but such capacity was planned for the more powerful cruisers that were to follow. The standard forcefield component of the deflector system was a practical defense against kinetic energy weapons.

Since ten new ships were also built to this standard, beginning with *USS Siva*, the variant is sometimes named the *Siva* subclass. Three vessels of the original run were left unconverted, though, as they had been given a thorough mission and configuration revamp a decade prior. Addition of a dorsal pod similar to that of the *Ranger* light cruisers had turned *USS Xerxes*, *USS Eztel* and *USS Rahman* into destroyer leaders, giving them significantly boosted sensing capabilities, a useful load of auxiliary craft, and spacious C^3I facilities. The modification had not decreased warp performance, but it carried an impulse maneuverability penalty.

The conversion had been a qualified success at best, and refitting of old *Texas* light cruisers to destroyer leader tasks was quickly deemed the better way of spanning the gap left by *Ranger* losses and retirements. This left the converted single-nacellers free for solo assignments. By 2235, they had all been renamed after scientists and engineers, and their registries had been given an O prefix to reflect observation duties in contested space.

Typically for a destroyer leader conversion in the 2240s, USS Kelvin *(the former* Rahman*) performs picket duty at the edge of Klingon territory. The survey capabilities of the design would be put to good use in charting resources close to or inside enemy space, paving way for possible future exploitation – perhaps in connection with a military expedition.The* Kelvin

herself was commanded by a succession of noted planetary scientists during this period, maximizing the efficacy of such missions.

In a mirror image of this move, several *Hermes* scouts would later be converted to destroyers and in turn have their constellation names changed to those of battle sites. The economical nature of single-engined attrition warships thus offered Starfleet unprecedented flexibility and allowed timely responses to changing strategic priorities. Few twin-engined classes were available in sufficient abundance to cater for such radical and quick-paced changes until the very last decades of the Klingon conflict.

* * *

A further upgrade standard introduced in 2249 gave the *Sivas* phaser VII armament, forced-intermix warheads for the torpedoes, a lower-profile bridge structure and a tractor beam mounted on the connecting fin's trailing edge midway between the saucer and the nacelle. This modification (sometimes referred to as the *Siva (II)* subclass or the *Siva Mk II* design, since no new keels were built, and the class ship was the first to be modified), helped the ships stay apace with the latest Klingon threat developments and served until the 2280s as the ultimate standard of *Saladin*-family ships.

No modification, however, could address the main problem of this at its time extremely innovative and modern design. The narrow cylindrar warp field generated by the single set of coils within the single nacelle did allow the ships to reach speeds up to warp 8, but the maneuverability of the vessel at such speeds was minimal. Early on, this practically forced the ships to drop to sublight and use impulse thrust maneuvering to reach firing positions in close combat situations, making them virtually powerless in one-on-one combat against more maneuverable vessels.

Enforcing the Axanar blockade. The fleet action was a major letdown to the Saladin *class, revealing the poor warp maneuverability of the type. However, the destroyers performed well as sublight torpedo platforms, while* Larson *destroyers took their place in the occasional warp combat. Note the trimmed-down flux visor of this vessel, as well as the shape of the navigational deflector rigging – these identify the ship as an early* Siva *type.*

The relatively bloodless solution to the Axanar crisis meant that Starfleet's ambitious shipbuilding programs became grossly oversized. There was little real military action between Axanar and the 2280s, and very few of the *Saladins* ever saw combat in that time period. Still, Starfleet trained aggressively for the use of the destroyers both in defense and offense. The earlier slow-paced combat tactics of warp speed deployment runs and impulse maneuvering gave way to high speed engagements where the destroyers only occasionally dropped to sublight speeds. Given the poor warp maneuverability of the early types, extreme skill was required in these operations. Not surprisingly, major casualties were soon suffered in practice maneuvers. In 2259, *USS Iblis* (NCC-

528) hit the tender *USS Newton* (NCC-3822) with her navigational deflector, killing 23 aboard the latter ship. In the 2262 exercise Have Gun, *USS Azrael* (NCC-517) sprang a major leak and lost 12 crew when she loitered too close to the black star TNC 65823, and in disorientation collided with the shields of the dreadnought *Dominion* (NCC-2115).

Many a profilic Starfleet captain received her or his initial command experience and combat training in the *Saladin* fleet, which despite the problematic handling qualities was ideal for the role: no other assignments tied down the offensive force in the late fifties or sixties. On the other hand, the absence of glorious battles meant that UFP saw less and less need to build dedicated capital ship killer vessels like the *Saladin* and later *Larson* classes. After the final *Larson* batch of 26 was procured in 2261, destroyer funds were redirected to experiments intended to address the inherent shortcomings of the single-nacelled configuration. The attempted remedies were somewhat uninnovative, though. Adding a second nacelle to *USS Pompey* (NCC-506) and two sisters in 2262 merely resulted in a disproportionately expensive destroyer or a poorly performing frigate. The *Siva (III)* dorsal-nacelle experiment performed on NCC-520 would in 2275 give the same results at even greater expenses.

Yet so poor was the reputation of the single-engine configuration at this point that the order for a final 26 *Saladin* destroyers in the late sixties was turned down by the Council a phenomenal six times in a row. The two-nacelled *Akula* class based on *Siva (III)* was funded instead, in one of the worst procurement blunders of the late 23rd century. It would take a completely new engine and a renewed Klingon threat to give Starfleet back its confidence in the abilities of single-engined vessels, as described in the later *Cochise* entry. The original *Saladin* lineage would be all but gone by the 2287 détente, and only the most extensively modified variants would see the turn of the century.

At the time of the writing, sixteen *Siva (II)* ships still reside in surplus depots in near-operational condition. Starfleet has not activated these vessels for the better part of a century mainly because of lack of trained personnel to handle the utterly antiquated power systems – spares could readily be manufactured by replicators, of course. While many political entities have long expressed interest in purchasing the dormant vessels, and while the technology aboard the ships no longer suffers from export limitations, the act of selling the ships themselves is contrary to UFP Council decisions in the aftermath of the Altair VI sales fiasco.

* Even though the Selenia launcher in the 2220s was dubbed a 'heavy' weapon, this work systematically follows the practice introduced in 2271, where weapons of this caliber are know as 'medium' systems. Actual 'heavy' weapons by current standards would be first introduced in the 2280s, while 'light' systems would remain comparable from the 2220s to the 2370s. The introduction of mini- and microtorpedoes has further muddled the waters during the past century. Yet the remarkable degree of standardization in Starfleet torpedo weaponry warrants the continued use of this simplistic-sounding, now five-tiered system.

Hermes

Scout
2224-2313

Completed:	50 total:
	15 *Hermes* scouts / fleet coordination ships built in 2224 13 *Monoceros* scouts converted from *Hermes* and 14 built in 2243-45 8 *Monoceros* converted to *Siva (II)* destroyers (later *Indianola* scouts) in 2250
Length:	219.4 m (*Hermes*) 242.5 m (*Monoceros*)
Beam:	127.1 m
Height:	74.2 m (*Hermes*)

	60.3 m (early *Monoceros*) 60.0 m (late *Monoceros*, *Indianola*)
Mass:	294,500 tons (*Hermes*) 349,000 tons (*Monoceros*) 351,100 tons (*Indianola*)
Officers:	30 (*Hermes*; numbers vary considerably for other types)
Crew:	130 (*Hermes*; numbers vary considerably for other types)
Cruise speed:	w 4 (*Hermes*) w 5 (early *Monoceros*) w 6 (late *Monoceros*, *Indianola*)
Max. speed:	w 5.0 (*Hermes*) w 5.8 (early *Monoceros*) w 8.0 (late *Monoceros*, *Indianola*)
Endurance:	3 years
Weapons:	*Hermes*: 1 laser emitter (130 nm/750 MW) fwd of ventral sensor array 12 plasma cannon (2.0 GW) in twin mounts on dorsal hull 12 plasma cannon (2.0 GW) in twin mounts on ventral hull *Monoceros*: 2 phaser VI emitters in twin bank fwd of ventral sensor array *Indianola*: 4 phaser VI emitters in 2 twin banks port/stbd of bridge 2 phaser VI emitters in twin bank fwd of ventral sensor array 2 fwd medium torpedo tubes w/ 10 photon torpedoes and 40 probes
Shields:	1-layer conformal forcefield Navigational deflector on structural support Secondary navigational deflector on fwd hull
Laboratories:	1 GP, 1 signal processing
Transporters:	2 GP (3-pad), 2 emergency evacuation (18-pad); Mk I (*Hermes*) All ships brought to Mk II standard after 2230 1 GP (6-pad), 1 cargo, 2 emergency evacuation (18-pad); Mk II (*Monoceros*) All ships brought to Mk III standard after 2250 1 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III (*Indianola*) Select ships brought to Mk IV standard after 2272
Auxiliaries:	2 shuttlepods, 2 work pod (*Hermes*, *Monoceros*) 2 work pods (*Indianola*)

Ships of historical interest:

USS Crockett (NCC-600), *USS Aeolus* (NCC-588)

SOURCES:	D STII/Franz Joseph (N FJ, SotSF) (H FJ, SotSF)

Starfleet's transitioning from the solo combat doctrine of cruisers back to joint fleet action did not happen easily, nor quickly. Even in the era of relatively practical shipborne subspace communicators, keeping a fleet coherent at warp cruise required significant skill and experience. Also, in order to be efficient, the fleet would have to know where to strike and when – requiring long-range sensor platforms in addition to low-observable scouting systems. Mere fleet navigation at warp factor four stretched the sensor capabilities of cruisers to the extreme, and posed major difficulties for the destroyers. A dedicated sensor ship of high capacity and fleet speed would help alleviate the problems; developing a new spaceframe for the ship was deemed unnecessary when the mission was one of tagging along with existing destroyers.

To meet Starfleet's requirement for a Deep Space Fleet Coordination Ship with advanced sensors and high speed, the *Saladin* design was in 2224 modified to create the *Hermes* class. The port and

starboard lasers were omitted along with the torpedo launcher, and the room dedicated to sensors of various types. Downscaling of fire control systems in turn provided space for various C^3I facilities. Propulsive systems, shielding and life support remained unaltered from the destroyer standard. A shuttle hangar, essential for exploration operations, was still missing from the design, even though solo exploration was to be a secondary mission profile for the vessels if peacetime ever returned. Various plans were made to add an *Einstein* style dorsal pod, but in the end, the class was fielded with only the two standard shuttlepods inside saucer docking berths.

Fifteen vessels were built to this standard between 2224 and 2228. While the scouts were theoretically to be the tactical-level eyes and ears of defense fleets patrolling the Klingon border, they were often pressed to use as strategic reconnaissance assets as well. But the loss of two *Hermes* scouts in 2231 to light Klingon ships on such long range solo missions prompted Starfleet to narrow down the role of these vessels. It became evident that the inflexible one-nacelle engine system made the scouts perfect targets for more nimble vessels – the high top speed of the scouts was of no use in close warp combat. At loss of a remedy to the performance problem, Starfleet decided never to deploy the scouts outside protective fleets, and instead used them solely as sensor platforms in conjunction with destroyers and cruisers.

Destination: Organia. The surviving Hermes *scouts were still an integral part of major fleet deployments in the 2260s, working both as outriders and as so-called fleet coordination ships. With a* Hermes *handing over targeting information to cruisers and destroyers, a Federation battlefleet resembled a single organism with specialized organs for every task. Gone were the days when it was thought that a solo survey cruiser would be the most effective combat unit. Fleet action remained important throughout the Klingon crisis, until the end of the century. After that, Starfleet gradually returned to the practice of operating single independent multipurpose ships instead of large formations, resulting in the death of many small-ship classes; current trend is again turning towards small specialized vessels.*

As the Klingon threat receded somewhat after the 2240s, Starfleet began to regret its major investments in the scouts. Destroyer procurement cutbacks threatened to leave many of the vessels without a mission. Since some *Hermeses* had already been refitted with phaser mounts in place of the lasers, and all had received the powerful PB-31 solid-state/dilithium engines, Mk II transporters, expanded primary hulls and superstructures, and the new low-profile bridge modules, the scouts were now virtually late-model *Saladin* destroyers without torpedoes and athwartship phasers. Also, fourteen newbuild ships of this standard (named the *Monoceros* subclass after the first of these newbuilds, but sometimes also known as *Hermes Mk II*) had been constructed just before the post-Axanar moratorium on destroyer production.*

To restore the balance between destroyers and their accompanying scouts, Starfleet in 2250-51 decided to modify eight of the *Monoceros* vessels (NCC-608-615) into *Siva (II)* standard. The scouts received torpedo launchers, targeting computers and sensors, and three double phaser VIIs (one simply inserted

to the existing phaser VI berth, two requiring the reinstallation of berths in place of former sensor mounts). Some internal differences to the orthodox *Siva (II)* destroyer remained; but then again, all ships tended to be individuals due to the flexible internal configurations. Thus, rather than go by the subclass name *Indianola* (the new identity of the erstwhile *Lynx*) Starfleet decided to eschew a special designation for the retro-refits.

The fusion of *Hermeses* into the *Saladin* main body can be seen as the first sign of the new Starfleet trend of simplifying ship lineages. Subclass designations and names were quickly falling into disuse, and general class identifiers were used instead. While it may initially have caused some confusion that three different standards of destroyers served under the same name, many of the readers are probably relieved by Starfleet's decision in 2287 to collectively call the 15 different standards and seven official subclasses of heavy cruisers *Constitution* class instead of using specific subvariant names. After mid-23rd century, and due to increasing flexibility of technology, every starship would practically have formed her own subclass as far as internal configuration, engine performance and equipment standards were concerned!

Quite the opposite political environment resulted in another mission swap in the early 2280s. Of the eight destroyers converted from *Monoceros* scouts, four were returned to scouting duty, as the value of their torpedo launchers in self-defense against the newly bellicose Klingons was acknowledged. Corresponding cuts were made in the now highly vulnerable remains of the original *Monoceros* fleet. The vessels retained the individual names they had earned in destroyer service, but again were absorbed into 'parent' class continuity without the systematic *Indianola* subclass distinction (which is used in this entry merely for sake of clarity). Such painless transfers back and forth stand further proof of the increasing flexibility of the Fleet, as well as of the ever greater degree of technological standardization.

The *Hermes* design briefly resurfaced in the 2320s in the *Merced* class scout concept, and later made a more successful comeback in the era of the Border Wars. However, this configuration has not found much use in other Starfleet roles. The main attraction of single-engined ships, that of low construction and operating costs, still holds – while the main drawback, poor warp maneuverability, also remains.

* A fifteenth vessel, tentatively named *Aries* and slotted to receive the registry NCC-602, was damaged beyond salvage during construction phase in 2245. What at first seemed like a tragic accident was later revealed to have been just one of several Romulan acts of sabotage on starship construction that year. The events left both the name and the registry of the lost vessel unused for several years.

Ptolemy

Fleet tug / tender
2224-2289

Completed:	31 total: 1 *Robinson* prototype Fleet tug/tender 15 *Ptolemy* Fleet tug/tenders built in 2224-27 14 *Ptolemy* refitted to dilithium standard in 2255 15 *Keppler* Fleet tug/tenders built in 2255-58
Length:	211.6 m (NX-3800) 212.0 m (*Ptolemy* original) 222.0 m (*Ptolemy* refit) 220.1 m (*Keppler*)
Beam:	107.0 m (NX-3800) 127.1 m (standard)
Height:	67.2 m (NX-3800)

	68.2 m (*Ptolemy* original) 66.1 m (*Ptolemy* refit) 67.0 m (*Keppler*)
Mass:	326,500 tons (NX-3800) 421,000 tons (*Ptolemy* original) 486,500 tons (*Ptolemy* refit) 626,900 tons (*Keppler*)
Officers:	16 (standard, most dilithium tugs) 22 (with passenger or battle pod)
Crew:	68 (standard, most dilithium tugs) 198 (with passenger or battle pod)
Cargo:	2 x 121,600 tons (*Ptolemy*, typical cargo pod arrangement) 3 x 121,600 tons (*Ptolemy* refit, *Keppler*, typical cargo pod arrangement) 500,000 tons (maximum load other than pod, typically 2 spare warp nacelles or mass-reduced starship)
Cruise speed:	w 4 (*Ptolemy*) w 6 (*Ptolemy* refit, *Keppler*)
Tow speed:	w 3 (*Ptolemy*) w 4 (*Ptolemy* refit, *Keppler*)
Max. speed:	w 5.0 (*Ptolemy*) w 8.0 (*Ptolemy* refit, Keppler)
Endurance:	1 year
Weapons:	None (NX-3800) 4 laser emitters (130 nm / 500 MW), 2 atop and 2 below primary hull (*Ptolemy*) 2 phaser VI emitters in twin bank fwd of ventral sensors (*Ptolemy* refit, *Keppler* except NCC-3826) 2 phaser VI emitters in 2 single banks aft of bridge (*Ptolemy* refit, *Keppler* except NCC-3826) Heavily armed battle pods sometimes carried
Shields:	1-layer conformal forcefield Primary navigational deflector under main hull on support strut Secondary navigational deflector on fwd hull
Transporters:	1 GP (6-pad), 1 emergency evacuation (22-pad); Mk I (*Ptolemy*) All ships brought to Mk II standard after 2241 Most ships brought to Mk III standard after 2255 1 GP (6-pad), 1 emergency evacuation (22-pad); Mk III (most *Keppler*) 1 GP (6-pad), 1 cargo, 1 emergency evacuation (22-pad); Mk III (NCC-3816-3820)
Auxiliaries:	2 shuttlepods, 1 work pod (original) 1 work pod (refit 2241, *Keppler*)

Ships of historical interest:

USS Aristarchus (NCC-3805), *USS Keppler* (NCC-3816)

SOURCES:	D STII, Franz Joseph (*Keppler*: aridas sofia) (N FJ) (H FJ)

In the early 2220s, as the threat from Klingons kept escalating, it was found that there were no resources for building starbases at the rate required to support operations on the faraway Klingon border. Furthermore, the torpedoes now in use aboard virtually all modern spaceships were useless without antimatter for their warp engines or warheads, and the starbases specifically equipped to produce this commodity in the 2190s were few and far between. To safely carry the volatile energy source to remote ships and bases, a new type of tender ship would have to be launched, more independent in operation than the earlier ships of this function. Simultaneously, the ever-increasing size of Starfleet frontline starships meant that a Fleet deep space tug of unforeseen dimensions would soon be needed for most recovery tasks. Starfleet decided to tackle the problems at the same time, equipping its heavy tug with tender and tanker gear and with the weapons and shields needed to survive in deepest space.

Geering Space Structures had already secured the contract in 2217, back when the project schedule had been more forgiving. Yet the prototype *USS Robinson* (NCC-3800), built around a 107 m saucer and structurally completed in 2219, suffered from systems integration problems and was nowhere near operational testing status when the needs of the frontier became acute. The repeated successes of the Chiokis Corporation prompted Starfleet to move the tender project over to that company in 2222. It was an excellent opportunity to test the company's new 127.1 m saucer hulls, which would be compatible (and competitive) with all the starship contracts currently in Geering hands.

The bottleneck technology was the constructing of powerplants and warp engines. Thus a ship compatible with many existing thermonuclear powerplants was built, and storage provided for antideuterium, deuterium and tritium fuel alike. Save for the prototype which had utilized the proven PB-18 design due to a Geering decision to avoid unnecessary development risks, the standard propulsion arrangement for the tug/tender became a pair of PB-29 warp nacelles. The two-lobed field could be extended around a ship or pod in tow, up to the size of the latest *Mann* and *Baton Rouge* class cruisers. The requirement was later modified to include the planned Chiokis series heavy cruisers as well.

A combined tractor beam assembly and antimatter replenishment boom extruded from between the downward-tilted engine pylons. Docking the tender upside down against the engineering hull of the various ship designs enabled transfer of fusion fuel, antimatter, supplies and crew directly to the waiting vessel. After 2241, ACB modulation in Mk II transporter systems made transrep of antimatter fuel theoretically possible. The need for a hard-docking system continued, though, since antimatter remained difficult to transport in large quantities.

Various cargo modules, most of them based on the classic Type VII cylinder, could also be towed when attached to the docking boom. This gave the class a secondary role as a general transport/cargo tug – although most cargo pods ended up being towed by more conventionally sized cargo tugs instead of the huge Starfleet tenders. A special passenger pod was a sublight spaceship unto itself, and necessitated extra crew to run even in attached flight mode. Also, torpedo armament was incorporated into an inconspicuous-looking pod that was intended to give a nasty surprise to pirates or Klingon raiders.

The tug/tender design was named *Ptolemy* class after the first completed Chiokis product, and in keeping with the originally chosen convention of famous Earth astronomer names. Beginning in 2224, fifteen hulls were built and at first given either minimal laser armament with two single banks above and below the saucer, or no armament at all. Nevertheless, there existed potential for equipping the imposingly large vessels as frontier warships – not mere auxiliary combatants, but true warfighters comparable to light cruisers. From the mechanical-computational point of view, the weapons berths could easily accommodate phasers as those became available. These new weapons could not be used without the installation of a new secondary plasma system, however, and such a refit had to wait for an overall power system modernization. In 2255, dilithium power was finally introduced to the tug fleet, as fifteen new *Ptolemy* ships (also known as the *Keppler* subclass) were built complete with PB-48 warp engines and modern saucer contours. The PB-48 was one of the first practical applications of the new 'linear' solid state warp coil technology, although the practicability soon was challenged by a poor reliability record.

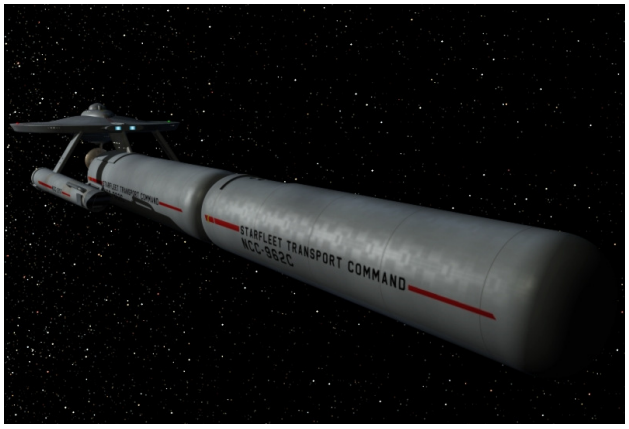
Modern cruiser-standard PB-32 engines, made affordable by Starfleet budgetary expansion and vital by Federation spatial expansion, were in turn provided for fourteen of the first-generation *Ptolemies*.

This gave them, too, a top speed of warp 8. Warp 4 could be achieved when towing another vessel. Also, these new solid-state coil assemblies enabled the extending of the warp field over far larger vessels or a combination of two or even three cargo pods. This mixture of cruiserlike and decidedly un-cruiserlike characteristics was mainly a side product of a decision based on the affordability of an engine common with the cruiser fleet. In the long term, greater reliability proved to be the most significant advantage.

Twenty-eight of the tugs out of the antimatter-powered total received phaser armament and served as frontline replenishment and recovery ships, with the frontier operating theater dictating an occasional command, coordination or combat mission as well. One *Keppler*, *USS Kidinnu* (NCC-3826), received stock laser armament instead. Although the unarmed *Robinson* initially was retained by Geering as a testbed, she was later leased to Starfleet for general logistics and training use.

Some time after the *Ptolemy* design had been proven and antimatter technology perfected, Starfleet approved the construction of a large number of more deliberately mercantile transports based on the design. The *Doppler* and *Dollond* classes of cargo tugs were to be built with limited weaponry and without military sensors, and to feature modern and economic linear warp engines. This was expected to result in significantly lower construction costs and enable large numbers of the ships to be built, to form the mainstay not only of Fleet heavy replenishment, but of its heavy cargo services as well. The first such ships were scheduled to enter service in 2268 with LN-23 early linear warp engines, but development of the engine type soon met with severe problems. As an interim measure, the *Kepplers* were in 2271-72 fitted with LN-52 engines instead.

Only in the 2290s were the *Dopplers* and *Dollonds* finally fielded, complete with LN-41 and LN-64F series advanced warp engines and several improved features. They are later described in an entry of their own.



Moving heavy civilian cargo pods like this liquid gas carrier of Dytallix Mining Corporation was one of the many missions of the Ptolemy *class. Most of the time, these ships carried Starfleet pods or served as fleet replenishment ships. However, a priority was always given to heavy starship towing missions, of which no other class was capable. The more modern* Doppler *and* Dollond *variants shared the mission profile of the* Ptolemies*, although their greater numbers made possible a more extensive cargo-carrying role.*

Worth mentioning is the fact that the pennant codes of cargo pods carried by these vessels are supposed to feature the letter C before the actual registry number. Thus, NCC-C2000 is not an *Excelsior* class heavy cruiser but a dry bulk cargo container! A glitch in a Starfleet logistics management program erased the letters from the self-organizing central registry records in 2241. Recovery would have required a systemwide booting that would have brought the entire Federation to a grinding halt; potential losses from the procedure were estimated at six trillion credits and 5,000

fatalities – or millions of people lost, were the registry to be damaged, or triggered to take self-preservative action. This persisting error has caused no small amount of anguish among traffic controllers and cargo operators. The fact that the error can't be eradicated is one of the monuments of the fundamental inflexibility of a modern computer-run society (not to mention a Holy Grail of sorts for programmers who in the past century have come up with thousands of ideas, ranging from fantastic to absurd, on how to recover 'The Cees' without killing anybody).

Thousands of the standard containers were built, featuring for example Liquid, Dry Bulk, Refrigerated Goods, Products, Starliner, Troop Transport and Large Components units, as well as small numbers of towable factories, hospitals and repair stations. Even though the *Ptolemy*-derived tugs have long since been retired, and Starfleet now follows the commercial practice of using pods specific to ship types, many of the old containers still serve on as space stations, asteroid-mining habitats, or even insystem sublight passenger and cargo haulers.

Sherman

Light transport / cargo drone
2224-2290

Completed:	171 total: 50 *Sherman* built in 2224-34 15 *Sherman* Mk I built in 2224-31 30 *Wanda* built and 20 converted from *Sherman* in 2228-37 16 *Sherman* Mk II built in 2235-44 20 *Alexis* built and 10 converted from *Sherman* in 2251-56 70 *Pershing* built in 2248-49
Length:	162.4 m (w/ crew module) 125.1 m (w/o crew module)
Beam:	58.7 m
Height:	53.9 m
Mass:	154,700 tons (w/o modules) 158,300 tons (w/ 12 general cargo modules) 156,200 tons (w/ 2 bulk cargo modules) 157,000 tons (w/ crew module)
Officers:	None (drone) 3 (crewed operations)
Crew:	None (drone) 22 (*Sherman*, *Wanda* crewed operations) 6 (*Alexis*, *Pershing* crewed operations)
Cruise speed:	w 3
Max. speed:	w 4.5 (*Sherman*, *Wanda*) w 5 (*Alexis, Pershing*)
Endurance:	9 years (*Sherman*, *Wanda*) 6 years (*Alexis*, *Pershing*)
Weapons:	None (standard) 2 laser emitters (200 nm / 200 MW) flanking the command pod (high security models)
Shields:	1-layer conformal forcefield Navigational deflector on fwd hull
Transporters:	1 GP (5-pad), 2 cargo; Mk I (*Sherman*, *Wanda*) 1 GP (5-pad), 4 cargo; Mk II (*Alexis*, *Pershing*)
Auxiliaries:	None (*Sherman*, *Wanda*, *Alexis*) Hangar space for 2 light shuttles (*Pershing*)

Ships of historical interest:

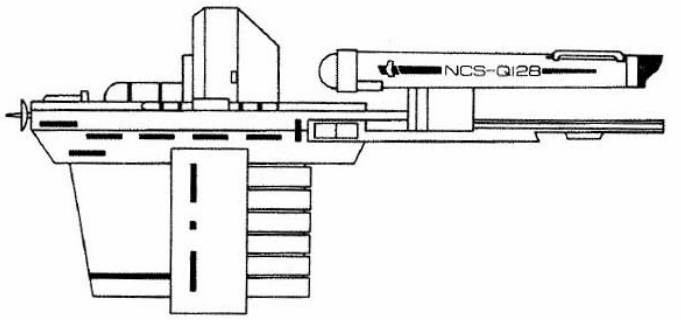
USS Penelope (NCC-G1415)

SOURCES: D TOS-R, TAS (Robert Gilbertson, SSA/Todd Guenther&Thomas Monson&Evan Malverne)
(N FASA, SSA, Jackill)
(H FASA, own)

The warp engine advances of the *Saladin* and *Baton Rouge* designs soon led to breakthroughs in nonmilitary use as well. As warp engines became faster and more compact, huge cargo carriers were no longer the only economical solution to interstellar cargo transport. Small, fast cargo ships could now compete with the lumbering giants in the carriage of valuables and passengers – or even in the timely delivery of high value bulk such as pergium- or dilithium-rich ore. To take full advantage of the fact, Starfleet decided in 2224 to field a large number of medium transports based on modern warp technology. Even after the introduction of medium warp transports, the sublight ore carriers retained their position in the UFP fleet, but the large fleet cargo vessels of *Vanguard* lineage gave way to the smaller, newer designs. Also, civilian designs were superseded by Starfleet vessels along many shipping routes in face of the serious military threat of Klingon privateers.

The design Starfleet chose for the first modern transport ships was an ambitious one. Not only was the design to feature top-class warp propulsion, it was also highly automated to allow for efficient loading and unloading of cargo. In later models, piloting operations were also automated, and the ships required only periodical maintenance. These ships were thus designated cargo drones, although they retained full life support in the hull to accommodate the occasional maintenance crews. Despite superficial similarities, little was common with the far more primitive *Boyden* warp-capable drones of the previous century.

The boxlike central hull featured small priority cargo vaults and inspection crew and passenger facilities, while warp engineering was housed atop it along with tanks for fusion fuel. Three types of modular tank could be clipped on, aft of the dorsal structure, although in practice only the largest model ever saw regular service. Main cargo holds were below the central hull; the centermost structure was fixed and featured elevators, dataways, power and ventilation trunks and multiple cargo airlocks, while storage modules for bulk cargo and liquids, as well as smaller holds for general cargo, could be attached forward and aft of the central structure. The tanks and holds could be maneuvered in place by a cargo crane system, the rails of which extended back from the central hull to allow for unobstructed access to port facilities. Cargo could also be brought onboard via port and starboard airlocks and fluid umbilicals. Finally, if needed, a standard cargo pod could be attached to the crane for towing at low warp.

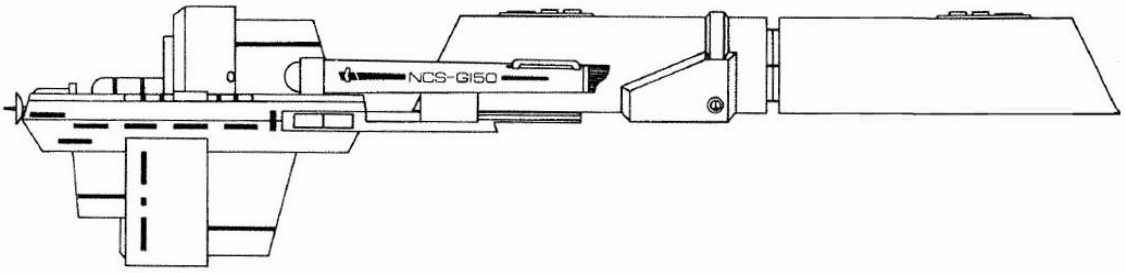


A basic Sherman *drone, or Mk I General Cargo Carrier, with a bulk hold clipped forward and a stack of six general goods modules aft of the ventral section. Noteworthy is the use of the original, small fuel tank, as well as a long crane platform later abandoned.*

The commercially obtained warp nacelles, dubbed PB-15 in Starfleet use, were mounted on short, sturdy pylons attached to the cargo elevator support structure. They featured large ramscoops for extended interstellar operations, and were somewhat stubbier than the PB-23 nacelles under development for modern Starfleet transports specifically. Drive plasma was fed through twin conduits running along the cargo crane rails. Power was generated by a large fusion reactor in the warp engineering compartment, and an auxiliary fission reactor was available for shipboard power needs. Impulse power was limited to low performance units at the aft support structure, but reaction control systems were of high quality to help with docking operations.

All around the hull were sensor strips for maximal situational awareness. Advanced optronics enabled both in-system and interstellar navigation with relative ease, although the ships did rely on external guidance cues when maneuvering near orbital installations or loading or offloading cargo. It was also reasonably rarely that the ships would venture outside communications range of traffic control systems that monitored shipping along standard lanes. A foray into the unknown, for example to assist Starfleet survey operations, would almost always be supervised by a live crew.

For crewed operations of extended duration, a further dedicated module would form the bow of the vessel to provide proper berthing. A traditional bridge atop this blocky extension took over from the control room within the core vessel, and in some models was flanked by twin laser cannon for self-defense. The automated flight control system was not authorized to fire the weapons – they were to be used only in conjunction with high-security cargo transfers, under the supervision of the onboard operating crew and security team. A navigational deflector dish at the bow of the core unit would in turn have to be removed when the crew module was attached, and replaced by a different, crew-rated unit attaching to the lower forward cargo hold.



A more refined Mk IIa model sports two bulk holds and the large standard fuel tank, and trails a special half-size cargo pod on the final version of the loading crane platform. Starfleet developed this specialized small cargo pod in the 2250s for military replenishment missions. The Shermans *were remarkably unmaneuverable with even these smaller pods in tow; the module saw no commercial use and was retired by 2268.*

The initial design was christened *Sherman* class in the crewed transport incarnation; the first full drone version, produced in parallel, was given the Mk I specifier. The crewed vessels were built in quantity, and quickly became the mainstay of Starfleet light cargo operations. In contrast, the drone class initially only comprised fifteen vessels that were placed under intense scrutiny before fully unpiloted operations could begin. However, a refined drone design eventually went to series production as the *Wanda* subclass, with 50 alliteratively named hulls completed for Starfleet Merchant Marine use by 2237, twenty of them through converting those crewed *Shermans* that were in the greatest need of an overhaul to begin with. A prime application was hauling of fissionables, heavy metals or other non-time-critical bulk and goods.

The Mastercom design bureau subsequently fiddled with follow-up variants with minor performance improvements or cargo space arrangement alterations. There was sufficient flexibility in the standard design to reproduce the results of the so-called Mk IIa and Mk IIb modifications, though, and no actual refitting of earlier units took place. A more distinct *Alexis* subclass with high performance was completed in 2251-56, with uprated PB-16 engines for a maximum speed of full warp 5. The final batch of drones would still largely follow *Wanda* guidelines, and comprise 70 units swiftly built by Star Fleet Division in 2261-63 under the subclass name *Pershing*. At the same time, most of the *Shermans* were converted to fully automated operations.

In addition to SF Merchant Marine use, Starfleet operated several *Sherman* derivatives as Class Two auxiliaries for fleet supply needs. Regardless of crew complement, these ships were all registered as drones, using the late 22nd and early 23rd century convention of NCC-#G format, where # was a number in the 128-160 (*Sherman*), 300-349 (*Wanda*), 480-499 (*Alexis*) or 1400-1469 (*Pershing*) range. This separated them from manned transports such as the original crewed *Sherman* vessels (500-549, with F following the number), as well as from manned supply ships, fuel carriers and general support types (S) or simple cargo pods (C). Non-transports like training ships (T) and local defense and law enforcement vessels (L) as well as repair and maintenance ships (R), warp couriers (D), light intelligence vessels (I), standoff observation ships of more substantial size (O), runabouts and similar small craft (B), and eventually also perimeter ships (P), were also given a special letter designation in this Starfleet scheme, which soon swapped format and applied the code letter before the number. In a further complication, NCC-Q# format was originally used on the Mk I, even though Q later came to denote target drones only. The elaborate system was mostly abandoned in the 2270s, and the various transports were thereafter given simple NCC registries.

Carrying only a single bulk cargo hold, the Antares *on detached survey service provides accommodation for her 25 crew in a standard unarmed bow module. Note the sensor/deflector unit at the upper part of the forward cargo assembly, rather than at the bow position of fully automated vessels. Further differentiating this original batch light transport from the drones, the* Antares *sports an F-series registry. Unlike several of her sisters, NCC-F501 would never see conversion to drone operations, instead being lost to sabotage in 2265.*

Some *Shermans* were drafted to scientific survey duty in addition to their transport role. In the simplest case, this meant that automated Starfleet or UESPA survey gear was bolted onto the hulls

to monitor randomly encountered phenomena. In more involving missions, there were science specialists aboard, and the ships were asked to follow predetermined routes for extensive stellar cartography, or sometimes to visit points of interest not directly on their path. *USS Antares* (NCC-F501) met a grisly fate in 2265 on such a mission, as she located and picked up a survivor from a crash while cursorily surveying planet Thasus; the young survivor soon misused supernatural abilities gained from the inhabitants of the planet and ultimately destroyed the *Antares*, killing twenty-five people.

Typical cargo train operations with atypical tugs. The presence of crew modules on both of the Shermans *in this convoy might be considered somewhat superfluous for peacetime operations. In a shot from the 2240s, though, the combination is less uncommon and provides added flexibility in case of hostilities. It also tells of greater doctrinal weight being put on the safe delivery of the cargo than on the safety of the crew.*

Uncrewed operations generally presented risk to material goods only. *USS Penelope* (NCC-G1415) fell into Orion hands in 2256 with a full load of dilithium, but a special forces operation to retrieve it was successful. No charges were pressed against the Orion government at that time – it was believed that support to the government would help curtail independent pirate operations. The policy was indeed successful in uniting most Orion pirates under single (or, at times, double or triple) government that could later be discouraged from continuing state-sponsored piracy. Klingon raids claimed half a dozen further *Shermans*, and a bizarre friendly fire incident ended the ore-hauling career of *USS Woden* (NCC-G325) in 2268, but losses thereafter were limited to retirements due to structural fatigue. A small number of *Pershings* received LN-61 engines in an economically unviable experiment that did not prolong the lifetime of the class to an appreciable degree. The last *Sherman*-derived drones were withdrawn from service in the 2290s, and replaced by drone conversions of more modern vessels.

Proxima

Battle cruiser
2226-2260

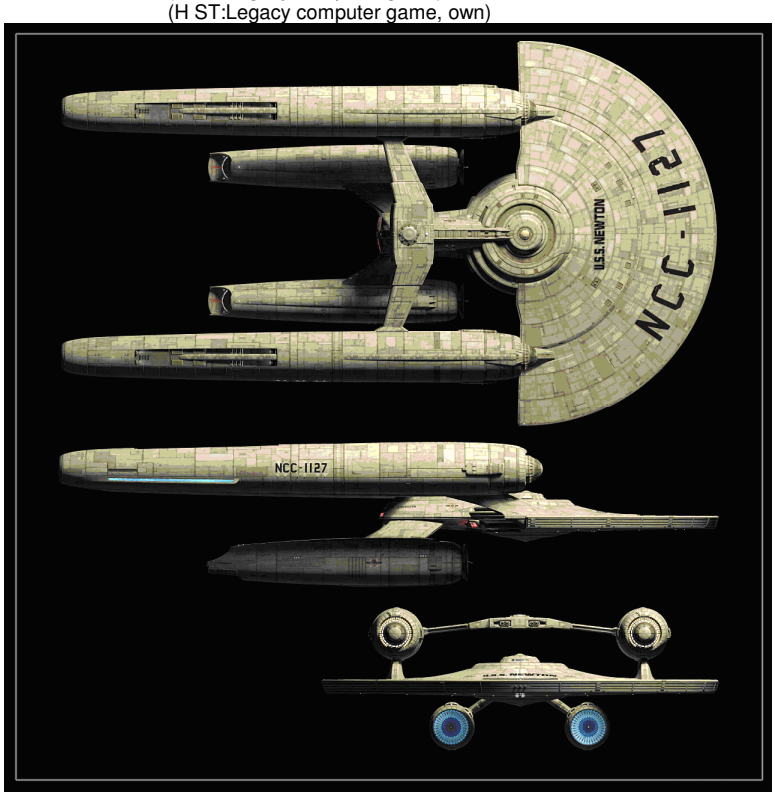
Completed:	20
Length:	270.0 m
Beam:	149.8 m
Height:	60.0 m
Mass:	520,000 tons
Cruise speed:	w 4
Max.speed:	w 7.1
Endurance:	5 years

Officers:	34
Crew:	323
Weapons:	4 phaser VII emitters in 2 twin banks on dorsal primary hull 4 phaser VII emitters in 2 twin banks on ventral primary hull 2 phaser VI emitters in single banks on dorsal secondary hull 24 plasma cannon (2.0 GW) in quadruple mounts on dorsal hull (removed in 2250) 24 plasma cannon (2.0 GW) in quadruple mounts on ventral hull (removed in 2250) 4 fwd medium torpedo tubes w/40 photorps on dorsal module 2 aft medium torpedo tubes w/40 photorps on dorsal module
Shields:	2-layer conformal forcefields Navigational deflectors on ventral hulls
Laboratories:	2 GP, 1 planetary sciences, 1 astrophysics
Transporters:	4 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk II All ships brought to Mk III standard in 2257-59
Auxiliaries:	2 heavy, 6 medium and 6 light shuttles, 1 special environment craft

Ships of historical interest:

USS Newton (NCC-1127), *USS Truman* (NCC-1115)

SOURCES:	D STXI (ST:Legacy computer game) (N ST:Legacy computer game) (H ST:Legacy computer game, own)



The high cost and high performance in the *Detroyat* heavy destroyers were relative things, measured against the changing absolutes of the Klingon threat. The 2220s saw growing desperation as Starfleet's stratagem of quality over missing quantity proved insufficient: the two main lines of destroyers were spread too thin on the battlefronts to amass to decisive strength, the cruisers in the wrong place in the wrong time. By 2224, the decision was made to crank up cruiser production by any means necessary and available. The result was a series of 'war cruisers', vessels of meager protection and hard punch that naturally fit in the traditional slot of battle cruisers.

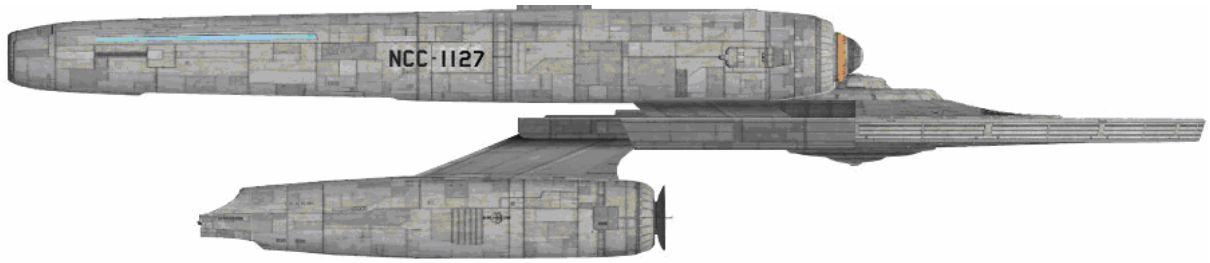
The design bureaux started by literally cutting corners. For the novel battlewagon, half a saucer would suffice: a primary hull nearly 150 meters in beam featured heavy particle and plasma armament in an intimidating forward arc, yet terminated at the bridge, only extending aft in the form of a central powerplant block that ended in a slightly boosted SAB-A impulse engine. Thin longitudal booms supported the major innovation of the class, the gargantuan PB-28 warp nacelles of 188 m length, above ship centerplane. The nacelles were further braced by a horizontal pylon structure that facilitated contingency sharing of plasma and featured a torpedo launcher in the middle. This secondary armament, a semi-commonalized unit capable of housing four to six Selenia Mk 1 launchers and originally intended for destroyer and frigate use, actually contributed relatively little to the firepower of the battle cruiser.

A changing of guard: USS Truman *(NCC-1115), command ship in anti-Klingon actions for most of the 2240s and 50s, departs Deep Space K-5 as the newly refitted* USS Farragut *(NCC-1702) stands by to dock.*

Even though many of the classic deep space cruiser elements were trimmed off the design, sensor capabilities were maintained at the state of the art. Two secondary hulls were rigged beneath the warp engines but not directly connected to them; rather, their attachment was by pylons angling up to the power block. High output navigational deflectors got direct primary power feed from the block, and for their part enabled the decisively high top speed of warp 8.1. Advanced navigational and targeting sensors were incorporated in the hulls, while each also held a stern shuttlebay with hangar facilities for a dozen light craft. Various assault missions could thus be undertaken when necessary.

Modular construction in which secondary hulls were separately produced allowed the completion of *USS Proxima* by late 2225, and commissioning to combat duty followed in January of 2226. The some 350 crew were now proud operators of the most potent attack machine ever built by Earth. Two phased particle cannon, a dozen quadruple plasma cannon and four heavy lasers controlled the forward firing arcs, while paired torpedo tubes in the pod were available both for forward and aft firings. Tolerable acquisition costs allowed the construction of twenty such ships in total, and the cutting of corners enabled four to be completed within 2226 already. Starfleet confidently took the spearhead force to battle.

Early engagements at Hromi and Wazn met with success, largely predicated by the inability of the Klingons to provide ships that could qualitatively challenge the *Proximas*. Yet the battle of β Thoridor, intended to secure the support of the local Rakelli against the Klingon Empire, ended in a humiliating withdrawal in face of superior Imperial firepower. The D-6 and D-7 battle cruisers, in short supply in the Empire, were able to make an appearance in force at β Thoridor. Their superior shielding allowed them to persist in close combat with their Federation counterparts, and resulted in near-disastrous damage to *USS Aquitania* and *USS Cancer*. The former had to be scrapped after several years of fruitless repair attempts, and the latter only returned to service with severe limitations imposed on her warp performance.



The side view of USS Newton drives home the enormousness of the PB-28 engines in comparison with the three hulls.

Rather than invalidate the design, the casualties suffered supported Starfleet's dedication to the *Proxima* concept. The two wounded ships were cheaper to replace than *Baton Rouges* would have been, and the replacements could be constructed faster. In comparison, it was believed that putting together a warbird of D-7 caliber would take the better part of a decade; some intelligence sources even believed that several key arts pertaining to that ship class had been lost in the years of internecine fighting, and that the Empire would not be able to recover from its losses at all if Starfleet managed to keep up the pressure. A second attempt at forcing β Thoridor was again thwarted, but use of battle cruisers in larger formations made up for their shortcomings in overall defense and rear sector weapons coverage. Klingon forces were sent to disarray on several fronts.

A decline in Klingon activity in the following decade allowed Starfleet to vector some of its *Proximas* to general exploration duties. Their equipment standards were not comparable to those of *Baton Rouges*, but their sensors and shuttlecraft facilities could make a useful contribution, essentially providing Starfleet with the capabilities of two *Pytheases* in one spaceframe. The high cruise speed of the PB-28 gave the class operational flexibility, although recall times from long exploration sorties could still be on the order of a full year.

The return of the Klingon threat at Axanar found the *Proximas* at a disadvantage. Their massive, unique engines had been difficult to modernize or replace, and their propulsive performance had not increased apace with other cruiser types. Even modern 'war cruisers' of affordable construction, such as *Rochester* or *Kearsarge*, would reach the battlefields faster, never mind first-rate, 'post-Starship' ships like *Constitution* or *Surya*. The *Proxima* class still formed an important part of Fleet fighting strength, though, at 18 surviving vessels. Remedial action was launched in 2259, resulting in a propulsive upgrade of intriguing scope. Four PB-31 engines were to be bolted on, two per pylon, to give the battle cruisers an acceptable cruise speed of warp six, and a top speed of warp nine. The only vessel to undergo the experimental modification, the original class ship, failed to enter operational service. The considerable expenses of the program did not result in a ship that

would have been either more powerful or more affordable than the *Federation* dreadnoughts, let alone an efficient continuation of the battle cruiser philosophy.

Disappointed, Starfleet mothballed the aging battle cruisers. From 2260 onwards, the surviving specimens languished decommissioned on surplus depots, and the venerable class name was freed for use and promptly applied on a brand new *Achernar* cruiser. Yet on the verge of scrapping, the veteran combatants found unexpected support. In the 2270s, several ambitious programs to construct a new generation of dreadnoughts were launched. Of these, the *Komsomolsk* class and its all-new, 185 m primary hull and multiple secondary hulls bore a striking conceptual resemblance to the *Proxima* class. Its propulsion arrangement of three LN-64C nacelles was intended to yield a sustainable speed of warp eight; by using four of the engines, in the paired arrangement pioneered by the *Proxima*, the old battle cruisers might well be coaxed to similar speeds. This major performance upgrade, ultimately usurping the *Komsomolsk* project in its entirety, is described in a later, separate entry.

USS Proxima *shown with the PB-31 engine quartet and the associated new pylons, but also with an enlarged primary hull, and lacking a torpedo arch. This configuration was an intermediate step in further upgrading the ship to the so-called* Proxima (III) *standard, with LN-64C engine pairs. A bow cutout was later applied to accommodate heavy torpedo launchers, while a medium torpedo pod was also reinstated on a pylon-mounted arch. Note the heavy array of forward phasers, to be repositioned in the final ships. This behemoth of a vessel would have challenged the* Deneb *class in the deep space defender role, had not the needs of the nearspace fronts been so pressing.*

Master

Medium fleet tug / tender
2226-2282

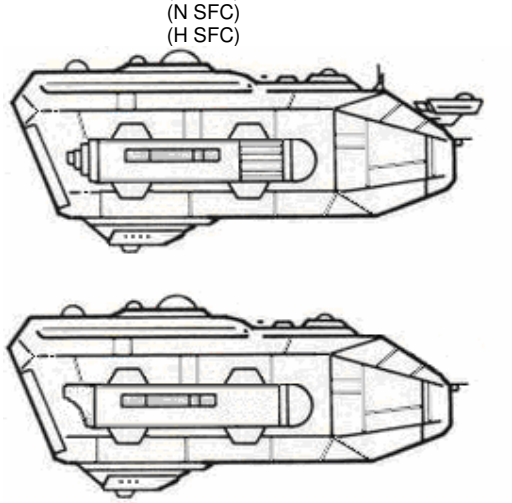
Completed:	30
Length:	145.0 m (standard) 154.7 m (w/ auxiliary deflector pods)

Beam:	98.9 m
Height:	67.7 m
Mass:	182,000 tons
Officers:	4
Crew:	16
Cruise speed:	w 4
Tow speed:	w 3
Max. speed:	w 5.0
Endurance:	1 year
Weapons:	None
Shields:	1-layer conformal forcefield Navigational deflectors on port/stbd bows Auxiliary navigational deflectors on dorsal bow (select units)
Laboratories:	None
Transporters:	1 GP (3-pad); Mk II
Auxiliaries:	2-6 work pods

Ships of historical interest:

USS Coxswain (NCC-3711), *USS Wiper* (NCC-3717)

SOURCES: (D SFC)
(N SFC)
(H SFC)



While the *Sherman* and *Ptolemy* classes represented a technological breakthrough in cargo operations, the deep space logistics chain of Starfleet was still severely lacking in the early decades of the 23rd century. Operations against Klingon forces put a great strain on theater logistics, and also created the need for recovery and repair that mere quality of the big *Ptolemy* tenders could not satisfy. For quantity, Starfleet needed dozens of medium tugs with frontline repair capabilities.

Shopping off the commercial shelf was problematic. While many a design was capable of towing loads the size of combat starships, and several could be equipped with an onboard repair facility as a manufacturer option or through minimal modifications, none had the propulsive performance for reaching the deep frontier. In 2225, following the retirement of the last *Watt* crewed and *Boyden* automated interstellar tugs, Logistics Command decided to procure a dedicated fleet tug, equipped

with specifically designed Pleshun PB-23 series engines for warp four cruising and for warp three under load. The major investment in propulsive systems meant low initial production numbers. Yet the results were so satisfactory that when additional funds were released, there was no need to purchase a further batch to complement the initial order for thirty *Master* class medium fleet tugs.

The *Master* was Starfleet's first true Class 2 supercruiser, a direct predecessor to the high speed transports of *Independence* class. Granted that *Master* achieved speed through excess power rather than warp-dynamic finesse, the tugship was still potently equipped for high speed, long range navigation in every respect. While the basic model had an integrated bow deflector, it was quite typical for the vessels to haul additional podded, outriggered deflectors, of the type that would also see use with the *Independences*. Especially useful with outsize tow loads, the pods would often be stowed in the holds 'just in case', to be installed as needed.

The holds, accessible through a giant, 30 m high rolling door at lower stern, were capable of accommodating a wide range of other components as well. Most *Masters* were equipped for carrying, servicing and swapping standard starship impulse reactors. They could also haul ordnance including antimatter pods, a capacity that would be of great signifiance later in their careers. Antimatter-powered starships were by and large too bulky to be efficiently towed by the medium tugs, but benefited from timely resupply of fuel (even if in small quantities) and outsize spares delivered by the vessels.

Compared with the cargo and repair facilities, crew spaces were spartan and rather cramped. It was customary, even if contrary to regulations, to accommodate part of the 30 crew amidst the machinery. The nooks and crannies in these public spaces typically offered greater privacy and comfort than the dedicated accommodations: what amenities did not exist, the crew could quickly construct out of the available spares. Only the bridge on Deck 1 and the adjoining navigation facilities on Deck 2 were safe from such modifications, and indeed saw little in the way of upgrades during the half a century that the tugs ended up serving.

No *Master* tugs were ever pressed to general cargo hauling duty, nor did Starfleet see the need to make them compatible with standard containers. While frontline and battlefront operations were the norm, nothing in the way of weaponry or combat sensors was installed. The ability to project strong navigational shields over the objects under tow of course nicely translated to additional self-defense potential. Nevertheless, two *Masters* succumbed to Klingon fire in the fifties, *USS Coxswain* (NCC-3711) in transit to a fleet staging area near Makus, *USS Wiper* (NCC-3717) while recovering the crippled battle cruiser *Zawiya* (NCC-1170). Mass retirements began after Organia, reflecting less the change in strategic situation or the introduction of the increased capacity *Cle Dan* type, and more the thorough state of fatigue that was making the *Masters* a hazard to operate.

The last *Master*, *USS Ordnanceman* (NCC-3722), ceased operations in February, 2282 and was decommissioned two months later. Like most of her sisters, she donated her onboard equipment to further use on starbases and other installations before being towed to a scrapping berth – by another *Master*, the now commercially owned former *USS Chaplain* (ex-NCC-3714).

Richter / Heston

Cruiser / battle cruiser
2228-2268

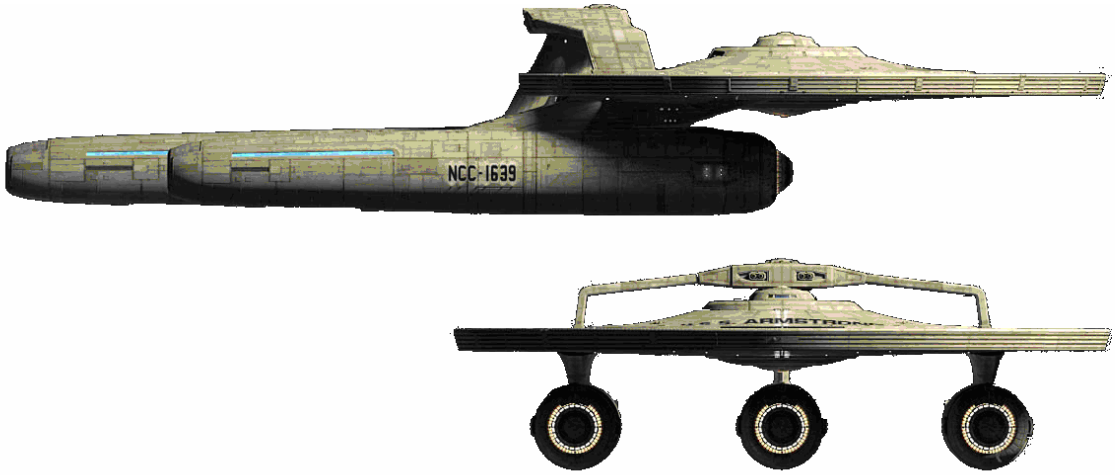
Completed: 19 *Richter* cruisers built in 2228-32
8 *Heston* battle cruisers built and 8 refitted from *Richter* in 2242-44

Length:	181.2 m *(Richter*, PB-21) 179.0 m (*Richter*, PB-45) 210.8 m (*Heston*)
Beam:	122.0 m
Height:	47.0 m (*Richter*) 52.7 m (*Heston*)
Mass:	345,000 tons *(Richter*, PB-21) 342,000 tons (*Richter*, PB-45) 410,500 tons (*Heston*)
Officers:	51 (*Richter*) 42 (*Heston*)
Crew:	263 (*Richter*) 229 (*Heston*)
Cruise speed:	w 4 (*Richter*) w 5 (*Heston*; *Richter*, PB-45)
Max. speed:	w 6.5 *(Richter*, PB-21) w 7.5 (*Heston*) w 8.0 (*Richter*, PB-45)
Endurance:	4 years
Weapons:	<u>Original</u> 4 laser emitters (130 nm / 1.0 GW) in 2 twin banks, port and stbd of bridge 2 laser emitters (130 nm / 1.0 GW) in twin ventral bank 4 fwd medium torpedo tubes w/50 photon torpedoes on dorsal pod 12 plasma cannon (2.0 GW) in 6 twin mounts on dorsal hull 8 plasma cannon (2.0 GW) in 4 twin mounts on ventral hull <u>Refit 2259:</u> 4 phaser VII emitters in 2 twin banks, port and stbd of bridge 2 phaser VII emitters in twin bank fwd of ventral sensor array 2 fwd medium torpedo tubes w/50 photon torpedoes on dorsal pod 2 aft medium torpedo tubes w/50 photon torpedoes on dorsal pod
Shields:	1-layer conformal forcefield Navigational deflector on secondary hull (*Richter*) Navigational deflector on center nacelle (*Heston*) 3 secondary navigational deflectors on fwd hull
Transporters:	1 GP (3-pad), 1 emergency evacuation (18-pad); Mk I (original) 1 GP (6-pad), 1 cargo, 1 emergency evacuation (18-pad); Mk III (refit 2263)
Auxiliaries:	2-3 medium shuttles, 10 light shuttles, 2 work pods (*Richter*) 2-3 medium shuttles, 2 work pods (*Heston*)

Ships of historical interest:

USS Armstrong (NCC-1639), *USS Farragut* (NCC-1646), *USS Hood* (NCC-1644), *USS Richter* (NCC-1431), *USS Semenov* (NCC-1435)

SOURCES:	D STXI (ST:Axanar/Tobias Richter) (N FASA) (H FASA, ST:Axanar)



By the mid-2220s, Starfleet finally had projects ongoing on all the types of warship it needed for halting the Klingon invasion. There would be large cruisers that enjoyed a technological edge over their Klingon counterparts, and battle cruisers that bartered some of that edge for numerical parity; large destroyers that could, if properly covered, tear apart all Klingon medium starships with torpedoes, and smaller destroyers to fill up the ranks; and independently operating light cruisers to guard the rear and secure the areas outside main battle zones.

It would still take years of fighting to establish the correct balance between production numbers. The war against the Klingon Empire could be lost by betting on the wrong ratios between cruisers and destroyers. But Starfleet also had another concern, one that kept nagging on the thoughts of the decisionmakers every time the analysts presented their most recent version of truth as pertained to the Klingon front. Space was vast and full of potential new enemies. What degree of resources should be dedicated to minding the other fronts?

Old enemies like Romulans were blessedly quiet for the time being. Yet outside the Klingon front, Starfleet's only presence consisted of the oldest and slowest of its arsenal: the pathfinding, now hopelessly outdated light cruisers from the turn of the century, and the slowly growing numbers of sluggish *Burke* frigates. Their patrol network could never hope to cover the distant wastes in decisive strength. Sooner or later, a rapid reaction force of fast, independent starships would have to be created. Yet until Project Starship could bear fruit, the comma had to be replaced by a slash.

Geering had engineered the *Burke* to be affordably expandable in multiple ways, and could in 2226 present Starfleet with both a fast and an independent variant of the basic design. Meeting the former criterion called for the installation of a third set of warp coils, right between the existing sets; the latter involved adding a proper secondary hull in the corresponding location. For the time being, the need for independently operating guardians of the far borders was the more pressing one, and the option to install a Pleshun PB-28 or PB-29 propulsion block was waived. Instead, a secondary hull much like those bolted onto *Rangers* was specified, and Geering set to work.

The *Richter* class patrol cruiser sacrificed almost a quarter of the primary hull to accommodate the secondary one within mass limits and without warp performance loss. The SAA impulse drive was installed in duplicate in the stern cutout to retain sublight performance as well. Directly beneath it was the dorsal attachment for the cigarlike secondary hull, featuring a Vaata B navigational deflector and sensor dish at bow and a bay and multilevel hangar for a fleet of support craft astern.

The main powerplant was relocated to amidships secondary hull, with much more ergonomic maintenance facilities and greater fuel reserves than in the original layout.

The torpedo launcher module projected for the *Burkes* finally saw action aboard the new patrol ship, with four Selenia Mk 1 tubes. A broader range of armaments was installed in the primary hull weapons berths as well: the three laser banks were given cruiser-standard 130/1 emitters (although the heavy duty plasma loops and other internal arrangements detracted from any "plug and play" ambitions), and six dorsal and four ventral plasma cannon pairs were fitted. Fire control systems were upgraded as Geering best could, but there were no breakthrough technologies available yet, and estimates on combat performance bordered on the downright gloomy. Still, the mere presence of the new vessels on the deep frontier would hopefully have the same pacifying effect as the appearance of the *Burkes* closer to the primary fronts of conflict.

Capitalizing on the added internal volume, Starfleet lavishly equipped the new designs with exploration gear and laboratory spaces. Ten light Class F shuttles were typically carried, even if early plans had been made based on clumsier Class A hardware and a lower number of auxiliaries. The hulls accommodated some 300 personnel in relative comfort, and provided enough space for four years' worth of consumables and supplies. Propulsive endurance was tailored to match, and the relatively high loadup of torpedo casings also supported years-long patrol missions even if they didn't prove quite incident-free. The inaugural vessel was in 2228 launched as the deep space patrol cruiser *Richter*, with a registry in the appropriate 1400 'century'. Twenty vessels in all were to be procured, in yet another case of treading water until Project Starship would deliver the UFP from danger.

Within less than a decade, the need for speed became acute. The rate at which the Federation was signing treaties and making friends meant that both the UFP territory to be patrolled and the buffer space around it to be studied and secured were becoming too vast for Starfleet to handle. Fortunately, a remedy was finally at hand: the new Chiokis light cruisers were proving the PB-45 solid state engine, and the success was leading to further orders and bringing down the unit price. Geering enthusiastically began applying the engine to its *Burkes* and *Syracuses*, within easy reach of recall orders. The *Richters* just had to wait a little longer until Starfleet could afford to rotate them through overhaul and refit.

Yet the time was running out at the turn of the decade already. As the news from Axanar reached core space, only a handful of up-engined cruisers was available, and there was no hope of hastening work on the rest as the bottleneck was PB-45 production rate. Thus, unexpectedly, the time was ripe for the second upgrade option to be taken, and old blueprints and warp field simulations were dusted off. The twentieth *Richter* was in 2242 completed with an old PB-29 nacelle instead of a secondary hull; the powerplant was housed in a quick and dirty extension block within the primary hull aft cut, and also mounted SAG impulse engines at extreme stern. Some of the auxiliary craft capacity was retained by expanding on the innermost cargo bays opening into the aft cut. Some internal volume in the primary hull had to be sacrificed for the purpose, yet there was plenty to throw overboard: there was no multipurpose element to the new vessels, which were readily dubbed the *Heston* class battle cruisers for their combination of high speed (comfortable supercruise of warp five plus dash at warp seven), firepower (the same 130 nm cruiser lasers as with the *Richters*, but ramped up to 2 GW) and modest shielding (no improvement over the *Richter* figures).

With a production run of eight vessels, and with eight *Richters* pulled in for conversion to like specifications, Starfleet felt confident – about addressing any frontier unrest not involving the

Klingons. Whether the ships would do any good against the main adversary remained to be seen, although the combat record of the already PB-45 –equipped vessels did not bode well.

This aft quarter view shows the unique propulsive arrangement of the Heston *(NCC-1634) to an advantage. The differing sizes of the PB-29 and PB-21 engines are evident, as is the dorsal vertical support that doubled as torpedo magazine. Portside shuttlebay is in clear view, as is the SAG impulse engine.*

In the end, the contribution of the *Hestons* to the Four Years War was as significant as it was indirect. Arguably the weakest of the battle cruisers, the type nevertheless excelled in the deep space action prompted by the main conflict, and kept it from escalating into a multi-front war. There were inevitable losses, both in and out of the main battlefields. Through forensic analysis, it is suspected that Tholians were responsible for the loss of *USS Farragut* (NCC-1646) in 2240, but the fate of the *Hood* (NCC-1644) remains completely unknown, as she disappeared without trace while in supposedly routine transit through Andesian-controlled territory in 2239. Of the *Richters*, *USS Kirbuk* (NCC-1439) went down fighting at Inverness, *USS Brailovski* (NCC-1445) at Obeka.

Not being tied down to specific combat theaters, and generally dashing this way and that from their assigned patrol areas on the oddest of errands, both the *Richters* and the *Hestons* generally covered more lightyears of deep space than other ship types of this era. They could be tasked with quick surveys and fact-finding missions a lumbering *Ranger* could not and a heavily armed *Proxima* would not perform. Several of these vessels were in fact engaged in cutting edge exploration in the late 2230s, prior to being pressed to use their abilities in missions of military reconnaissance. They were also favored couriers for first contact teams and diplomatic envoys, and sometimes delivered priority military shipments such as the C-bombs used against the Tobaki dimensional portal in 2239, or the bioagents utilized in the infamous attack on the Klingon agricultural worlds in 2241-43.

The ‘frontier hero’ role of the vessels was taken over by a wide range of fast and capable cruisers and heavy frigates in the mid-2240s already, leaving the baseline *Richters* mostly serving as short-leashed if fast-running guard dogs of core systems for their last two decades of operations.

The modern solid state warp engines add to the mass of USS Korolev*, making the twin SAB impulse engines struggle. Significant C^3I facilities were introduced in the 2242 refit, but research gear was also retained, depriving the crew of the accommodation standards of the original configuration. Note the re-registering performed for counterintelligence purposes, a classic feint for the era; registries and names would be more or less randomly assigned for specific missions to hide Starfleet's significant disadvantage in numerical strength.*

Icarus / Ashanti / Apache

Battle cruiser / heavy destroyer
2229-2281 (*Icarus)*
2238-2297 (*Ashanti)*
2241-2266 (*Apache)*

Completed:	70 total: 28 *Icarus* battle cruisers built in 2229-36 22 *Ashanti* battle cruisers built in 2238-42 20 *Apache* heavy destroyers built in 2241-44
Length:	274.1 m
Beam:	155.0 m
Height:	51.9 m (*Icarus* original) 56.9 m (refit 2234, *Ashanti* original, *Apache*) 53.2 m (refit 2259-62)
Mass:	439,000 tons (*Icarus* original) 440,300 tons (refit 2234, *Ashanti* original) 440,600 tons (refit 2259-62) 425,200 tons (*Apache* original) 410,100 tons (*Apache* scout refit)
Officers:	66 (*Icarus*, *Ashanti*) 44 (*Apache*)
Crew:	285 (*Icarus*, *Ashanti* 2229-2259, typical) 270 (*Icarus*, *Ashanti* 2259-2297, typical) 210 (*Apache*)
Cruise speed:	w 4 (PB-27) w 5 (PB-29)
Max. speed:	w 5.9 (PB-27) w 8.5 (PB-29)

Endurance: 4 years

Weapons: *Icarus* original:
4 laser emitters (130 nm / 1.0 GW) in 2 twin banks on dorsal primary hull, port and stbd of bridge
2 laser emitters (130 nm / 1.0 GW) on ventral primary hull, port and stbd of navigational deflector
2 laser emitters (280 nm / 600 MW) on aft ventral secondary hull
2 Type L phased particle cannon (800 GJ / 1.2 TW) on dorsal primary hull
1 Type L phased particle cannon (800 GJ / 1.2 TW) on ventral primary hull
Icarus refit 2234, *Ashanti* original:
4 laser emitters (130 nm / 1.0 GW) in 2 twin banks on dorsal primary hull, port and stbd of bridge
2 laser emitters (130 nm / 1.0 GW) on ventral primary hull, port and stbd of navigational deflector
2 laser emitters (280 nm / 600 MW) on aft ventral secondary hull
2 Type L phased particle cannon (800 GJ / 1.2 TW) on dorsal primary hull
1 Type L phased particle cannon (800 GJ / 1.2 TW) on ventral primary hull
4 fwd medium torpedo tubes w/80 photon torpedoes and 10 probes on dorsal primary hull
Apache:
4 laser emitters (130 nm / 1.0 GW) in 2 twin banks on dorsal primary hull, port and stbd of bridge
2 laser emitters (130 nm / 1.0 GW) on ventral primary hull, port and stbd of navigational deflector
2 laser emitters (280 nm / 600 MW) on aft ventral secondary hull
4 fwd medium torpedo tubes w/80 photon torpedoes on dorsal primary hull (removed in 2254 scout refit)
Refit 2259-62:
4 phaser VII emitters in 2 twin banks on dorsal primary hull, port and stbd of bridge
2 phaser VII emitters on ventral primary hull, port and stbd of navigational deflector
2 phaser VI emitters on aft ventral secondary hull
4 fwd medium torpedo tubes w/80 photon torpedoes on dorsal primary hull
2 fwd medium torpedo tubes w/60 photon torpedoes on secondary hull
Refit 2273:
4 phaser VII emitters in 2 twin banks on dorsal primary hull, port and stbd of bridge
2 phaser VII emitters on ventral primary hull, port and stbd of navigational deflector
2 phaser VI emitters on aft ventral secondary hull
4 fwd medium torpedo tubes w/80 photon torpedoes on dorsal primary hull
2 fwd medium torpedo tubes w/60 photon torpedoes on secondary hull

Shields: 1-layer conformal forcefield
Navigational deflector on secondary hull bow
2 auxiliary navigational deflectors on primary hull bow

Laboratories: 1 GP (*Icarus*, *Ashanti*)
1 GP, 1 planetary sciences, 1 astrophysics (*Icarus* refit)
None (*Apache* original)
1 signals intelligence (*Apache* scout refit)

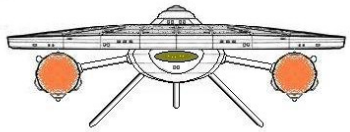
Transporters: 2 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II
All ships brought to Mk III standard in 2250-52

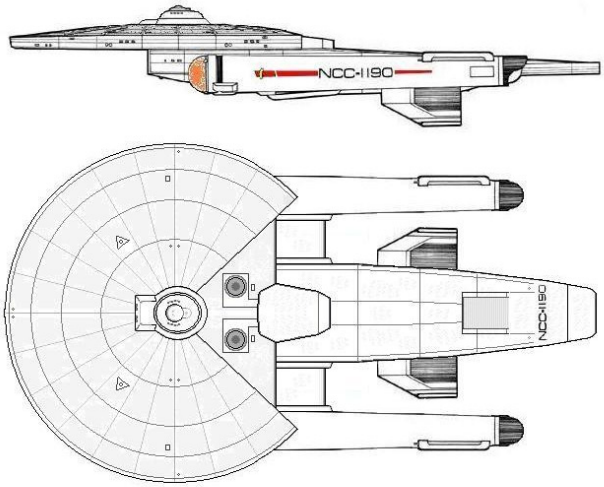
Auxiliaries: 2 atmospheric and 2 spatial shuttlepods, 4 work pods (original standard)
1 scout cutter, 2 work pods (some *Icarus*)
2 light shuttles, 4 work pods (refit 2250-52, not on *Apache*)

Ships of historical interest:

USS Apache (NCC-1178), *USS Ashanti* (NCC-1158), *USS Endeavor* (NCC-1148), *USS Golden Hind* (NCC-1142), *USS Icarus* (NCC-1130), *USS Sanhadja* (NCC-1190/3190)

SOURCES: (D FSCC/Todd Guenther)
(N *Icarus* Kevin Ryan 'Errand of Vengeance', *Ashanti* SotSF & LUG, *Apache* FSCC, FASA)
(H own, Kevin Ryan 'Errand of Vengeance/Fury', David Dvorkin 'Timetrap', SotSF, FASA, LUG)





The first clashes between Klingon forces and Starfleet's newest capital ships were unfortunate events, as they pitted the *Proximas* and *Baton Rouges* against the very best enemy counterparts – modern D-6 warbirds whose firepower was exceptional for the Klingon fleet. The loss of *USS Aquitania* was a tragedy that disquieted the public and the government alike. More significantly, it caused Starfleet analysts to adjust a few parameters in their cost-benefit analysis models, turning them slightly more in favor of quantity as opposed to quality.

Thus, the second battle cruiser to enter Starfleet's new anti-Klingon arsenal abandoned many *Proxima* concepts and instead became a direct outgrowth of *Detroyat* heavy destroyer philosophy, indeed a growth version in the physical sense. Even the engine of choice was the PB-27 familiar from the super-destroyer, vastly more affordable than the goliath nacelles of the *Proxima* class. Rigging was again by horizontal pylons on the single engineering hull, yet with decreased separation and with field guide vanes that had plasma expanders on the outboard surfaces and vents on the trailing edges. The powerplant was a modified *Baton Rouge* unit, calling for a horizontally rather than vertically stretching engineering hull; the cruiser was thus markedly longer yet less beamy or tall than her heavy destroyer forebear.

Similar changes in dimensional relationships improved the affordability and durability of the primary hull. A straight-contoured disk similar to the *Baton Rouge* one in diameter, yet slimmer at just four decks, was installed with a 90 degree sector cut out from astern. An impulse power and propulsion assembly of the standard SAB-A type filled the cutout. The mounting provided less maneuverability than the corresponding *Proxima* installation, as the proximity of the secondary hull reduced thrust vectoring. To compensate, twin IMRF units were installed, ultimately giving the new design superior agility. Internal volume was roughly comparable to the bulkier *Baton Rouges*, and similar armament was installed as well. By now the virtual standard for Fleet lasers, the Lockheed 130/1 was mounted in two twin banks on the dorsal surface and in two single banks on ventral flanks, providing near-perfect spherical coverage. Smaller 200-series units took care of a stern blind cone. Main hitting power came from Type L phased particle guns, in an off-the-shelf dorsal double mount. A torpedo launcher was originally considered as an alternate fit but, much as with the *Detroyats*, a single type of main weapon per class proved enough of an integration and maintenance challenge.

Sensor fit was of the austere *Proxima* standard, not even featuring short range arrays on the primary hull. The single laboratory normally installed provided just 80 m^2 of general purpose analysis, synthesis and simulation space; separate computers were carried for the purpose, as the main computer buses were directly wired to tactical systems and lacking in branches. On the other hand, much of the interior was very generic in layout, accommodating systems and facilities from any number of manufacturers, and hopefully allowing both mass production and effortless upgrades. There were advantages to combat and post-combat repair in this approach as well, even though survivability as such suffered from lack of optimized bracings and isolation arrangements.

While construction of *USS Icarus* (NCC-1130) was the responsibility of Geering affiliate Ethertech's Sol V yards, no less than four design bureaux and 23 constructors were enlisted in the project, refining the design further by paring it down to the lowest common denominator. Production picked up pace in a manner that made the battle cruisers the numerically dominant combat force and the preferred attrition unit – ten vessels were completed by 2232, and proved superior to both the lesser *Detroyats* and the larger *Proximas* in combat economy. A second battle cruiser batch was immediately ordered, and the ten units were completed to satisfaction by 2235.

Technology was speeding past the dependable design, however. By the late 2230s, light cruiser designs with superior weaponry and agility were emerging, and Project Starship was close to becoming reality as well. It was with decided reluctance that the Council agreed to fund the final eight units of the original standard – aptly named, the crews argued, for their tendency to get their wings burned. The Naming Commission could hardly be blamed for the choice, though, as *HMS Icarus* herself had been a splendid example of British shipbuilding and a worthy inclusion in the thematic group that perpetuated the names of Royal Navy warship of historical note.

Yet there was still potential in the sturdily built hulls, and brute force could substitute for finesse, especially when the primary opponent remained the Klingon Empire. The obvious approach was taken, and PB-29B units bolted onto the sides of the final surge of twenty *Icarus* units, known as the *Ashanti* subclass. Armament upgrades were implemented across the battle cruiser fleet, chief among them the installation of a four-tube torpedo launcher, yet engine refits of similar scope remained unaffordable. In practice, the *Ashantis* completely replaced the original *Icarus* force on the front lines, yielding a slight decrease in numbers but an increase in battlefield availability nevertheless; the new engine gave a solid cruise performance of warp five.

The 2240s were a grim chapter in *Icarus* history. At Nozseca, five vessels were rendered unspaceworthy, three beyond repair, all with massive loss of life. At Donatu, three would perish from the *Icarus* group; at Second Arquin, two *Ashantis* would be ambushed with lethal results. By the time of Final Axanar, Starfleet dared not field its battle cruisers unescorted by a more heavily shielded 'proper' cruiser, even if the latter had inferior propulsion. Yet both the *Icaruses* and the *Detroyats* made for excellent frontline destroyers when operated under proper doctrine. Indeed, the 22 *Icarus* units built as attrition replacements were specifically outfitted for the destroyer mission (enabling quicker completion for frontline use) and dubbed the *Apache* class, by far the most powerful of Starfleet destroyers at the time. Unlike the *Detroyats*, they also came to feature proper flotilla command facilities for leading packs of lighter destroyer types.

It was the introduction of these advanced single-engined destroyer classes in the 2240s and 2250s that sent the two-nacellers to mothballs and deprived them of a solid-state coil refit. Yet times of crisis would see reactivation of select examples of the valuable assets, with contemporary phaser modules nonchalantly plugged into laser and phase cannon sockets before deployment. Many an

Icarus still operated in the 2260s, often at their own peril. While combat still claimed victims, the most devastating and public loss was that of *USS Golden Hind* (NCC-1142), which in 2268 misjudged a warp approach and slammed into Devon, blasting a huge crater in the landscape and killing thousands by direct and secondary shockwave and radiation effects. The sluggish downgradient behavior of the PB-27 was officially established as a factor in the incident, and Starfleet had little option but to permanently idle all vessels of this engine standard. Recall orders were issued across the operating theater of the battle cruisers.

Yet when the *Icaruses* began returning from the frontier, they met a world much changed. The intervention of the Organian entities had created the circumstances under which peace could be waged between the UFP and the Klingon Empire, but the combatants had been the ones to forge the actual terms of the peace. Shipbuilding under the Organian Peace Treaty was riddled with limitations, especially concerning the numbers of capital ships constructed. This particular limitation had been expected to work to Starfleet's advantage, offsetting the high output of Klingon dockyards and finally allowing the higher quality of Starfleet vessels to have an impact. However, the 'use it or lose it' nature of the treaty terms also meant that Starfleet needed to cling to every cruiser hull in active service. Funds saved from the recalling of war fleets helped maintain the *Icaruses* in nominal exploration and patrol duty. In practice, this mainly consisted of lowest-level quayside readiness, now under the expedient heavy cruiser designation.

Row upon row of idled destroyers blankets the sky above Genetra III. Three unrefitted and two refitted Icarus *vessels can be spotted in the second-nearest row at camera level, modern pennants decorating their anachronistic PB-27s. The main distinguishing factor is the bridge module, featuring a high rounded sensor dome in the refit and a squat pillbox array in the original. The single-nacellers demonstrate the* modele du jour*, with the lower dome shape. The closest vessel above camera level is an* Apache *converted into a heavy scout as evidenced by her prominent ventral sensor dome; the bridge, hidden from view, has a dome to match.*

Cruiser numbers in general plummeted in the 2270s. The *Icarus* retirements contributed to the temporary reduction in heavy cruiser figures, along with the decommissionings of *Constitution* derivatives for their engine upgrades. The nineteen remaining *Ashantis* were also considered plausible candidates for re-engining, possibly with PB-47, perhaps even with PB-32 units liberated by *Constitution* refits and retirements. However, the mid-70s saw the return of bountiful budgets and a gradual withdrawing from the Organian commitments. Re-engining of the *Ashantis* for deep space never got beyond theoretical studies.

There was plenty for heavy cruisers to do close to home, though. Compared with re-engining, upgunning was almost trivially simple, and a token rearming of *Ashantis* and *Icaruses* was approved in 2273 already. Surplus RIM-13 and 10A phaser banks replaced the older models, mostly of RIN-6 and 9 standards, and modern ordnance was brought aboard for the torpedo launchers. The forces

saw very real Subquadrant Zero patrol duty, bringing their deterrent to bear with almost sedate grace; a number also served on the Klingon border, and contributed to defensive deployments near key starbases.

There was no denying the poor maintainability and slow response times of the aging vessels, though. Retirements continued throughout the following decade, and some of the hulls were put to use as engineering testbeds for the troubled modern battle cruisers in the 2280s. After Khitomer, the last *Ashanti* could finally be broken up in good conscience in 2297.

USS Sanhadja*, originally NCC-1190, gained a new registry in the appropriate 3100 range when she was drafted as a testbed in the* Menahga *heavy destroyer / battle cruiser program. A heavily modified primary hull provided space for items to be tested and instrumentation for the testing, whereas the secondary hull and drive system remained externally virtually unchanged. Retained, too, was the heavy cruiser designation – perhaps aptly for a ship that would see no 'battle' and 'destroy' nothing, despite her massive onboard arsenal.*

Hale

Scout
2229-2250

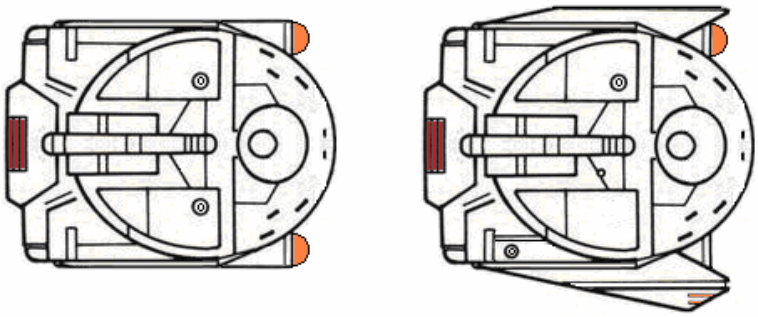
Completed:	130
Length:	120.0 m
Beam:	90.5 m 101.4 m (w/ field guide petals) 120.1 m (w/ field guide petals and lateral ramscoops)
Height:	44.5 m
Mass:	147,000 tons 147,900 tons (w/ field guide petals) 148,600 tons (w/ field guide petals and lateral ramscoops)
Officers:	13
Crew:	52
Cruise speed:	w 4
Max. speed:	w 5.0
Endurance:	1 year
Weapons:	1 laser emitter (130 nm / 650 MW) on fwd ventral primary hull 1-2 plasma cannon (2.0 GW) on dorsal hull (optional) 1-2 plasma cannon (2.0 GW) on ventral hull (optional) 1-2 plasma cannon (0.7 GW) on dorsal hull (optional)
Shields:	1-layer conformal forcefield Navigational deflector on fwd hull
Laboratories:	1 GP, 1 signal processing
Transporters:	None

Auxiliaries: 1 light shuttle or 2-3 shuttlepods

Ships of historical interest:

USS Cassegrain (NCC-I429)

SOURCES: (D SFC, FASA)
(N SFC)
(H SFC, FASA)



The 'scout gap' of the turn of the century was not quite filled by the introduction of the mere forty *Podish* and *Tuverlind* scoutships. Their poor reliability had made further production of the type unlikely. There were downsides of other kind to the massive *Hermes*, a military machine theoretically capable of secondary missions of scientific study. Maneuvering such ungainly hulls in missions of clandestine military or scientific intelligence gathering presented high risks; hauling such bulk around was unwise from the economical point of view as well. Restricting the *Hermes* class to a standoff observation and fleet coordination role was a rational decision that brought out the strengths of the design, yet it dealt a further blow to the scientific scouting force. The small *Lowell* in turn was only eligible for nearspace operations of limited scope.

The 2218 Klingon offensive had left scant leverage for the parties promoting scientific scouting, however. Some half-hearted studies at converting the light *Kovaris* destroyers aside, little progress was made in the 2220s. Finally, after much budgetary wrangling, a new request for proposals was put forth in 2227 to give Starfleet a dedicated scout type adaptable for both scientific and military missions. Requirements included full shuttlecraft operations support capacity, stealth and agility, endurance, warp probe launching ability, high speed and adequate defensive strength, all naturally at a low acquisition cost. Instead of the bulky standard saucers, smaller type-specific hull designs were to be used as the basis of the spaceframe.

It only took two months for all parties involved to agree that no single class could meet the requirements. An optimized procurement plan was formulated for two distinct types. One would aim at stealth, agility and low cost, all of which agreed with a small spaceframe; supercruise and a dash speed comparable to light destroyers were still required of the design. Another would tackle the issues requiring bulk and brawn: the shuttlecraft capability, the high speed engines, the probe launcher. The plan did not deal with the engineering aspects of the two classes, but did assign construction contract numbers and class names for both.

The *Hale* class of Short Range / Proximity Survey scouts was by far the easier of the two to build, of that Cosmadyne Corporation was convinced when it accepted the contract for 50 vessels. A slightly ovoid saucer hull was swiftly designed, 96 meters on the long and 74 on the short axis, and 18 meters and five decks thick. The volume could easily accommodate long duration survey crews in addition to the regular contingent of 65, which already was set to include five mission officers alongside the eight operating the ship. The bridge was almost completely inset into the forward part

of the top deck, with just sensors and a small observation tower protruding. An extendable sensor boom rested atop the aft part of the hull, and could deploy a trailing array for passive gravitic, subspace and EM field measurements.

The Fairey FTL-6 main reactor of the vessel occupied some 6000 m^3 in an armored box below the sensor boom, while propulsive systems were housed outside the saucer hull. The modern PB-23 warp engines, of the dedicated S variant to properly compromise between the high reactor output and the proximity and signature limitations of the warp field, were usually shrouded by protective petals for further improved stealth and safety; a low signature lateral ramscoop could also be fitted in place of the usual domes. At full power, warp 5 could be sustained, although this meant significantly degraded low observability characteristics. The centrally mounted SP-1B impulse engine was hidden behind protective vanes as well, yet would offer great agility and acceleration with the shutters fully opened. A tiny hangarette for one light shuttle had ventral space doors, and featured little in the way of service gear.

Staring down a Catullan scout, USS Steidel *hopes to assert the UFP claim to Iota Virginis. The shuttered impulse engine and the shrouded nacelles are evident from this lower stern angle; hidden is the sole laser emitter, pointed at the Catullan vessel.*

Primary armament consisted of a single relatively heavy laser emitter below the bow. The main weapon was not particularly well positioned for discouraging pursuit and might have been best suited for engaging lightly defended opponents such as transport vessels. The SR/PS mission profile hardly called for offensive operations, though. Moreover, secondary power distributors were somewhat underengineered, and charging the main gun meant reduced power for other tactical systems. Some ships were thus equipped with supplementary plasma cannon in up to six individual berths; extremely few ever carried a full complement. The presence of the weapons was mostly a gesture of concession to the ongoing major military confrontation. Defense Command reassured UESPA and FSA representatives that the vessels would be relinquished for scientific survey duty ‘as soon as the war was over’.

Undeclared and seemingly unresolvable, the conflict dragged on to the 2230s, with no end in sight. Other projects superseded the scout program, and in 2233, Cosmadyne was told to halt construction at 80 units. Fifty more were to be built, but to more affordable general standards emphasizing the support and supply aspects of the survey mission. The new power system assembled from off-the-shelf components chosen for their lower cost actually had a 125 % higher secondary loop output than the original system. The resulting improved tactical response did not secure any further construction contracts, however.

The *Hales* were never to be freed from their military obligations. A withdrawal from frontline operations after Axanar came too late in the life of the class to allow for a second career. In the 2240s, dilithium-regulated annihilation finally emerged as a viable power source, and spelled the end to many open-intermix types. While smallish vessels lacking the room required for an engine upgrade were the first to be retired, the *Hales* also suffered from another type of inherent drawback: namely, their warp engine geometry. Starfleet engineers were at loss to find a way to increase engine output without immersing the entire hull in deadly field gradients. A combined complete engine remounting and weapons upgrade might have saved the scouts, but no funds were forthcoming for such a major effort, as the creation of the *Capella* class to those specifications was the far more cost-effective solution. Some two decades later, the problems associated with the tucked-in nacelle configuration would finally be solved, and the *Garneau* class would closely approximate the *Hale* design, albeit at smaller size and higher performance.

In 2246, the *Hales* were retired en masse. As no compromising photon torpedo or dilithium technology was included in the vessels, most units could be sold to civilian and foreign users, but a handful were kept as liaison and supply vessels for Starfleet use. *USS Cassegrain* (NCC-I429) was in 2249 hijacked by renegade Andorians who set the crew adrift and disappeared to parts unknown with cargo holds full of various weapons components. Within a year, Starfleet had decommissioned the last specimen of *Hale* class from their supply and liaison role. A select few units still performed useful service as training facilities for firefighting and sealing crews until the mid-2270s.

Independence

Medium transport
2229-2290

Completed:	584 total: 100 *Independence* 100 *Freedom* 100 *Equality* 100 *Liberty* 100 *Justice* 14 *Fraternity* 70 *Honor*
Length:	92.0 m
Beam:	58.1 m
Height:	64.3 m
Mass:	194,000 tons (PB-23 –engined, typical) 235,000 tons (PB-35 –engined, typical)
Officers:	3
Crew:	22 (typical *Independence*; numbers vary considerably)
Passengers:	100 (troop transport/evacuation configuration)
Cargo:	24,000 - 32,000 tons
Cruise speed:	w 3 (PB-23 –engined) w 5 (PB-35 –engined)
Max. speed:	w 4.0 (PB-23 –engined) w 6.2 (PB-35 –engined, typical) w 9.0 (*Liberty*, empty)
Endurance:	1.5 years
Weapons:	Normally none

	4 laser emitters (200 nm / 200 MW) on single banks on primary hull bow and flanks (*Justice*, *Honor*, optional)
Shields:	1-layer conformal forcefield 2 navigational deflectors on double pylons flanking fwd keel 2 auxiliary navigational deflectors on pylons on fwd hull (*Liberty*, *Justice*, *Honor*)
Transporters:	1 GP (6-pad), 2 cargo; Mk II (original) 1 GP (2-pad), 2 cargo; Mk II (*Freedom*, *Equality*) 1 GP (2-pad), 2 cargo; Mk III (*Liberty*, *Justice*, *Fraternity*, *Honor*; some *Freedom* refitted in 2249)
Auxiliaries:	Four work pods; space for 2 cargo shuttles, none normally carried 2 medium shuttles often carried on special mission vessels

Ships of historical interest:

USS Huron (NCC-F1913)

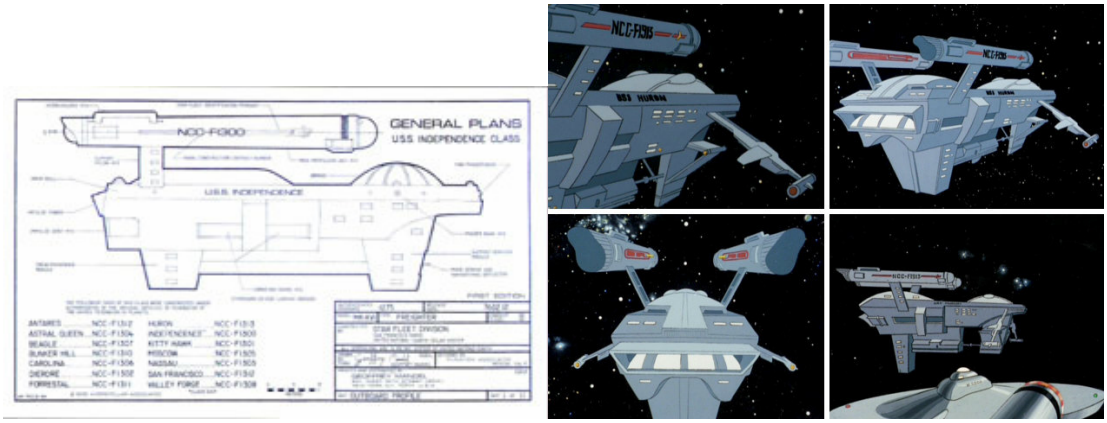
SOURCES:	D TAS (N ICP/Geoffrey Mandel, FASA) (H FRS, ICP, FASA own)

The *Sherman* class of transports was soon joined by an even more ambitious design. This slightly smaller cargo ship, named the *Independence* class, featured improved warp engines, a shuttlebay and high performance impulse engines. While bulk cargo capacity was decreased from the *Sherman* design, mission versatility was increased, and the ships could perform a wide variety of courier, passenger transport or replenishment missions at a moment's notice. Part of the versatility resulted from the fact that the ships were designed to be operated by living crew instead of simple automation – despite advances in AI development, Starfleet was very hesitant to give computers extensive control over missions requiring quick adaptation and passing of judgment.

The central hull was a flat, rectangular structure housing crew quarters and passenger space as well as the usual personnel support amenities and computing systems. To cater for a wide range of missions, the transport sprouted appendages dedicated to the various mission aspects; the somewhat inelegant end result nevertheless was highly functional. At the bow, the control dome sat atop the hull, while a keel-like structure extended downwards and housed the main docking adapter for cargo handling, complete with elevator shafts, pumps and valves for every conceivable need. In many variants, two navigational deflector pods were later added for extra protection; they dangled at the ends of narrow 'whiskers' angled 40 degrees downward from the central hull. These booms also mounted additional tractor beam emitters for cargo handling, duplicating functions already found in the keel structure itself and increasing loading/offloading speed and flexibility.

Aft of this bow keel, the central hull ventral surface curved downwards until the hull reached the height of five decks. The forward half of these featured crew amenities and passenger space. The aft part held the complete propulsive package, including main reactors, a wide, four-nozzle Scarbak KKR impulse engine, and fuel tanks for each drive system. The warp coils were mounted on straight pylons angling out laterally from the hull. The engines were PB-23B units – slight modifications of the original *Master* tug engines, their simplified plasma purge system now complete with a military-standard diffuser endcap that gave them a few meters of extra length.

Beneath the central hull were the actual cargo spaces, taking the form of a long keel box whose dimensions varied from model to model. Some variants also incorporated a tower extending down from the main cargo compartment as far as the lower warp field lobe went; this structure was usually dedicated to passenger accommodation.



A side-by-side comparison of an original F1300 series Independence *and a refined F1900 series* Honor *is only possible through photomanipulation, as the earliest vessels were retired and scrapped long before the fielding of the final variant. Note the increased size of the aft hull, as well as the refinements in shuttle handling arrangements and bridge dome. The addition of deflector pods on the* Honor *is a less crucial alteration, as is the exact nature of the cargo holds bolted underneath; the PB-23 and PB-35 engines appear remarkably similar externally as well, despite differences in positioning and pylon arrangement..*

Above the stern was a shuttle hangar, with dorsal doors atop an access shaft extending to the ventral holds so that shuttle-sized items could be brought directly onboard. Facilities for supporting the visiting craft were rudimentary; workshops had to be installed at the expense of cargo space and thus typically were omitted.

The ships were originally flown by 25 crew. Duotronic upgrades later brought crew requirements down to as few as nine, at least on short, one- or two-shift trips. Also, several successor subclasses with arousing and alliterative naming schemes were fielded after the original 100 *Independences* had been completed. The *Freedom* and *Equality* ships were growth versions of the basic design, with improved engine systems; their central hull sterns bulged out and curved down to house the augmentations. The shuttlebay was remodeled for better onboard accommodation of visiting craft, now that access from the bay to the cargo holds had to be rearranged anyway to clear the expanded engineering spaces. Few of these ships received the extra deflector pods, thanks to greater power available for the main deflector array. The forward ventral tower was also slimmed down considerably, no longer housing refrigerated goods holds or fabricators.

The *Liberty* ships (not to be confused with the contemporary Liberty ship concept where components of former fighting vessels were combined into contingency transports) were the first to introduce PB-35 solid-state engines, and could theoretically reach warp 9 when lightly loaded. They were intended for rapid deployment of supplies to faraway battlefronts, and mostly spent their time waiting idly at starbases. Special crews had to be trained to operate their quirky powerplants, whose high performance ill befitted the light spaceframe. Not even the best Tellarite engineers could guarantee safe operations, however, and two vessels were lost to powerplant explosions at high speed in the late 2240s.

The *Justice* series featured minimal self-defense armament and special secure vaults for precious cargo, and omitted much of the bulk cargo spaces, as well as the extended ventral structure for passenger accommodation; these vessels never mounted the podded deflectors, but received improved sensors in twin housings atop the bridge dome. The *Fraternity* class again married the *Freedom/Equality* standard with PB-35 propulsion. It was terminated in mid-production in favor of

a final 70 examples of *Honor*, a repeat of *Justice* but with the passenger tower and deflector pods restored.

Registration followed the practice of giving manned freighters a NCC number preceded by letter F. The vast majority of these ships were operated by Starfleet Merchant Marine, hauling priority cargo where no civilian organization dared venture. The *Independence* variants and *Shermans* now seriously contested civilian freighters in numbers, and the trend seemed to be toward an ever-increasing portion of frontier cargo traffic being handled by Starfleet vessels. Thus, the dedicated freighter registry scheme was a logical choice for the Starfleet of that time, even if a handful of the ships always served as dedicated Fleet transports with standard military crews.

A medium convoy of five Independences*, two* Ptolemies *and an escorting* Loknar *frigate brave their way through Orion-threatened space during a brief period of increased hostilities in 2268. Transports were seldom convoyed in normal operations in this era, although wartime contingency plans officially called for an escort of light cruisers or frigates for ten-ship formations of cargo vessels. Civilian freighters began a series of exercises with Starfleet in the mid-2260s in preparation for such operations, but the exercises were gradually discontinued after Organian peace. The last time such tactics had actually been used was in the 2220s, to counter Klingon border raids; since then, Starfleet had been seriously lacking in escort capacity, until the mid-50s and the introduction of numerous frigate and escort classes. Note the differences in* Independence *silhouettes, readily distinguishing the* Equality*,* Liberty *and* Honor *subclass vessels in the convoy.*

Even though the ships rarely operated near Klingon space, it was impossible to direct all cargo traffic away from the zones of influence of the Romulans, Orions or other threat forces surrounding the Federation space. No Romulan attacks on cargo runs were recorded prior to 2268, however. Still, Landorian and Orion pirates were notorious for harassing UFP light and medium transports. Starfleet could not hope to arrange an escort for every transport, and patrol frigates often arrived too late to apprehend the criminals, much less save the ship from pillaging or (illustrating the brutal modus operandi of the new, secrecy-conscious pirate breed) often also from killing of crew and destruction of vessel. The first time an Orion ship was caught and prosecuted for piracy was in 2269, when *USS Enterprise* hunted down and forced to surrender the murderers of four of the crew of the *Honor* subclass transport *USS Huron* (NCC-F1913). After the introduction of the *Daran* family of frigates in the late 2270s, piracy was drastically curtailed, and the series of treaties with Orion groups in the early 24th century finally ensured safe passage for transports moving inside the Federation space near Rigel.

The *Independence* class was retired from Starfleet strength with the introduction of *Sydney* and *Laweya* class modern transports, which filled all the traditional niches of the *Independence* design while adding some fields of competence of their own. Accompanying the *Shermans*, some *Independences* were turned into cargo drones in the 2260s and 2270s. With remodeled holds, they stepped in for many a hazardously old carrier drone, faithfully moving semi-refined ore from

automated or semi-automated mining platforms in deep space asteroid clusters, Oort clouds or uninhabited systems to end refineries in inhabited systems, until their much-abused warp drives finally gave up in the 2320s.

Texas refit

Light cruiser
2230-2276 (*Navigator*)
2243-2267 (*Mojave*)
2258-2274 (*Texas (II)*)

Completed:	95 total: 20 *Navigator* light cruisers refitted from *Texas* and 23 built in 2230-36 1 *Mojave* light cruisers refitted from *Texas* and 23 built in 2243-46 26 *Texas (II)* light cruisers refitted from *Texas* in 2258-60 8 *Negev* minesweepers refitted from *Texas* in 2262 2 *Duquesne* drone cruisers refitted from *Mojave* in 2283
Length:	189.9 m (*Navigator*) 203.1 m
Beam:	85.3 m
Height:	50.1 m (*Navigator*) 47.2 m
Mass:	212,025 tons (*Navigator*) 379,590 tons (*Mojave*) 376,485 tons (*Texas (II)*) 375,825 tons (*Negev*) 378,200 tons (*Duquesne*)
Officers:	21 (*Navigator*) 24 (*Mojave*, *Duquesne*) 22 (*Texas (II)*) 11 (*Negev*)
Crew:	85 (*Navigator*) 94 (*Mojave*) 88 (*Texas (II)*) 67 (*Negev*) 81 (*Duquesne*)
Cruise speed:	w 4 (*Navigator*) w 6 (*Mojave*, *Duquesne*) w 7 (*Texas (II)*, *Negev*)
Max. speed:	w 5.7 (*Navigator*) w 7.5 (*Mojave*, *Duquesne*) w 9.1 (*Texas (II)*) w 7.1 (*Negev*)
Endurance:	3 years
Weapons:	*Navigator*, *Mojave*: 2 laser emitters (130 nm / 1.0 GW) on port/stbd primary hull (not in NCC-956) 2 laser emitters (130 nm / 800 MW) on fwd primary hull (290+ nm in NCC-956) 2 laser emitters (130 nm / 800 MW) on aft secondary hull (290+ nm in NCC-956) 1 phased particle cannon (classified performance, in NCC-956 only) 2 fwd torpedo tubes w/ 60 fusion or photonic torpedoes on ventral primary hull (1 tube in NCC-956, classified other ordnance also carried; 1 tube in NCC-962, 966, 967, 974) *Mojave* refit 2259-60: 2 phaser VII emitters on port/stbd primary hull (not in NCC-995, 996) 2 phaser VI emitters on fwd primary hull 2 phaser VI emitters on aft secondary hull 1 fwd torpedo tube w/ 50 photon torpedoes on ventral primary hull *Texas (II)*: 4 phaser VII emitters in twin banks on port/stbd primary hull 2 phaser VI emitters in twin bank on fwd dorsal primary hull 2 phaser VI emitters on aft secondary hull

2 fwd torpedo tubes w/ 80 photon torpedoes on primary hull bow
Negev, Duquesne:
2 phaser VI emitters on fwd primary hull
2 phaser VI emitters on aft secondary hull

Shields: 1-layer conformal forcefield
2 navigational deflectors on lateral mounts on fwd hull

Laboratories: 2 GP, 1 planetary sciences, 1 life sciences, 1 astrophysics, 1 linguistics/signal processing (not in *Negev*)

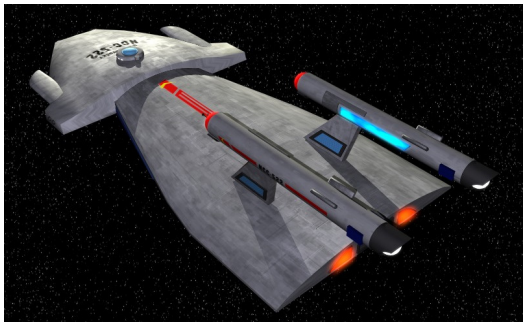
Transporters: 1 GP (6-pad), 1 emergency evacuation (22-pad), 2 cargo; Mk II (*Navigator*)
1 GP (6-pad), 2 emergency evacuation (22-pad), 3 cargo; Mk II (original *Mojave*)
1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk III (*Mojave* refit 2259-60)
1 GP (6-pad), 1 emergency evacuation unit (22-pad), 2 cargo; Mk III (*Texas (II)*, *Negev*)

Auxiliaries: 4 light shuttles (standard *Navigator*, *Mojave*)
2 light shuttles (*Texas (II)*)
4 assault shuttles; classified drones assumed carried (NCC-956)
1 light shuttle, 14 warp combat drones, 42 bombardment drones (*Duquesne*)
2 light shuttles, 18 minesweeping drones (*Negev*)

Ships of historical interest:

USS Sutherland (NCC-997)

SOURCES: (D SFB / Steve Cole & Richard Kerr)
(N SFB, own)
(H SFB, SFC, Voyda McIntyre)



The Navigator *family of upgraded light cruisers retained warp engines close in dimensions to the original PB-7. Superior performance still came at physical as well as financial cost; transition to PB-35 added so much coil weight that the planetary landing and takeoff capabilities were jeopardized.*

Starfleet's three early 23rd century destroyer programs, *Kovaris*, *Saladin* and *Detroyat*, gave the organization a fighting chance against the Klingon menace. The *Baton Rouge* and *Proxima* cruisers offered promise of actual qualitative high ground. New sensors, improved antimatter warheads, modern shields and transporters and the possible triumphant return of phased particle beam technology were all promoted as decisive elements in managing the deepening crisis. However, despite the optimistic public face, Starfleet understood very well that its greatest weakness lay in its low numbers. The desperation of the situation is best reflected in the 2228 decision to start refitting old *Texas* class light cruisers for frontline duty.

Dating back to 2175, the *Texas* cruisers were inadequately shielded, and had a miserable top speed of warp 4.13, the second decimal being included in official records out of pity. Most were relegated to insystem, sublight patrol duty by the 2220s. Yet thanks to this absence from the front lines, all fifty were still structurally sound and, at 72,000 tons hull mass and 190 m length, offered greater potential for refitting than the newer 50,000 ton, 150 m *Caracals*. The first vessel to be pulled in for the sorely needed updating was *USS Rub al Khali* (NCC-926), the former guardian of Vega.

The first order of business was to boost power generation for the needs of the systems soon to be installed. The Fairey FTL-3 reactor upgrade offered more power than the *Caracal* powerplants, at lower total mass than the original FTL-1 low intermix ratio assembly. Channeling the power to PB-35 engines, fully modern solid-state units of increased field strength (official redline at 1.18 kc, allowing theoretical speeds up to wf 9.5 with sufficient power generation and thereby offering significant growth potential), gave the *Rub al Khali* a supercruise capability and a dash speed of warp 5.7. Beam weapons on the primary hull were brought to newer standard yet not altered in placement. Instead, several modern targeting system elements were added at the bow, and long range sensors in the lateral deflector shrouds were significantly improved and increased in number and variety.

Shield generator swap from DS5 to SE standard brought protection to tactically acceptable levels – yet since the existing shield grid served the new generators so well, the engineers saw no need to alter the hull plating. As the polarizer rotors were also retained initially, the *Rub al Khali* enjoyed two-layer protection. The practical increase in combat persistence in case the main shields failed would have been five to eight seconds; the corresponding psychological value was immeasurable.

Changes to the interior included subdivision of the laboratory spaces to six discrete areas, upgrading of the main Labin-Escher optronic computer core to the Mk 3 standard, overhauling of all secondary and tertiary power grid elements, and a partial aesthetic-functional revamp of corridor and cabin spaces closer to 23rd century benchmarks. The ancient VR interfaces were finally replaced by retina projection displays, and plasma screens by lightfilms. At the relaunch of the *Rub al Khali* in December 2230, representatives of the media could be given an unashamed and uncensored tour of the vessel.

Conversion of nineteen more units followed. The ships swiftly accumulated an operational record of successful frontline patrol, escort and interdiction missions, alone or with formations of destroyers. Even more to the public's liking during the uncertain thirties were survey missions securing new resources for the Federation. With five hundred planets and sixty-nine member societies already under its wing, the alliance sorely needed every possible benefit the federal government could offer. The members themselves began to have different views of their needs, and mere promise of military protection no longer was sufficient to hold the Federation together – especially since the effectiveness of that protection had now been so visibly challenged by the Klingon Empire.

Due to the surprisingly good performance yet high costs of the *Rub al Khali* refit, a further twenty-three units were ordered in 2233 as newbuilds. *USS Navigator* (NCC-950) spearheaded the batch in 2236, and donated her name to the entire subclass soon thereafter. The naming scheme now moved away from the wastelands and deserts of Earth, to more esoteric directions. The mission class designation of four specially equipped ships was also adjusted, to 'light survey cruiser', even though the upgraded design was far above an auxiliary cruiser in capabilities. Of these, *USS Voyager* (NCC-974) was the first to be completed, converted from the much-abused *USS Alaska* by introducing larger holds, better-equipped laboratories and more versatile sensor suites and by removing one torpedo tube. She thus became the 'sub-subclass' namesake, with the other conversion *Viking* (NCC-962) and the newbuilds *Deerslayer* (NCC-963) and *Orleans* (NCC-966) following soon thereafter.

A special operations support vessel or 'commando cruiser' was also introduced, in the form of *USS Eagle* (NCC-956). The vessel carried warp-to-warp transporters, assault shuttles, atmospheric-tuned lasers and a single stun-type phase cannon, and had several low observability features and covert

surveillance capabilities that still remain classified. She was also reputedly capable of tactically meaningful planetfall and takeoff, unlike her clumsier sisters for whom the latter feat involved considerable time and anguish. A supposed decommissioning in 2248 and the subsequent transfer of the name to a *Constitution* heavy cruiser were but counterintelligence ruses; the actual retirement date of this vessel is unknown, as is the extent of upgrades performed on her. Her known service record includes Operation Grey Ghost, Starfleet's 2276 adventurist Romulan expedition, which also became the last hurrah for half a dozen other *Navigators* from the border fleets.

* * *

A further thirty *Texas* hulls still remained unconverted and, for the time being, inactive. Questions and suggestions regarding the status of the vessels were seemingly ignored by Starfleet. In reality, intense planning was underway for converting the light cruisers for dilithium power. In 2241, such plans could finally be made public, and *USS Mojave* (NCC-927) was the first vessel to receive the FWB dilithium reactor and matching PB-45B solid-state engines. The mass penalty was worth paying: warp six cruising and warp 7.5 dash speed brought the light cruiser on par with Starfleet's most modern types. The conversion process was found to be especially awkward and costly, however, and the funding for a total of thirty refits was redirected at 23 newbuilds instead. Although this number exactly avoided overlap of registry numbers with the *Horizon* class, Starfleet officially quoted less frivorous budgetary and tactical concerns for the procurement decision. Yet a certain degree of arbitrariness was involved when, for a change, the name of the converted ship was chosen for the subclass.

Few system upgrades were performed in the refit or introduced for the newbuilds, and few frontline duties were assigned in the conflict of 2246-2250 as a consequence. Substitution of phaser armament in place of the laser cannon in 2259-60 required a host of modifications and upgrades, however: duotronic computers and new targeting scanners, reinforced second stage plasma conduits and reconfigured power distribution systems were introduced, at a cost almost as high as that of the original dilithium refit. The design still stayed in budgetary favor in the post-Axanar decade of relative peace, thanks to its inherent exploration prowess.

The greatest hour of the *Mojave* class coincided with the return of the Klingon menace, yet did not involve combat with Klingon adversaries. Throughout the early 2260s, these vessels were tasked with what the politicians back on Earth fondly called the best crusade: an intense hunt for Orion pirates and slave traders. While most of Starfleet was tied up with the increasing tension on the Klingon border, the outdated second-line combatants did their best and beyond in executing the new active anti-piracy policy. Virtually every light cruiser in the force got to participate in searches, arrests and sometimes in heated battles with pirate forces. Most engagements took place in deep space in the Rigel sectors, pitting single light cruisers against often grossly superior vessels. This in turn required superior command skills from the *Mojave* captains.

Deep space duty quickly wore down the engines, reducing cruise and top speeds to warp 5 and 'at the captain's discretion', respectively. Active operations everywhere were discontinued soon after the Klingon cease-fire of 2267. As the 2270s approached, and the Organian peace appeared to hold for the time being, the light cruiser force was allowed to dwindle rapidly. The surviving *Navigators*, definitely no longer representing 'sensitive technology', were generally sold abroad to allies of secondary import, but most of the *Mojave* units were floated directly to dismantling yards. The colorful history of the latter subclass was not completely over yet, though. The *Duquesne* and the *Pacific*, having survived the pirate hunt virtually unscatched, were reactivated and converted to

drone control platforms in the 2280s. The *Mojave* herself became the sole museum specimen for the entire *Texas* family in 2277, refurbished for the role after a decade of bitter preservation battles. The *Sutherland*, destroyed in the Ghioghe crisis, is immortalized in a different way, being remembered forever as the first independent command of the legendary Starfleet hero James T. Kirk.

* * *

The final major upgrade performed on the light cruisers was the conversion of 26 of the remaining original standard vessels to phaser-armed, PB-45E-engined dilithium cruisers in 2258-60. The resulting *Texas (II)* subclass would score two important victories. The first, in which the titular vessel defeated a Klingon D6 cruiser at Iota Eridani in early 2260, made possible the second, in which the subclass triumphed budgetarily over *Amchitka/Kearsarge* procurement. The more durable coils of the E model engine admittedly provided a slight speed edge over the original *Kearsarge*. Yet in terms of overall performance, the *Texas* offspring remained humble vessels, only useful in second- or third-line duties. It was only through lesser structural fatigue that the *Texas (II)* units managed to outlast their elder sisters, and even then only by less than a decade.

A typical specimen of Texas (II)*, the* Carolina *demonstrates all the key elements of the final refit in this dorsal view, while hiding the anachronisms and incidental modifications. The massive PB-45 engines are out of structural necessity mounted on shorter pylons of greater chord, and the entire top of the secondary hull is reinforced and integrated tightly to the bow section. This in turn carries new deflector cylinders and modern phaser banks, with the heavy units still on the lateral protrusions but the bow weapons moved onto a dorsal twin bank. The ventral shuttlebay is gone, displaced by the needs of the new main reactor; a hangarette now opens directly aft from between the impulse engines. The ventral sensor and deflector pod remains unaltered.*

Behind even *Texas (II)* in prestige were the unrefitted units. Eight were brought out of mothballs in 2262 and converted to *Negev* minesweepers; although PB-45E propulsion was retrofitted for commonality reasons, maximum performance was limited to warp 7.0 due to neglecting of relevant SIF upgrades and the desire to minimize power signature without investing in advanced masking technologies. Six more might have been turned into assault transports if not for Organia, yet others into escorts if not for the much cheaper *Remora* class. The brief tightening of the budgetary screw in 2287 was required before Starfleet finally agreed to scrap all remaining *Texas* spaceframes. The *Duquesnes* were retired in 2295. The *Negevs* held on the longest, and were used for mopping up the *Tomed* disaster zone in 2311 before deactivation.

Amchitka / Kearsarge

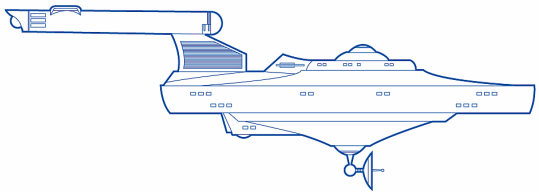
Light cruiser
2230-2269 (*Amchitka*)
2231-2287 (*Kearsarge*)

Completed:	51 total: 10 *Amchitka* light cruisers 40 *Kearsarge* light cruisers 1 *Wotan* interdiction cruiser
Length:	197.2 m (*Amchitka*, *Wotan*) 211.8 m (*Kearsarge*)
Beam:	122.0 m
Height:	54.9 m (*Amchitka*, *Wotan*) 47.2 m (*Kearsarge*)
Mass:	320,200 tons (*Amchitka*) 312,500 tons (*Wotan*) 441,100 tons (*Kearsarge*)
Officers:	31 (*Amchitka*,*Kearsarge* original) 16 (*Wotan*) 29 (*Amchitka*,*Kearsarge* refit 2251)
Crew:	272 (*Amchitka*,*Kearsarge* original) 133 (*Wotan*) 261 (*Amchitka*,*Kearsarge* refit 2251)
Cruise speed:	w 4 (*Amchitka*, *Wotan*) w 5 (*Kearsarge*)
Max. speed:	w 6.9 (*Amchitka*, *Wotan*) w 8.5 (*Kearsarge*)
Endurance:	3 years
Weapons:	*Amchitka* standard weapons fit 2230-51: 3 laser emitters (290 nm / 1.6 GW), port/stbd of bridge and fwd of ventral sensor array 1 Type L phased particle cannon (800 GJ / 1.2 TW) on ventral primary hull (NCC-1310-1315) 2 mine tubes w/ fusion mines on ventral primary hull (NCC-1316-1317) 2 medium fwd torpedo tubes w/ 80 torps on dorsal primary hull *Amchitka* standard weapons fit 2251-2269: 3 phaser VII emitters, port/stbd of bridge and fwd of ventral sensor array 2 medium fwd torpedo tubes w/ 70 torps on ventral primary hull *Wotan*: 3 phaser VII emitters, port/stbd of bridge and fwd of ventral sensor array 1 heavy fwd torpedo tube w/ 28 torps on fwd primary hull *Kearsarge* standard weapons fit 2231-52: 3 laser emitters (290 nm / 1.6 GW), port/stbd of bridge and fwd of ventral sensor array 2 Type L phased particle cannon (800 GJ / 1.2 TW), port/stbd of bridge 4 medium fwd torpedo tubes w/ 100 torps on dorsal primary hull *Amchitka* standard weapons fit 2252-2269: 3 phaser VII emitters, port/stbd of bridge and fwd of ventral sensor array 4 medium fwd torpedo tubes w/ 100 torps on dorsal primary hull *Kearsarge* standard weapons fit 2252-2287: 6 phaser VII emitters in twin banks port/stbd of bridge and fwd of ventral sensor array 2 phaser V emitters port/stbd of bridge 4 medium fwd torpedo tubes w/ 100 torps on dorsal primary hull
Shields:	1-layer conformal forcefield Navigational deflector below primary hull (*Amchitka*, *Wotan*) Navigational deflector on fwd primary hull (*Kearsarge*)
Laboratories:	1 GP, 1 planetary sciences
Transporters:	1 GP (6-pad), 2 emergency evacuation (22-pad); Mk II (*Amchitka*) 2 GP (6-pad), 2 emergency evacuation (22-pad); Mk II (*Kearsarge*, NCC-1312, 1314) 1 GP (6-pad), 2 emergency evacuation (22-pad); Mk III (*Amchitka* refit 2251, *Wotan*) 2 GP (6-pad), 2 emergency evacuation (22-pad); Mk III (*Kearsarge* refit 2252)
Auxiliaries:	2 light shuttles, 4 work pods; either 2 shuttlepods or 4 heavy spacesuits also carried (*Amchitka*) 2 shuttlepods, 4 work pods (*Kearsarge*) 2 work pods (*Wotan*)

Ships of historical interest:

USS Amchitka (NCC-1310), *USS Kearsarge* (NCC-1500), *USS Wotan* (NX-1390)

SOURCES: (D SFB)
(N *Amchitka* SFProt/SotSF, *Kearsarge* SFB, *Wotan* GEC and own)
(H SFB, own)



[redacted]

In February 2229, a crisis meeting was held at Starfleet R&D's Tokyo headquarters. Participating were admirals from SF Operations, top-clearance researchers from various departments, and representatives of the Chiokis Corporation. The latter had unpleasant news to deliver: due to problems encountered in structural integration of modern engines to *Horizon* class spaceframes, work on Project Starship would be delayed by at least five more years, moving the projected delivery date to 2239 or later. The frustrated Starfleet could do nothing to hasten the process. It was entirely dependent on the ability of Chiokis to deliver the spaceframe for the first Starship, since no other corporation possessed the technological expertise, nor could outside elements be brought into the highly classified project at this late date. While Chiokis could promise to deliver the first manned full-scale testbed for the starship drive system by 2230, this machine would be no closer to actual operational fighting vessel status than the heretofore built unmanned and subscale prototypes had been.

Yet Starfleet desperately needed new rapid-response cruisers. It had counted on getting the first Starships by 2225 at the very latest, and thus gaining a platform capable of simultaneous heavy laser, phased particle cannon and warp torpedo operations. What it really had in the beginning of the thirties were torpedo- and laser-equipped *Saladin* and *Detroyat* destroyers plus the first few *Icarus* cruisers; laser- and particle cannon -toting *Baton Rouge* heavy cruisers; and a host of older designs severely lacking in speed and firepower. While mixed fleets of these vessels could successfully combat Klingon forces, no single ship yet possessed the trident of weapons vital to success. Thus, when calculating the number of vessels available for defending UFP planets, the admirals had to divide the true numbers by two or three. Since Starfleet already possessed far fewer ships than the Klingon Empire, this state of affairs was simply unacceptable.

Two short term solutions existed: refit the *Baton Rouges* with multi-tube, forced-intermix warp torpedo armament, or field a new cruiser class. Naturally, Starfleet would have preferred not having to choose at all. But relentless Klingon pressure on the borders was threatening Federation integrity and throttling down its industrial expansion. The unity of the Romulan War era was eroding fast, and some in Starfleet even expressed irrational anger at Andor for the failure of Chiokis to deliver on all its promises. Adding to the troubles, a superior type of total conversion powerplant utilizing dilithium focusing finally emerged in the 2230s – but instead of being the salvation of Starfleet, it rather perversely slowed down the efforts to upgrade the *Baton Rouge* or complete Project Starship, as the new powerplant absolutely had to be included in the design of these future combatants. A stopgap for a stopgap would have to be fielded to buy time for the inclusion, without the dilithium reactor but with a maximal number of other Project Starship innovations. Thus was born the final in a series of light cruisers that nobody really wanted but everybody desperately needed, an ugly outgrowth of the *Ranger* modernization family tree.

Chiokis' providing of six initial cruisers at greatly reduced cost and licensing out the production of a further six to Salazaar Fleet Builders was considered a sufficient penance by Starfleet. Perhaps better classified as heavy destroyers than light cruisers, these vessels still filled the cruiser boots

better than the *Texas* refits did. They featured a variant of the *Ranger* refit or *Jidai* saucers, built to increased thickness (12 m, 4 full diameter decks) and diameter (122 m) by mounting the upper and lower main structural frames farther apart on redesigned outer stringers. The ventral bulge still had the telltale conical shape, setting the design well apart from the flat Geering hulls of the old heavy cruiser and frigate series. Mated to the aft rim was a slightly protruding engineering facility, and on canted pylons above it, two 90,000 ton nacelles of PB-35 type. These engines, whilst successful in transport applications and in the recent modernization of the *Texas* class, could at best be considered scale models of true cruiser engines. If not for continuing production bottlenecks, Chiokis would have preferred to install a single PB-30 series nacelle instead, and never mind the reduced throughput for lack of dilithium power. Still, the company's experience in coercing extra performance out of the smaller engine type for high speed special transports proved invaluable in making the light cruiser perform as desired with minimal R&D expenses and effort.

While the vessels seemingly shared many features with the delayed Project Starship, they were in fact much simpler machines. The total conversion powerplant was sufficient for giving the ships a maximum warp speed superior to that of the most modern destroyers, but the fire control sensors were directly lifted from the *Saladins*, and the navigational deflector and sensor array was little modified from the *Baton Rouge* one (although outriggered on a slimmer *Saladin*-style ventral mast). Nothing fancy was attempted regarding cruise performance or maneuverability. What sufficed was getting either one 'Adasak' 1.2 TW phase cannon or mine rack, one 'Vas-Alan' twin-tube torpedo launcher, plus a full battery of heavy warp-accelerated lasers to the battlefield at speeds comparable to those of the destroyer fleet. Mounting the torpedo launcher on Deck 3 of the saucer, and the particle beam weapon on Deck 9, left enough space for 80 torpedo reloads, a crew of 203, and one ultramodern Mk II warp-to-warp transporter platform. The Salazaar variant omitted the phase cannon and instead mounted the 'Kshat' minelaying system.

The NCCs of the ships built to the *Amchitka* specs fell after the light cruisers of *Jidai* class, beginning with NCC-1310. After delivery of the fourth Salazaar *Amchitka* (*USS Shumagin*, NCC-1319), Starfleet reneged on further procurement, ostensibly to give Chiokis time to finish the first Starships. Andorian displeasure was made public – yet was nothing compared to the outrage when in 2230 it was revealed that Starfleet would order no less that forty ships of *Amchitka* type from Terran and Martian yards.

It was to great interstellar relief that Star Fleet Division in early 2231 responded that it lacked the capacity to produce all the light cruisers contracted for. In a largely symbolic gesture, Salazaar obtained two keels of an eventual 40, and cooler sentiments prevailed. Economically far more significant to the company was the largely indigenous *Loknar* frigate program, utilizing Project Starship technologies and essentially outdating the controversial light cruisers before a single one had been launched – albeit with the same risks of possibly being stillborn as Project Starship carried. It was now Star Fleet Division's turn to act out of spite, proceeding with its *Amchitka*-based program against better strategic-logistic judgement. In any case, *USS Kearsarge* (NCC-1500, one of the last registry 'centuries' to be initiated) was able to sail off SFD's Titan yards in April 2231 unhindered by mass protests of the kind that Andorian workers had previously staged.

This bow shot of USS Assawari *features the pre-refit muzzles of the four torpedo tubes and the turrets of the dorsal laser and phase cannon to an advantage. The 2252 refit would introduce a more prominent cowling for the enlarged torpedo system, and retractable mounts for the twin main and single secondary phasers. In practice, light cruiser captains would often choose to operate with the weapons turrets deployed, for the intimidation value more than for reaction speed reasons.*

The distinguishing features of the *Kearsarge* class were a conformal navigational deflector system, a quadruple array of torpedo tubes and a pair of PB-45 nacelles. While the former two represented only minor improvements over *Amchitka* standard, the engine swap gave the *Kearsarges* a cruise speed of warp 5 and a practical redline at warp 8.5, worlds above *Amchitka* performance. More importantly, the figures tallied with those projected for the *Loknar* class, giving SFD reason for smugness: a ship of roughly equal hull mass (some 140,000 tons vs. the 110,000 – 145,000 tons of *Loknars*) was moving just as swiftly with far more compact engines (150,000 tons per nacelle vs. the 250,000 tons of full PB-31 units). This of course ignored things such as fuel economy or range, but SFD had a point in saying that those were actually superfluous in the defensive mission profile chosen by the Andorians. The missions of the *Kearsarges* in turn consisted of classic 'secondary fleet action', raiding and convoy escort all across the Starfleet theater of operations. In comparison, the ten *Amchitkas* suffered from propulsive limitations, and were relegated to destroyer leader roles, providing cruiser-type sensor and computing capabilities to flotillas of low-performing destroyer types.

Yet after 2246, it seemed that the Andorians would get the last laugh. In the post-Axanar fleet, a very narrow niche existed for the light cruisers. Starfleet had decided to designate the *Surya* and *Miranda* classes of starships 'heavy frigates' instead of light cruisers, and was utilizing them in deep space operations neither the *Amchitkas* nor the *Kearsarges* were capable of – not with their small auxiliary craft contingents and humble research facilities. All that was left were second-line scouting and commerce protection tasks in relatively secure regions of space, training duty, and assistance to destroyer operations. In all these roles, greater affordability was being offered by the modernized *Texas* units, of which there seemed to be an endless supply. Understandably, Starfleet

did not want to waste effort in upgrading the *Kearsarges*; as for *Amchitka*, Chiokis mostly wanted to forget that it had ever been forced to design such a ship class.

To retain at least some modicum of operational worth, the light cruisers still had to receive weapon system upgrades. The most important of them had been the fitting of retractable modern Agusta twin phaser VII turrets in place of the multi-megawatt lasers beginning in 2251. The older phase cannon mounts in turn were fitted with single light Type V phasers for CIWS work; these compact new weapons made good use of the infrastructure available at the former heavy mounts, and could essentially be dropped in place and left to run on automatic. Crew requirements dropped from 303 to 290 due to computer upgrades introducing duotronic technology. Transporters were brought to Mk III standard; a few ships ultimately received an advanced system with two platforms sharing a single pattern buffer. A decision was still made to retain the minimal shuttlebays, to compensate for some of the shortcomings of the transporters. All the new gear was rapidly using up the space reserved for upgrades, and further refits were deemed highly unlikely.

The late sixties brought about a new threat scenario: large interstellar 'berserker machines' had been witnessed in action for the first time. In addition, exploration vessels had reported on encounters with malevolent and extremely resilient spaceborne lifeforms against which standard cruiser armament was impotent. Starfleet briefly toyed with introducing superheavy antimatter warheads to defeat these potential new opponents, and plans were made to turn the eight *Amchitkas* into special 'defensive monitors' by installing this superweapon aboard. A half-finished spaceframe from Salazaar's abortive production run was converted into a proof-of-concept testbed, *USS Wotan* (NX-1390). After proving quite the opposite, the testbed was relegated to destructive structural testing. However, the brief resurrection of the program had given Salazaar hope of new orders.

Such hopes were in obvious conflict with the recent Organian peace treaty. The Fleet did not need new warships, so said the Committee for Starfleet. Could the *Amchitkas* be given exploration prowess? As Salazaar was discovering that the answer was negative, a new factor emerged. Within three months, sixteen pirate attacks were connected to Orion activity all along the crucial Rigel shipping lane, and several dozen more were suspected of having been committed by Orions. This was a major ramp-up in pirate activity, and certainly cause for concern. Considering the past history of Orion-Klingon relations, it was not inconceivable that this was a continuation of Klingon aggressions by proxy. Starfleet's frigate forces were deployed on the shipping protection mission in full, and so were the heavy frigates and light cruisers. By the next three months, the logistics problems had become intolerable, yet pirate raids still continued.

Here, finally, was an opening for Salazaar. Design work on correcting the biggest shortcoming of the *Amchitka* class, the propulsion system, had already been finished: the modern PB-47 engine and the RMR-510 dilithium powerplant were adaptable to the light cruiser. Salazaar gambled, and declared its readiness to field three upgraded light cruisers by the end of the following year, with full series production to follow. Yet Committee for Starfleet was hesistant to commit. A competing PB-47 light cruiser design had recently been submitted, and would offer significantly greater performance than any refit of the preexisting vessels. The only thing standing on the way of this new class were the old light cruiser hulls, and the Organian Peace Treaty clause limiting the total number of hulls in this category. The orders Salazaar eventually received were not for conversion work, but for dismantling.

Vocal protests erupted overnight, and not just on Andoria. Why was SFB once again sold short? Why had there been no open bidding process for the new light cruiser program? Internal reports by Starfleet, revealing the revolutionary PB-51 linear engine as the true propulsion system for the new design and

justifying the secrecy, could not be made public. Other kinds of 'spin control' had to be utilized to save the *Kearsarges* and the Andorian faces. A bookkeeping sleight-of-hand allowed half of the ships to be placed in 'reserves' in late 2268, thereby circumventing Organian limitations; in practice, the ships were merely idled in a manner similar to the dreadnoughts and HQ ships, and still formed a very real deterrent against their similarly 'camouflaged' Klingon counterparts. Salazaar in turn was promised a role in a number of refit programs that would bend, stretch and mangle the Organian treaty in other ways to Starfleet advantage.

The 'active' *Kearsarges* saw sterling service in the Xindi Incursion, but were defeated by more subtle and sinister forces immediately thereafter: the waves of modern heavy frigates that emerged in the late seventies so outperformed the *Kearsarge* class that its retirement became a political necessity. By the 2280s, all the old light cruisers, from *Amchitka* to *Kearsarge* to the *Texas* refits, had disappeared – either being disarmed and donated forward, sold for scrap, or converted to support vessels of various sorts. The light cruiser force had shrunk by more than 60 % in a matter of a decade.

A stern view of USS Attu *reveals the distinguishing features of the* Amchitka *light cruiser variant: the PB-35C nacelles and the ventral deflector mast. The early high-profile bridge can also be seen here. The more capable* Kearsarge *vessels mounted larger engines and conformal deflector systems, as exemplified by* USS Guderian *on the far background. Refueling lighters can be seen beside both cruisers at the forward resupply post in this unidentified star system, in a photograph probably taken during the anti-piracy operations of the late 2260s.*

The fight for the future of the *Kearsarge* class had meant a decreased commitment to the original *Amchitkas*. Eight of the ships had near-miraculously survived the great pirate hunt and were being kept on 'active standby' – another bureaucratic limbo that in practice meant idling on core world piers with minimal supervision crews. In 2285, when the Genesis crisis brought Federation-Klingon relations to a breaking point, the decision was made to refit the vessels for escort duty. This refit, far greater in scope than the projected *Kearsarge* modification, was aimed at producing a vessel capable of fighting against modern Klingon warships, and perhaps enabling Starfleet to convert the mothballed *Kearsarges* to this standard as well. The limited success met with the project is described later in an entry of its own.

Ishinomaki

Fuel transport
2231-2266

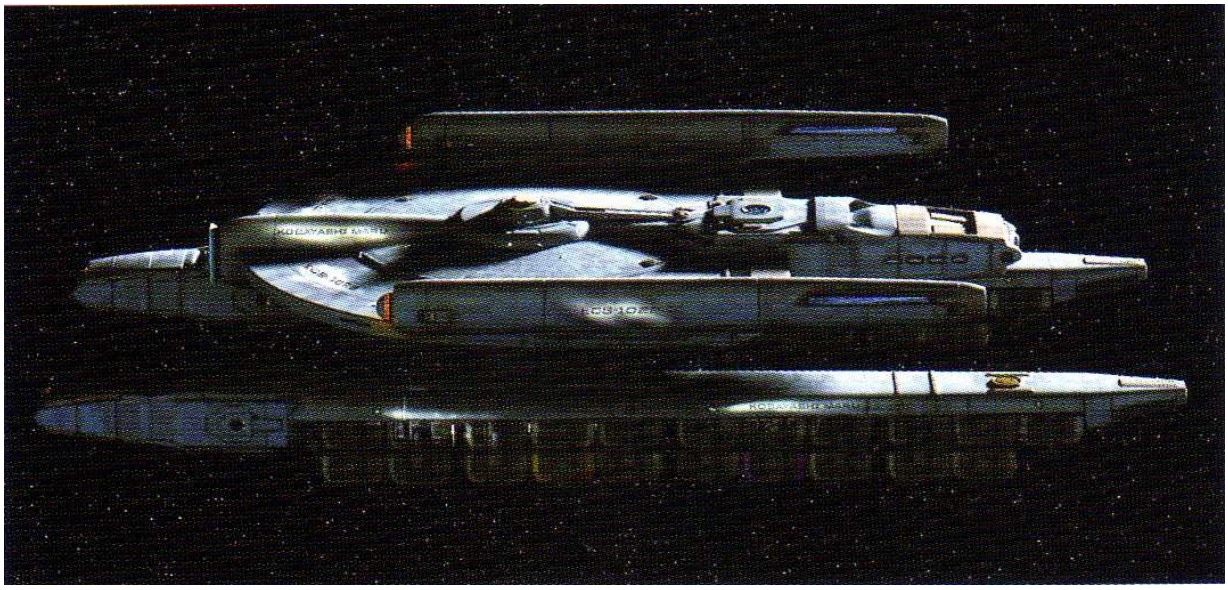
Completed:	36
Length:	237.0 m
Beam:	111.1 m
Height:	70.0 m

Mass:	647,900 tons tons
Officers:	9
Crew:	72
Cargo:	91,000 tons
Cruise speed:	w 4 (partially loaded) w 3 (fully loaded)
Max. speed:	w 6.0
Endurance:	1.5 years
Weapons:	4 laser emitters (130 nm / 2.0 GW) in single banks on dorsal primary hull quarters 1 laser emitter (130 nm / 2.0 GW) on dorsal stern 1 laser emitter (130 nm / 2.0 GW) on ventral primary hull
Shields:	1-layer conformal forcefield Navigational deflector on primary hull bow
Transporters:	1 GP (6-pad), 1 emergency evacuation (22-pad), 2 cargo; Mk II
Auxiliaries:	2 medium shuttles, 4 work pods

Ships of historical interest:

USS Roskilde (NCC-S315)

SOURCES:	D STXI/John Eaves (N Richard Mandel) (H own)



A well-worn Ishinomaki *in ECS livery sometime in the 2250s. Note the covers over the four dorsal weapons berths, in theory sealing them off but in all probability hiding lasers of some sort.*

The ebb and flow of Klingon offensives in the 2220s and 2230s was vastly preferable to a relentlessly unified frontal attack. By giving Starfleet time to redeploy, replenish and replan, it promoted strategic thinking wherein fleets of ships could be constantly moved between hot spots, rather than being stationed around fortified bases or targets to be defended. In the long line of Starfleet excuses for its inferior numbers, the idea of a 'lean and mean' force of conventional but highly mobile assets was now taking the place of the 'silver bullet' stratagem.

Yet 'lean and mean' was as elusive a goal as 'silver bullet' had been, because every element of a mobile task force had to represent the latest in propulsive technology – in other words, every ship, from cruiser and destroyer to tug and tanker, had to be capable of supercruise. Even by the 2230s, this was not true of replenishment units, the majority of which still were adapted civilian transports of limited range and speed. Only a select few elite units could hope to be accompanied by a *Ptolemy* class supertender. The idea of providing forward staging areas with enough neutronic fuel to keep a task force going was still more or less science fiction. Thus, once a critical mass of *Ptolemy* units had been acquired, an immediate follow-up order was placed on a less ambitious supercruise design, to be built primarily as a fuel transport.

The PB-29 was deemed too expensive for the intended paired application, and the somewhat dated PB-21 of the *Burke* and *Aldrin* frigates was selected instead. Also adapted from these projects was the spaceframe itself, a standard Geering saucer complete with weapons berths. Additions to the basic frame included a bulge at the bow for the large deflector required at supercruise, four impressively bulky Scarbak BTE impulse engines at the trailing edge (two per side), and a centerline powerplant block between them. A hangar for work pods and replenishment shuttles adjoined the power block, and heavy duty tractor beam emitters were installed at the aft end of the structure. However, main cargo carriage was by the means of two ventral grapples. These usually held massive canoe fairings that featured fixed neutronic hydrogen tanks at the forward ends plus a series of deployable tanks held in rows of up to ten. In theory, the grapples could handle standard containers as well, but if these were fully loaded, the ship would be slowed to a crawling pace at warp and impulse alike.

A snapshot from a classic combat simulation scenario places in jeopardy yet another Ishinomaki*, this time a Fleet transport. There seldom was a positive outcome to such an engagement: fuel transports were great targets of opportunity for roaming Klingon forces when unprotected, but also sometimes warranted preplanned attacks by suitably superior force. Pirates seeking to capture rather than destroy could be repelled on occasion, though.*

Under the nominal fuel load of 90,000 tons, the PB-21 engines flanking the main hull could propel the ship to a top speed of warp six – but not to the required supercruise, not quite. A partial load would allow warp four to be sustained, though, and this was standard operating procedure for the class during runs through or near contested space. Klingon countermoves might be deterred by the six light laser emitters, even though targeting systems were modest in scope and reliability. It would have made no sense to invest in anything more potent, as the goal was to procure some eighty of

these already rather expensive vessels (as well as release the design to commercial use, even if without a permission to install armaments of any sort).

Construction between 2231 and 2236 yielded 76 operational hulls of the *Ishinomaki* class for Logistics Command use, plus two training ships that lacked the cargo grapples and outermost impulse engines and were used for a variety of familiarization and basic training duties. While the training vessels stayed close to Earth for their entire careers, all the fuel transports were heavily engaged in frontline operations. In theory high-value assets, they were in practice forced to perform most of their supply runs unescorted, as the very idea behind the project had been to increase Starfleet's flexibility and reach, not to tie down its already limited resources. Inevitably, there were losses, many related to the general dangers of deep space rather than to Klingon activity.

Curiously, the concept of a supercruising fuel transport never evolved into a supercruising fleet tanker. Freely roaming task forces remained a rarity in Starfleet doctrine, as there remained other factors to tie them down to fixed assets even if forward fuel replenishment was provided for. No effort was made to fit the *Ishinomaki* class with a direct fuel transfer receptacle similar to that of the *Ptolemy* class. Nor were engine upgrades performed even after various military and commercial alternatives to PB-21 became available in the 2250s. Instead, the ships were gradually replaced by commercially obtained stock, such as the *Arcadia* class that was externally quite similar to *Ishinomaki* yet cruised at warp three. True high speed tankers would have to wait, and the *Ishinomaki* class would not survive to see their emergence. The last of the older fuel transports were removed from Starfleet service in 2266, a decade before the introduction of the fast *Huntington* class.

Bonaventure

Dilithium power testbed
2231

Completed:	1
Length:	137.2 m
Beam:	82.0 m
Height:	54.9 m
Mass:	334,200 tons
Officers:	14
Crew:	67
Cruise speed:	w 3
Max. speed:	w 5.2
Endurance:	1 year
Weapons:	None
Shields:	1-layer conformal forcefield Navigational deflector on fwd secondary hull
Laboratories:	None
Transporters:	None
Auxiliaries:	2 shuttlepods
SOURCES:	D TAS N TAS

(H own)

In the beginning of the 2220s, Starfleet had faced repeated demands of increased performance of both its warfleet and exploration forces. The application of third-generation stardrives to new destroyers, cruisers and scouts was a major effort, and produced some increases in defense capabilities, but the numbers of new ships stayed low and the performance still only barely on par with Klingon weapons technology. Even warp 4 cruise speed was too slow for any hope of effective defense for the far-flung UFP. The doctrine of that time called for last-ditch defenses of the core worlds and abandoning of colonies in case of an invasion, although this was naturally not made public.

The low rate of modern ship production was not entirely due to lack of resources, however. The Admiralty knew well that the UFP's survival thus far was mainly due to pure good fortune, and that no shipbuilding program could save the Federation in case of a massive invasion. What was needed was a miracle – and that is exactly what the Admiralty relied on. 'Miracle factories' throughout the Federation were its best chance of survival. Fantastic plans for new weapons and strategies were being created every week, usually to be abandoned as unrealistic after a short briefing.

At the moment of greatest darkness, three miracles did emerge: the phaser, the duotronic computer, and the red coral crystal. The first was the result of slow and tedious perfection and consolidation of subspace, phased particle beam and coherent EM technology into a flexible weapon system on par with Klingon disruptors. The second was the brainchild of a single man, yet thanks to it, centuries of careful studies and bold concepts by multiple races were suddenly blooming into working applications. And the third was a coincidence of literally cosmic scale.

A new mineral first analyzed on the mining hubworld of Deneva, the red coral crystal was at first considered just another alien gemstone of a lot of decorative but little practical value. A thorough inspection performed by Federation Customs Service laboratories in connection with a simple smuggling case soon changed that view of the material: in a few weeks, it became clear that the shard of crystal was a highly complex matrix of mainly lithium, silicon and iron, with the primitive cell formula 2<5>6 dilithium 2<:>1 diallosilicate 1:9:1 heptoferranide – that is, naturally occurring dilithium! Just like its fragile and astronomically expensive semisynthetic form, this crystal was both a sponge of almost all types and frequencies of radiation energy, and an excellent moderator for annihilation reactions. And it could be dug up in quantity from Federation soil!

A starship utilizing this moderator in her power systems would bring about a revolution in the economics and strategy of interstellar war. A technology more reliable and less prone to disaster than the old 'Archer drive' naturally had to be developed first, but now that the strategic incentive was there, perfecting the technology was just a matter of appying enough resources, time and expertise. In 2229 Starfleet began to construct an appropriate testbed for warp engines regulated by natural dilithium. The goal was set at creating a scale model of the upcoming heavy cruiser design, to keep the interactions of warp field and hull geometries as true to the ultimate cruiser reality as possible. This placed strict and at times conflicting requirements on the three main elements of the vessel: the warp nacelles that would explore the new field shapes, the secondary hull where the advanced power systems would be housed, and the primary hull which would mainly serve as an impulse engine test mount and representative shape.

Material technology improvements made possible the mounting of heavy experimental nacelles on long, spindly pylons, quite unlike the broad-chord structures of the previous century. Four different

configurations of steadily increasing pylon length were established, expanding the asymmetry envelope to its very limits. The engine of choice for these initial tests was a minimally modified PB-14, or the '099 engine'. On the fourth and final pylon configuration, three sets of novel warp coil layouts were to be tested, but the 'moderately safe, moderately performing' phase two or '101' engine was dropped from the program in 2231, and a direct leap made to the '102' high-risk venture. The distinguishing external feature of this engine, its bloated aft section, held an oversized off-axis field controller that would make possible emulation of the heavier field loads and stress patterns a full-size starship would encounter. In time, Starfleet hoped to introduce such flexibility into its service engines as well, but the technological solutions of the 2230s remained prohibitively expensive.

Dilithium-controlled annihilation called for a reactor assembly with an extremely compact actual reaction area yet extensive and expansive support systems. The configuration chosen for the experiments featured four parallel reactor tubes; a direct growth version was to be adopted for Project Starship, although some fundamental changes would eventually be made. All secondary mission systems save the shuttle hangar were omitted from the secondary hull to give room for the new powerplant and its ventrally mounted antimatter containment pods. The hull was provided with multiply redundant sliding/blowaway panels, ejectors and purge mechanisms for rapid and efficient jettisoning of the systems saturated with the volatile fuel.

A navigational deflector of significant power was added late in the design process, to allow for testing at full speed range in case the engines did work as planned. Its fitting into a cylindrar protrusion of the secondary hull bow was not free of problems, but end result still represented a level of aesthetics unseen in prior testbeds.

Testing of the Starship impulse system at representative scale required a bulky aft extension to the command saucer. The trapezoid shape, forming some 35% of overall primary hull volume, held all the basic elements of the SBA engine: twin fusion reaction chambers, advanced exhaust accelerators, integrated driver coils and dechargers, and fully vectoring nozzle fields. An exceptionally robust connector neck box extended through the impulse decks, curving to blend with the command superstructures at the upper end, and welded to secondary hull upper and lower surfaces and central keel box. In addition to deuterium tanks, the structure also held plasma conduits for feeding primary annihilation power to the impulse driver coils. This system would play a major role in future ship types, but in the test rig it was a deliberately underpowered proof-of-concept showpiece only. The minimum operating crew of 81 was already at risk from the high-power systems running through the interiors, and from working in the still poorly known emission environment of the annihilator assembly. Cabins were provided for most of the crew in the relative safety of the primary saucer, but some crew quarters were necessarily located in the secondary hull as well.

Commissioning ceremonies were performed in early January 2233. The ship was given the registry NCC-B1, and the name *Bonaventure* as a good omen for future achievements. The outsized nacelles, the distorted saucer and the undercut secondary hull all added up to a somewhat comical appearance. Many of the observers of the closely guarded ceremony later remarked that their first impression had been one of watching a baby starship, her rounded features only faintly suggesting the sleek lines of cruisers to come. The baby face belied the abilities of the ship: in her maiden warp flight, the *Bonaventure* managed to accelerate from zero to warp three in 11.9 seconds and maintain warp 5.2 for sixteen hours. The immediate success of the design gained the vessel a permanent commission in April, and operational warp engine development status in May.

The Bonadventure *enters spacedock above Candor Chasm, following a successful 'round-the-block' run in early 2233. Very little information was initially released on the test flights, but the very fact that they took place from and near the Sol system meant that tight secrecy was out of the question. Starfleet was quite willing, even eager, to let competing space powers witness the introduction of a superior power source to its arsenal.*

Three long performance evaluation cruises were performed between May and September 2231. The test program was cut short, however, when contact with the ship was lost just outside Deltan space. Subsequent searches by cruiser *Savannah* revealed no debris or ion trails, nor the antimatter residue characteristic of the vented plasma of the experimental ship. All 89 persons aboard were declared missing, and considered lost three years thereafter. However, the antimatter powerplant development program continued at full pace and several *Baton Rouges*, *Saladins* and *Hermeses* began conversion to this powerplant type.

In 2269, heavy cruiser *Enterprise* (NCC-1701) accidentally entered an interspatial anomaly in the Delta Triangle region. Inside the anomaly, the cruiser located the derelict *Bonaventure* among hundreds of other lost spacecraft of varying origin. Joint efforts by the *Enterprise* and *IKV Klothos* enabled the cruisers to escape the anomaly, but very little information was gathered on the actual fate of the *Bonaventure*. Her crew is believed to have survived inside the anomaly essentially unharmed and unaltered by the passage of time, as had the crews of various other vessels. However, the *Enterprise* was unable to establish contact with representatives from the *Bonaventure*. Further excursions into the anomaly have ended in failure – apparently, the interspace portal changes position and characteristics rapidly and unpredictably.

Rochester / Kitty Hawk / Taurus

Cruiser
2231-2297

Completed: 60 total:

20 *Rochester built in* 2231-2241
20 *Kitty Hawk* built in 2231-2247
20 *Taurus* built in 2236-2250

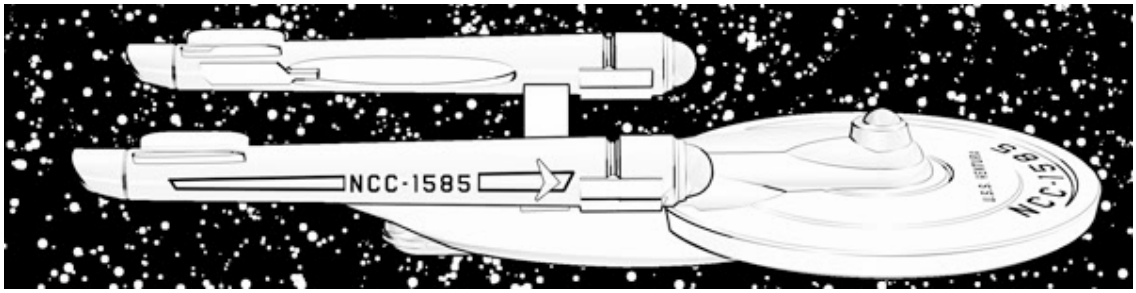
Length:	175.2 m (w/o plasma diffusers) 178.5 m (w/ plasma diffusers)
Beam:	95.0 m
Height:	41.3 m (*Rochester*, *Kitty Hawk*) 33.8 m (*Taurus*, NCC-1552)
Mass:	458,000 tons (*Rochester*) 459,800 tons (*Kitty Hawk*) 459,000 tons (*Taurus*)
Officers:	38 (*Rochester*) 41 (*Kitty Hawk*) 45 (*Taurus*)
Crew:	231 (*Rochester*) 253 (*Kitty Hawk*) 260 (*Taurus*)
Cruise speed:	w 5
Max. speed:	w 7.0
Endurance:	2 years
Weapons:	*Rochester*, original: 4 laser emitters (130 nm / 4.2 GW) in 2 twin banks port/stbd of bridge 2 laser emitters (130 nm / 4.2 GW) in twin bank fwd of ventral sensor array 3 fwd medium torpedo tubes w/ 50 photorps on ventral primary hull 2 Type L phased particle cannon (800 GJ / 1.2 TW) fwd of bridge *Kitty Hawk*, original: 2 laser emitters (130 nm / 4.2 GW) in twin bank fwd of ventral sensor array 2 laser emitters (130 nm / 4.2 GW) in twin bank above shuttlebay 3 fwd medium torpedo tubes w/ 60 photorps on ventral primary hull 2 fwd medium torpedo tubes w/ 20 photorps or probes on dorsal primary hull *Taurus*, original: 4 laser emitters (130 nm / 4.2 GW) in 2 twin banks port/stbd of bridge 2 laser emitters (130 nm / 4.2 GW) in single banks above shuttlebay 1 fwd medium torpedo tube w/ 40 photorps + 20 probes on dorsal primary hull 1 fwd medium torpedo tube w/ 30 photorps on ventral secondary hull 2 Type L phased particle cannon (800 GJ / 1.2 TW) in twin bank fwd of bridge 2 Type L phased particle cannon (800 GJ / 1.2 TW) port/stbd of deflector pod *Rochester* and *Kitty Hawk* refit 2256-58: 4 phaser VII emitters in 2 twin banks port/stbd of bridge 2 phaser VII emitters in twin bank fwd of ventral sensor array 3 fwd medium torpedo tubes w/ 50 photorps on ventral primary hull *Taurus* refit 2256-58: 4 phaser VII emitters in 2 twin banks port/stbd of bridge 2 phaser VII emitters in single banks above shuttlebay 1 fwd medium torpedo tube w/ 20 photorps on dorsal primary hull 1 fwd medium torpedo tube w/ 20 photorps on ventral secondary hull
Shields:	1-layer conformal forcefield Navigational deflector on fwd secondary hull (*Rochester*, *Kitty Hawk*) Navigational deflector in ventral pod fwd of secondary hull (*Taurus*)
Laboratories:	2 GP (*Rochester*) 1 GP, 1 planetary sciences, 1 medical (*Taurus*) 2 GP, 1 planetary sciences, 1 astrophysics, 1 life sciences, 1 linguistics/sociology (*Kitty Hawk*)
Transporters:	1 GP (4-pad), 2 cargo, 2 emergency evacuation (16-pad); Mk II All ships brought to Mk III standard after 2256 *Taurus* brought to Mk IV standard after 2274
Auxiliaries:	2 light shuttles, 4 work pods (*Rochester*) 2 light shuttles, 1 shuttlepod, 4 work pods (*Taurus*) 2 medium shuttles, 1 shuttlepod, 4 work pods (*Kitty Hawk*)

Ships of historical interest:

USS Albert McKenzie (NCC-1551), *USS Kitty Hawk* (NCC-1552), *USS Taurus* (NCC-1558)

SOURCES: (D Starfleet Academy movie project study drawing, LUG 'Spacedock' descriptions, John Byrne 'Crew: Ghosts')

(N LA Graf 'War Dragons', LUG)
(H LA Graf 'War Dragons', LUG, John Byrne 'Crew: Ghosts')



Struggling through delays and hurdles, the 'Great Awakening' nevertheless came, in the successive perfection of solid-state warp engines, dilithium foci, Mk II transporters and duotronics… A veritable stampede of inventions that could only be corralled aboard the largest, most expensive starships in its entirety. It was a far more demanding affair to try and fit the technologies aboard existing vessels of humbler size, either wholly or in part. The *Texas* refits were fiddling unrelated to the technological transcendence; the light cruiser and destroyer fleets still were in want of appropriate new champions. Newbuilding was acknowledged as the only viable solution for the necessary Fleet upgrades long before the first Starship sailed.

Yet Starfleet knew that the results would fall short of strategic demand. Given just one further decade, a dozen heavy and fifty light cruisers would be followed by an admittedly impressive fifty heavy and fifty medium frigates, resulting in a Fleet some eighty sufficiently modern cruisers and a hundred frigates strong. But this force was backed up by mere fifty destroyers of worth, leaving the Fleet starving for attrition units. Even though massive production of advanced designs plus improved *Saladin* variants was planned and budgeted for, there would be no dockyard slots at Sol or Andor for these keels for the next five to ten years – and no real prospect of producing destroyers significantly faster than cruisers even beyond that date. The Starfleet procurement stratagem of favoring quality over quantity inevitably meant that multipurpose cruisers rather than dedicated warships would be the attrition type of choice for the time being.

Thus arose the fleet of medium and light cruisers that would dominate Starfleet till the 2270s. Estimates for the size of the 'cruiser gap' ranged from fifty to a hundred; erection of fifteen extrasolar dockyards for an immediate production run of sixty cruisers was eventually deemed the prudent response, and a vessel between the clumsy *Kearsarge* and mighty *Constitution* in capabilities if not size the proper gapfiller design. With Sol involved in the aforementioned programs, and Andor toiling with the *Loknars*, it fell to Alpha Centauri, Aldebaran and Daran (or primarily the human colonies there) to meet the cruiser order.

The engineering genius of Marvu Hreedenck of Alpha Centauri would play a central role in the creation of the modern dilithium-reactor cruisers. Significant construction facilities also already existed at Centaurus, but for the time being, they were slated for strategically crucial *Larson* production. Aldebaran had so far produced almost solely mercantile vessels; the first of the new cruisers would be built there using modified commercial tooling, until proper Fleet facilities could be erected out of transportable components. The recently admitted member world Daran was already a veteran producer responsible for several light cruisers based on the time-honored *Texas* template, and slated to build several more in the near future. To upgrade its production capability, numerous collapsible box docks were likewise shipped in, and mobile fabricator stations were anchored to local asteroids.

In March 2231, Daran could announce the launch of the inaugural "medium" cruiser of *Rochester* class, NCC-1540. In record time, and no small thanks to the innovative ideas on modular construction by Dr Hreedenck, Arias-Mastac FY had thrown together a combat vessel combining hypermodern PB-45 propulsion with a fairly rudimentary early dilithium focus power system, within a two-hull spaceframe roughly 75% the size of the heavy *Constitutions* and comparable to the monohull *Kearsarges*. The smaller-diameter primary hull of the cruiser also diverged from the *Kearsarge* in shape, with a prominent dorsal rim protrusion accommodating new shield machinery. The stern engineering bulge was in turn extended aft to form a proper secondary hull, which could hold a main powerplant twice as large and twice as powerful as the light cruiser one. The hull also housed a proper shuttle hangar and landing bay at lower stern, freeing the primary hull interior for maximum martial gear. This consisted of a devastating Mk 2-3 triple torpedo launcher on lower bows, three paired Tesla laser banks divided between the surfaces, twin Type L phase cannon on the tall dorsal superstructure, and two shield generators, of the Hycor type carried in triplicate aboard the heavy cruisers. For advanced logistics, a single four-pad Mk II transporter was paired with a Mk VI industrial fabricator in the saucer, and a pair of cargo units was provided in the engineering hull. Only two general purpose laboratories were shipped, and the torpedo magazines normally held no research probes, nor were the two shuttles equipped for scientific survey.

One of the many quirks in Dr Hreedenck's complicated plan for meeting the cruiser specifications manifests here in the engine configuration of USS Kitty Hawk*, her pylons angling down rather than up from the engineering hull. The Mk II subclass otherwise adopted the same pronounced dihedral for the pylons as in the original* Rochesters*, while Mk III featured a much shallower angle for a more compact profile.*

In December 2231, Centaurus followed with the first *Rochester* Mk II, or *Kitty Hawk*, (NCC-1552). The vessel featured a quintuple torpedo launcher, with the two additional tubes displacing the phase cannon and some of the lasers. Such an arrangement should have left even less space for exploration gear than the *Rochester* design, and placed greater crew requirements as well. Yet the lean and mean cruisers were fully furnished for survey and charting duty in deep space, and sported five to six laboratories and a range of planetary sensors, in addition to always carrying a number of probes in the torpedo magazines. Their shuttles were equipped not just for general liaison, but for advanced planetary forays as well. All this was necessary from the strategic point of view, as the expansive Klingon front largely spanned unknown space. Awareness and understanding of the alien battlefield might yield the slight tactical advantage that the outnumbered Starfleet did not dare overlook.

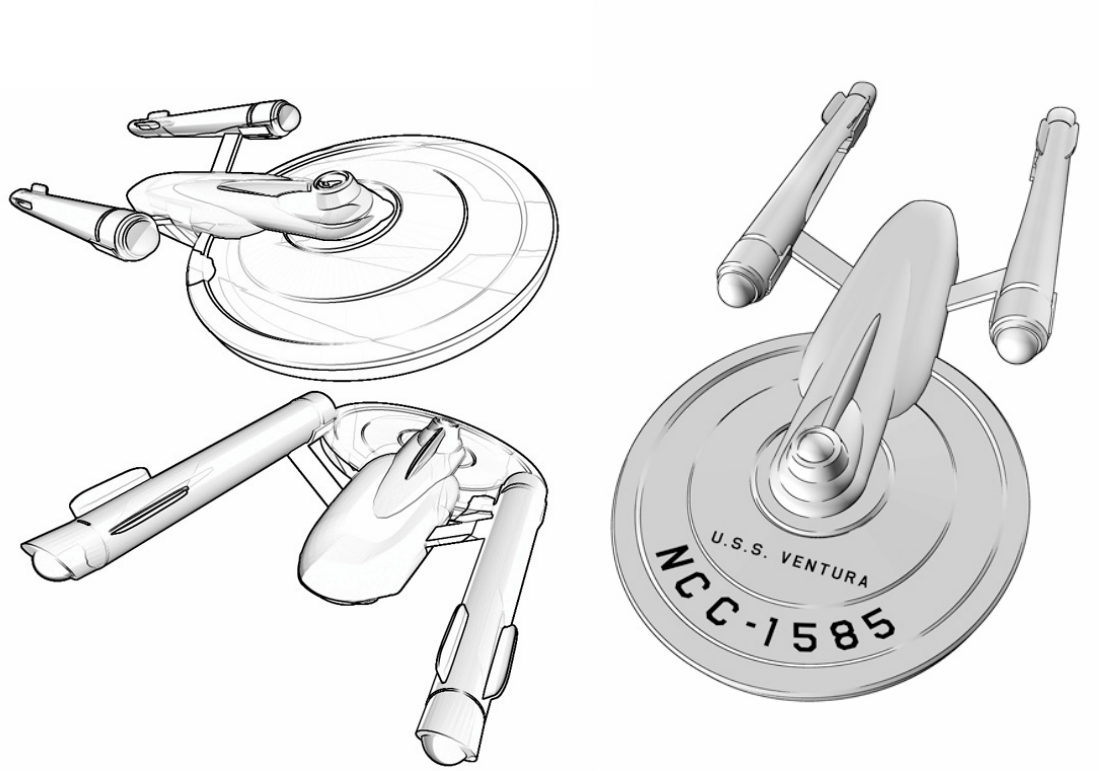
In June 2236, the Aldebaran contribution, *Rochester* Mk III or *Taurus* (NCC-1558), rounded out the cruiser family. The triple Mk 2 ventral torpedo tube assembly was left ashore, its socket fitted with a deflector pod instead. A compact single Mk 3 launcher was carried in the dorsal position, another being squeezed in the lower stern of the secondary hull; the modifications liberated plenty of room for a second phase cannon and gave much better all-around weapons coverage for close quarters

fighting. Significantly more complex combat management facilities and fire control computers were introduced to handle multitargeting scenarios. Enough room remained for the inclusion of multiple laboratories in this cruiser model as well. Outwardly the greatest distinguishing feature of the variant was obvious: Dr Hreedenck's modular propulsion design was configured for a nearly flat, maneuverable field and low silhouette by using greatly reduced dihedral on the warp engine pylons.

Despite appearances, the three cruiser types were not intended to cover for the tactical weaknesses of each other in combined action. The differing weapon suites merely reflected slightly dissimilar independent mission profiles, with the *Kitty Hawks* favoring long range warp armament for their deep space exploration sorties, and the *Rochesters* and *Tauruses* fighting at shorter ranges in their intended nearspace attack and patrol missions, respectively.

Initially, twelve *Rochester* Mk Is and six members of each of the other classes were completed. Successively larger batches followed, until twenty vessels of each type were in service. Thematic naming was faithfully followed, the *Rochesters* commemorating Earth's military genius, the *Kitty Hawks* its aeronautical derring-do, and the *Tauruses* its longstanding traditions of astronomy. The irony was not lost on the extrasolar builders of the classes, who nevertheless valued the significant military protection afforded by the cruiser fleet – even if this did not constitute a rigid regional defense. The ships would not stay behind to guard their originating systems, or even be assigned a specific homeport. Rather, in true cruiser fashion, they would be choreographed across a vast theater of operations in a flexible manner.

Admittedly, the cruise speed of warp 5 afforded by PB-45 was a disadvantage in deep space, compared with the warp 6 performance promised for *Loknars*, *Constitutions* and *Mirandas*. Yet there was little evidence that Klingons would be doing any better on the average, their numerous lighter vessel types typically cruising at no higher than warp 4. Routing maneuvers on a strategic scale were a distinct option for Starfleet, especially if the new cruisers were spearheading formations of destroyers capable of similar speeds. Future development and procurement of logistics ships would decide the viability of such schemes; initially, the *Rochester* variants sailed out either singly, or then in hunting packs featuring one or two light cruisers or medium frigates.



A few more views of a late standard Kitty Hawk*, in this case the* Ventura*, veteran of the Eridani Gap. Plasma diffusers add to stealth and give the PB-45 much more modern looks. Oh the other hand, the tall superstructure accommodating the dorsal torpedo launchers is still in evidence.*

It was not until 2254 that the construction of the various *Rochesters* could be completed. By then, major upgrades had already become topical. Laser armament was replaced by Type VII phaser systems, but not without a major and time-consuming secondary plasma system upgrade. Older phase cannon were removed from the *Rochesters* and *Tauruses*, and upper torpedoes from *Kitty Hawks*; the space on Decks 2-3 was put to good use by incorporating computer cores compatible with the Duotronic III architecture. Tactical sensors were updated, engines overhauled, and a new warhead type introduced for the torpedoes. While crew requirements stayed the same, there was internal reshuffling towards a more exploration-oriented mission profile, mainly as a result of the post-Axanar Klingon passivity.

However, these upgrades were more modest in scope than the sweeping improvements that kept the *Constitutions* and *Mirandas* at the cutting edge of technology. Much like the *Kearsarges*, the tightly packed "economy" cruisers risked semi-neglect of the kind that was already making the *Baton Rouge* family uncombatworthy. When Klingon hostilities peaked once more in 2266, there was difficulty in integrating the *Rochesters* into the C^3I network, as well as a shortage of Mk 2-3 spares, to the degree that some *Rochesters* shipped spare *Miranda* transceivers and datalinks to stay in contact, and even dabbled in quickly dismounting the 'Wolf' launchers in favor of less capable but more accessible 'Awalt' ones.

Post-Organian patrol duty saw the cruisers still operating their original gear, yet their propulsive disadvantage was becoming debilitating. The gradually yet inexorably expanding theater of operations no longer was fit for the original 2240s generation of starships. The PB-45 was becoming unserviceable even without the extra strain of the long range, high speed patrols, and several vessels

had to be placed under envelope restrictions or outright sailing ban by 2268 already. One was unlikely to meet any in deep space beyond that point; several began accumulating at key star systems, mainly seeing training use there.

A massive withdrawing from service was effected between 2268 and 2277, first on the *Rochester* and then on *Kitty Hawk* cruisers. *Taurus* units were retained for the time being, as a propulsive refit was planned (yet ultimately came to nought, for the lack of a suitably sized engine). Only the final four *Kitty Hawks* were in 2270 upgraded in some secrecy and transferred to TacFleet, apparently becoming commando support vessels; *USS Trailblazer* (NCC-1596) was rendered unspaceworthy and stricken within two years of the transfer, while *USS Scovil* (NCC-1598) served on a variety of theaters until 2297. *USS Virgo* (NCC-1572) of the *Taurus* subclass had been lost in the course of duty, of unknown causes while scouting in the direction of Zeta Persei in 2261 – the first and last operational loss after the Battle of Donatu that had claimed *USS Aries* (NCC-1586). Much like the *Kearsarges*, the *Rochesters* bowed out unvanquished by the enemy, defeated only by their own ranks. However, this time the increase in Fleet quality did not quite compensate for the decrease in numerical strength. No obvious successor arose to take the place of the *Rochesters*, and the 60 % drop in cruiser numbers translated to at least 30 % loss of overall fighting capacity. Granted, modern dreadnoughts supposedly provided so much reserve firepower that little or no factual drop occurred overall – but the performance of the active forces certainly began a downslide as the result of the early 2270s decommissionings.

Unsuited for foreign sales due to their advanced armament and the general policy change, all the *Rochester* and *Kitty Hawk* hulls were marked for scrapping between 2277 and 2280. Much of this work was completed at Aldebaran; the frontline world cast worried looks across the border every time a cruiser keel was cut, all too aware that its Klingon counterpart Amar was engaged in operations of the opposite kind. Construction of eight to ten *K'teremny* class destroyers and four to five *K't'inga* cruisers was undeniably underway. Against such vessels, the *Rochesters* would of course have been sorely outclassed, and their operating and maintenance funds and resources were arguably better spent elsewhere. It is still with some regret that a starship enthusiast looks back at the *Rochester* and *Kitty Hawk* classes, vessels that left virtually no mark in history.

Not quite all *Rochesters* remained anonymous to the public, though – even if Starfleet would have preferred otherwise. It remains unclear to this day how a band of Anjiri secessionists managed to get their hands on *USS Albert McKenzie* (NCC-1551) in 2290, at a time when she was supposed to be mothballed and secured at the Big Horn lunar depot in the Aldebaran system. The vessel was used in Anjiri internecine fighting that first involved the Federation at DS 3, then the Klingons at Kreth; a bloody altercation between the major empires was only barely avoided and the Anjiri factions brought to answer for their actions. Orion involvement in the debacle has been widely suspected, especially on the matter of the *McKenzie* theft. Somewhat ironically, the *McKenzie* is the only surviving example of the *Rochester* lineage today, having been interned by the Klingons in 2290 and discarded after brief study. Her evacuated and engine-less hull now resides in the α Gaudianus system, in a stable orbit unbothered by Klingon traffic and unreachable by outsiders.

Bode

Heavy scout
2232-2256

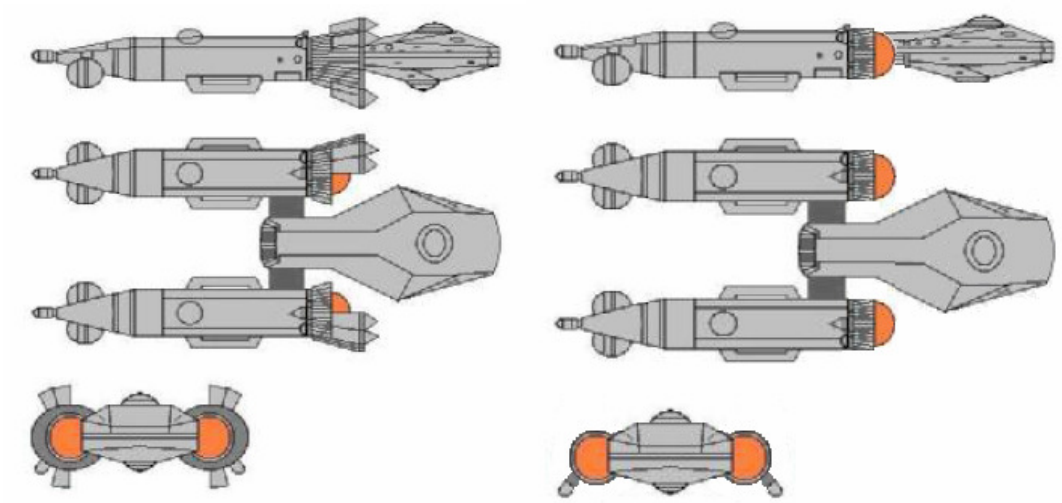
Completed:	51
Length:	191.2 m

Beam:	78.7 m 82.6 m (w/ standard field visor)
Height:	31.0 m 38.7 m (w/ standard field visor)
Mass:	287,000 tons
Officers:	15
Crew:	58
Cruise speed:	w 5
Max. speed:	w 7.3
Endurance:	1 year
Weapons:	2 laser emitters (130 nm / 700 MW) on dorsal primary hull 1 fwd torpedo tube w/ 70 warp probes or 50 probes and 20 fusion torpedoes
Shields:	1-layer conformal forcefield Navigational deflector on fwd hull
Laboratories:	1 GP, 1 planetary sciences, 1 astrophysics, 1 life sciences Up to 6 modular laboratories optionally carried
Transporters:	1 GP (2-pad); Mk II
Auxiliaries:	1 light shuttle; 1 additional light shuttle and 2 shuttlepods seldom carried

Ships of historical interest:

USS Guernsey (NCC-I596), *USS Hilbert* (NCC-I552), *USS Levy* (NCC-I568)

SOURCES: (D SFC, FASA)
(N SFC)
(H SFC, FASA Four Years War sourcebook)



The upper tier of the 2227 scout program was dubbed the *Bode* class early on. Being far more complex to develop and build than the lower tier *Hale* class, the High Speed / Long Range scout first began trials in 2230. An arrowhead hull 98 m long, 29 m high and 44 m wide was designed from scratch to house two lasers on upper bows, a probe launcher on ventral bow, and a host of laboratories within. The all-important shuttle landing bay was located astern, with an upward-rolling space door. Forward of the bay was sufficient hangar and repair space for up to four shuttles, or alternatively room for installation of up to six modular laboratories. The versatile vessel in effect carried enough research gear to qualify as a research cruiser rather than a mere scoutship. As the

engines quite dwarfed the hull, though, it was immediately obvious even to the casual viewer that high warp performance was the *raison d'etré* of this ship class.

With the first performance trials came great disappointment: the engines ran into severe Ishakawa-Dell power drain effects and had trouble breaking past warp five. There was no fault as such in the PB-27-2 engine, similar in basic design to the *Mann* upgrade units. The two 120,000 ton nacelles installed on the *Bode* were self-contained units, each carrying fuel on a saddle tank running along the topside, featuring an intermix cone and two heat exchanger 'eggs' astern and tubular final stage intercoolers below, and even serving as mounting platforms for scientific and reconnaissance instrumentation. Their output certainly should have been sufficient for greater performance, but there was a conflict inherent in the extra boost needed to break past the Ishakawa-Dell threshold: the unexpectedly high breakthrough field strength would endanger the instrumentation, and possibly the crew as well.

Yet settling for warp five top speed would have voided all the advantages and aims of the scoutship program. Extensive, indeed destructive testing on *USS Mayer* led to the development of a protective visor system between the hull and the front ends of the warp engines. Several variants were flown; the final choice was almost 40 meters across. Satisfactory field strength values within crew spaces were reached, while instrument relocation settled some of the equipment compatibility issues.

This rendezvous between a Texas *light cruiser and a* Bode *scout 'somewhere in the Beta Quadrant' makes clear what separate views of the ships might not: the HS/LR scouts sported engines of frontline warship standards – if only in terms of size. Taking of the spooled warp coil technology to these extreme limits resulted in a starship that by the late 2230s was ridiculously slow for her bulk and complexity. Starfleet's investment in the* Bode *class thus mainly served to deepen the problems of the scout fleet, rather than alleviate them.*

By 2232, the fifteen *Bode* scouts in service (the *Mayer* having been written off as unsalvageable) were operating at a top speed of warp 7.3, more than twice the maximum speed of the destroyer fleet and as such quite sufficient for the intended scouting duty. Impulse maneuverability with the single NSP-5B engine beneath the shuttlebay was rather limited. So was weapons coverage, especially with the field visors blocking the aft sectors. This mattered little, however, as standoff scouting was the primary mode of operations for the class. In military operations, the ability to send ahead fast probes, instead of forcing the ship herself to enter the area of interest and then deploy sublight probes, was understandably crucial. The probes of the bow launcher had a range of several lightdays, and the FTL scanners and passive sensors could theoretically detect an idled starship at up to six lightyears. Stealth at supercruise was sufficient for getting much closer to the enemy, though, and 'peek and run' operations were also practiced.

Despite the initial design problems and their makeshift solutions, the high performance scoutships finally entered series production (a term somewhat at odds with the scope of the production run). By

2236, all fifty units originally projected had been completed, not including a replacement for the sacrificed *Mayer*. Yet the original procurement plans had become quite unrealistic, if they hadn't been that from the start. With a fleet of barely a hundred viable scouts of various types, and with the cruisers tied up in defense duties, Starfleet could not keep up its exploration and military programs simultaneously. The *Bodes* were dedicated to the latter, never sailing out with more than one shuttlecraft and typically sacrificing twenty of their probes for an equal number of fusion torpedoes.

The state of disarray in the exploration program was widely criticized in the Federation Council, and the discussion about resources dedicated to Starfleet heated up. In 2237-38, Councilman Saldran of Rigel IV led a campaign of Starfleet black-painting and doomsday predictions. This was met with embarrassed silence on behalf of the worlds protected from the Klingon threat by the same Starfleet, and with forced smiles from Starfleet representatives who assured the Fleet would be up and running again in a few years, but could not yet publicly reveal the progress being made in antimatter power system development.

Meanwhile, partial remedies were attempted. Exploratory missions were subcontracted to organizations like UESPA, ACI, NUMA and NAR, and some Class Four and Five civilian vessels with second- and third-generation stardrives leased for exploration support operations. Whenever possible, *Bode* scouts were sent to scientific errands, usually in regions that also held military interest. Yet it was not on these somewhat foolhardy extended solo operations that the first casualties were suffered. *USS Hilbert* (NCC-I552) was apparently boarded by Klingons while surveying a variable-speed pulsar well within Federation borders, and found adrift, her crew, coding devices and navigational charts missing. *USS Levy* (NCC-I568) ran into a trio of Klingon destroyers near planet M-83-II, but escaped with minimal casualties, apparently at least partially thanks to the Klingon hesitancy in attacking massively inferior targets – *one* destroyer might have blown her up before she managed to engage warp drive, but for *three* an argument over who was to execute such an action resulted in a crucial delay! The ruins of an ancient culture on the planet were later found to have been completely destroyed, presumably by the Klingons. To date, no rationale has been found for this mysterious act of vandalism, but reports of similar harassing of Federation archeological teams by Klingons at that time are plentiful.

No losses were suffered during the battles of 2246-2250, mainly due to the cautious tactics used. By the forties, though, the *Bodes* were hopelessly outdated in every respect. In the new, dilithium-engined Fleet, their top speed was in no proportion to the bulk and complexity of their drive systems. Tweaking of the warp reactors for higher output in 2247 helped little, except in emphasizing the problem. A redesign involving solid-state engines, dilithium power and a lightweight hull – and thus in practice representing a completely unrelated, all-new class – was proposed in 2254 for warp 6/11 performance, and abandoned half a year later. Medium scouts or scouting cruisers were a relic of the past: scouting duties were being handled by offshoots of the versatile *Procyon* corvette design, insofar as the improved sensors of regular starships were insufficient for the job. Early 2254 saw the quiet retiring of the last *Bode*, *USS Guernsey* (NCC-I596).

Byrd

Galactic survey cruiser
2234-2278

Completed:	3
Length:	347.0 m

Beam:	117.1 m
Height:	46.0 m
Mass:	525,500 tons (original) 665,700 tons (refits 2259-63) 587,000 tons (*Smith* carrier refit I) 589,500 tons (*Smith* carrier refit II) 586,200 tons (*Smith* commando carrier refit)
Officers:	61 (exploration missions at launch) 65 (*Smith* carrier refits I and II) 67 (*Smith* commando carrier refit)
Crew:	389 (exploration missions at launch) 375 (*Smith* carrier refits I and II, not including pilots and Marine units) 443 (*Smith* commando carrier refit, including Marine support units but not including troops)
Cruise speed:	w 5 (original) w 6 (refits 2259-63)
Max. speed:	w 8.5 (original) w 9.0 (refits 2259-63)
Endurance:	25 years
Weapons:	Original: 2 laser emitters (130 nm / 1.0 GW) in twin bank on dorsal primary hull 2 laser emitters (130 nm / 1.0 GW) in twin bank on ventral primary hull 2 Type I phased particle cannon (800 GJ / 900 GW) on dorsal primary hull 2 fwd torpedo tubes w/ 55 photon torpedoes and 90 probes on ventral primary hull Refits 2259-63: 2 phaser VI emitters in twin bank on dorsal primary hull 2 phaser VI emitters in twin bank on ventral primary hull 2 fwd medium torpedo tubes w/ 50 torps and 120 probes on ventral primary hull (not in *Smith* carrier refits)
Shields:	1-layer conformal forcefield Navigational deflector on secondary hull bow Auxiliary navigational deflectors on primary hull bow
Laboratories:	16, in varying configurations (14 inactive in transit or in *Smith* carrier refits, 1 GP and 1 astrography active)
Transporters:	4 GP (6-pad), 3 emergency evacuation (22-pad), 3 cargo; Mk III
Auxiliaries:	4 medium and 2 heavy shuttles, 1 or 2 special environment craft, 6 shuttlepods, 8 work pods (exploration) 4 medium and 2 heavy shuttles, 6 special environment craft, 6 shuttlepods, 8 work pods (*Smith* second mission) 20 tactical craft, 2 light shuttles, 8 work pods (*Smith* carrier refit I) 24 tactical craft, 2 light shuttles, 10 work pods (*Smith* carrier refit II) 6 tactical craft, 6 assault shuttles, 2 light shuttles, 6 work pods (*Smith* commando carrier refit)

Ships of historical interest:

USS Richard Evelyn Byrd (NCC-1381), *USS Albert Cushing Read* (NCC-1383), *USS Charles Kingsford Smith* (NCC-1382)

SOURCES:	(D SFB *Napoleon*, SFC battle cruiser modified) (N SFB) (H SFB)

When the *Archon* improved heavy cruiser construction program was cut short in 2225, this was to the satisfaction of a surprisingly diverse group. Defense Command was eager to divert funds to cruisers of decisive performance, such as *Baton Rouge* and *Icarus*. The UFP Council found delight in being able to impose 'cutbacks' on Starfleet for once. Exploration Command in turn held hopes that the *Archons* would be found unfit for frontline combat duty and would become available for long-neglected research, survey and charting projects in deep space. Perhaps the most surprisingly of all, the major starship design bureaux and shipyards involved in *Archon* production also welcomed the news, as it meant resources freed for meatier projects.

For Rapier of New Aberdeen, the only extraterrestrial contractor in the entire *Horizon* program as manufacturer of *USS Guardian* and *USS Warrior* of the *Advance* subtype, cancellation of the

would-be *USS Gjöa* meant disaster. Dockyards geared for production of heavy cruisers, thousands of professionals still clinging on to expertise from decades past, and material resources already obtained – the massive misinvestment would collapse the corporation and beggar the colonial government. Pleas for replacement contracts were sympathetically received in the UFP Council, where a slight and diminishing majority tried to fight for a policy of unity and support for fringe areas; yet Starfleet could present no useful application for Rapier's services. While *Archon* components might be of use in Project Starship, New Aberdeen did not possess the required skills or clearance, and the hull of the *Gjöa* was in any case too far completed already.

Yet with new cruisers and destroyers finally pouring onto the battlefields in sufficient quantity, Defense Command could take a breather and allow some funding to flow to the competing divisions. Plans on re-engining existing survey cruisers with PB-29 were already in motion, and the *Gjöa* might well be rescued the same way. Within five years, Exploration Command had funded to completion the design effort on three heavy survey cruisers based on the *Archon* template, to be constructed in parallel with the *Cahuya* refits. All three contracts went to Rapier, legitimizing the years of work already conducted on the first vessel.

In all due economy of design, *USS Richard Evelyn Byrd* (NCC-1381) still represented a challenge of powerplant and drive system integration. While PB-29 was no more massive than the preceding PB-18, it would have to be mounted significantly farther aft to provide proper field interaction between the port and starboard units. Pylon repositioning meant internal changes, but these were necessitated anyway by a key upgrade criterion: a 70% increase in power production, for the ability to sustain a cruise speed of warp 5 until fuel exhaustion. In practice, this meant replacing the 'Sternn' main reactor with a novel and largely untested Kiratovani twin system of 7:1 antimatter augmentation.

At warp, little power was left for armament, of which four lasers and two torpedo tubes were retained and two phase cannon of modern 800 GJ type were introduced. The main tools of trade for the *Byrd* were her sensors, of fairly conventional make but carried in quantity and provided with bountiful onboard processing and data storage resources. The *Byrd* cruisers were expected to spend a high percentage of their mission in transit to extremely distant targets, then conduct brief but comprehensive surveys at these locations inaccessible to vessels of lower performance. To reflect this, the balance of sensors was on deep space navigation and charting systems, while planetary survey equipment was less prevalent than in the *Cahuya* class. A degree of flexibility was built in, though: after establishing orbit around the target, the ship would rapidly reconfigure the sensors, and interior spaces dedicated to habitation during transit would become laboratory spaces.

At completion in April 2234, the *Byrd* was assigned a mission towards the galactic core, with six targets of interest and a quarter of a century to visit them. The crew of 450 was all-volunteer, their morale high, their equipment first rate. By the October launch date, it had also become evident that they would not be deserting a Federation besieged by superior foe: not only were the new heavy cruisers making a difference on every battlefield, but Klingon military activity overall was rather mysteriously dropping. Hopes of truce and peace negotiations escorted the *Byrd* on the first leg of her journey. Then communications ceased as the thin 'breadcrumb' line of communications relays was expectedly severed.

On schedule, Rapier finished work on the second keel and laid a third. The *Charles Kingford Smith* (NCC-1382) and *Albert Cushing Read* (NCC-1383) set out for their 25-year voyages in 2236 and 2238, respectively. By the time of their departure, hopes of Klingon peace were dashed, their momentary weakness over, presumably an artifact of infighting in the Empire. The Babel of 2238

would soon leave the UFP internally divided as well, even if actual dissolutionary attempts were suppressed for the time being. There would be no more *Byrds*; the spares caches of the completed vessels were confiscated on the assumption that no repairs would ever be performed on any of them.

Yet 2257 saw the *Byrd* return to communications range of a Federation once more unified in a solid front, easily holding back a dispirited Klingon Empire, and on the verge of launching a massive exploration initiative using the technology of the Great Awakening. The limping survey cruiser would indeed have no need for spare PB-29s, as solid state warp engines of PB-32 type were awaiting her 2259 arrival. Scientific results from the odyssey were eagerly received, while the debriefing of the handful of officers involved in the secret mission of securing new UFP military alliances and technologies was conducted as a dry formality. There would be no need for anyon inversion beams or merculite warheads now that the dockyard crews were installing Type VI phasers and forced-intermix photon torpedoes onto the recuperating *Byrd*. Nor would the Lyrans become a crucial ally when their association with the UFP would strain recently established relations with the more useful Hydran kingdoms.

A similar reception would await the other two cruisers, and all three would be refitted for a second mission of galactic survey. Yet the *Smith* would not be launched on one outright; a round of experimental modifications in 2261 would see her trailblaze the cruiser-carrier concept, of which the prototype *Napoleon* (NX-1384) would emerge in 2265. This awkward design was fated to be easily defeated by through-deck variants of the *Constitution* type, and saw no further production – two keels were actually cancelled in mid-build. The *Smith* in turn was able to mount a final mission to galactic north in 2265-78, being the last *Byrd* to resign her commission at completion of the task.

This 2264 test cruise catches USS Charles K. Smith *in her final shuttlecarrier guise, optimized for commando missions with an estimated reinforced company of Marines, half a dozen assault shuttles and the same number of tactical craft. Additional space doors cut into the expanded hangar reduced the structural integrity of the vessel, yet not so drastically that she could not return to survey duty afterwards. The malleable interiors of the* Byrd *type facilitated a rather painless back-and-forth refit, and ultimately allowed the* Smith *to ship a high number of special environment craft for her final voyage of exploration.*

The success of six exploration sorties of extreme endurance would directly inspire a follow-on class of even more ambitious scope, described in the later *Draco* entry. Such missions would still remain a rarity in the Starfleet of late 23rd and early 24th centuries, as its new multimission cruisers would often be tied down with defensive assignments. The fairly special circumstances that produced the *Byrd* class and those that made its *Draco* successor reality were an opportunity for Starfleet's exploration arm to extend itself, yet they highlight the limitations under which this branch had to operate even in times of relative peace. In final analysis, the leaps and bounds of Starfleet technology evolution still originate in its military commitments and challenges.

As of this writing, all major missions of deep space exploration are being conducted by dual-purpose ships. Special deep space propulsion arrangements are a rarity, and recent acquisition of

advanced technologies in that field is more likely to see general rather than dedicated exploratory application.

USS Richard E. Byrd remains in orbit around Aldebaran as an exhibit of the history and exploits of the entire class.

Marklin

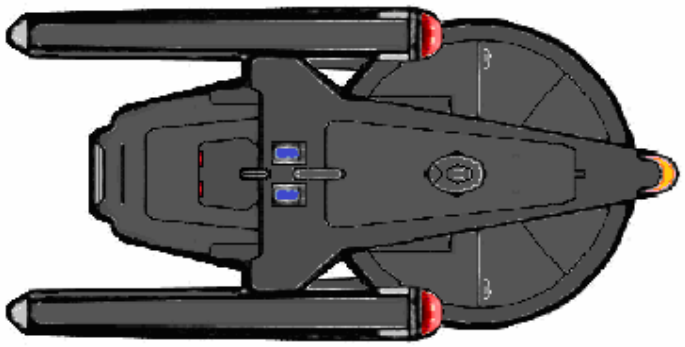
Light destroyer
2236-2251

Completed:	20
Length:	157.4 m
Beam:	75.0 m
Height:	39.9 m
Mass:	219,300 tons
Officers:	22
Crew:	89
Cruise speed:	w 4
Max. speed:	w 6.8
Endurance:	4 years
Weapons:	2 laser emitters (130 nm / 700 MW) on dorsal primary hull port/stbd 2 laser emitters (130 nm / 700 MW) on ventral primary hull port/stbd 1 fwd medium torpedo tube w/ 70 fusion or photonic torpedoes on ventral primary hull
Shields:	1-layer graviton/subspace globular forcefield Navigational deflector on propulsion hull bow 2 auxiliary navigational deflector emitters on saucer hull ventral bows
Laboratories:	1 GP, 1 sigint
Transporters:	1 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk II (*Marklin*)
Auxiliaries:	2 light shuttles, 2 to 4 shuttlepods

Ships of historical interest:

USS Bonhomme Richard (NCC-567), *USS Xenophon* (NCC-558)

SOURCES: (D FASA *Four Years War*/Dana Knutson & *The Federation*)
(N FASA)
(H FASA, SFB, own)



Acknowledging the great potential there was in a lightweight vessel equipped with the potent PB-25, Starfleet did not wish to give up easily on fielding one. As late as 2234, plans were put forth to

upgrade the *Kovaris* design to meet the challenges of the modern battlefield. Key to this would be the extension of the propulsion hull to house a higher output warp reactor; this time, it would be the saucer that would be retained, possibly lifted off retiring *Kovaris* units as is, and merely internally refurbished.

To comply with tactical developments, the saucer would house a more modern torpedo launcher with enlarged magazines, improved computing facilities, C^3I rooms and systems, and the sort of accommodation required for missions of doubled duration. This part of the refit promised to be straightforward enough, with the saucer largely a passive piece of 'cargo' hanging on to the main spaceframe anyway. In reality, it was going to be a subscale test run for many systems and structures destined for Project Starship, including advanced duotronic fire control and transporter management systems.

For the propulsion section, a sturdy new pylon system was devised, featuring additional broad-chord vertical supports flanking the central pillar and reaching far forward for further leverage, with the hopes of fitting presumably massive solid state engines as soon as a suitable design would emerge. Initially, PB-25 was mounted, in a much wider arrangement than the *Kovaris* one for a new balance between maneuverability and speed; the former could be stressed now that higher overall power levels would be available. The stern section was greatly enlarged aft and now housed facilities for operating multiple shuttlecraft, in yet another attempt to compensate for the shortage of modern deep space survey and scouting vessels. The impulse engine package was moved out of the way, to a pod mounted on the central pylon. The initially fitted SSRW reactor would in time be supplanted by a dilithium foci power system, so plenty of room was provided for upgrades. Chiokis was tasked with both design and construction of the updated type, the promise of almost forty *Kovaris* conversions implicit in the deal if the initial work on 20 newbuilds panned out.

Yet just a week after work on *USS Marklin* began, a lawsuit filed by M'Yengh Yards brought the whole program to a grinding halt. Many things spoke against the integrity of Chiokis and Committee of Starfleet: the secrecy concerning the Project Starship contract, the financial interest of a Committee member in Chiokis, the fact that Chiokis still was the only off-Earth corporation to win major Starfleet shipbuilding contracts. It took Chiokis close to six years to convince the Federation Tribunal that the bidding process for the *Marklin* had been fair and open. By the time the conversions were finally completed, the *Marklins* were hopelessly outdated, as dilithium-powered competitors ruled the scene. Chiokis had little interest in the type at that point, and extended no bids for further modernization when the 2245 defense review sealed the fates of numerous pre-dilithium ship types. The existing destroyers saw brief service on the Klingon front in the 2240s, but Starfleet was dissatisfied with the limitations of the light design in both the escort and patrol roles, preferring the more specialized *Remoras* and *Procyons* for those purposes.

Two Marklins *home in on a torpedo kill in this simulated scene from the manufacturer's brochure. In reality, the destroyers tended to operate solo, in tasks calling for their special gear such as shuttlecraft, cargo holds, or even onboard laboratories, of which two were provided.*

The *Marklin* class was not without historically remarkable representatives, though. *USS Bonhomme Richard* (NCC-567) of the type was the first vessel to report on the unrest at the secessionist world of Axanar in late 2245. *USS Xenophon* (NCC-558) in turn was in 2246 assigned to Captain Kelvar Garth for her final mission when a dockside explosion suddenly tore a gaping hole in her engineering section and compromised the integrity of her entire spaceframe. While initial analysis put the blame on the age of some structural components and the antiquated design of the engineering systems, traces of explosives commonly used by Klingon intelligence forces were later discovered aboard the ship. No sound explanation has been found for the fact that Klingon saboteurs targeted the obsolete *Xenophon*, instead of the more modern *Baton Rouge* cruisers *Connecticut* and *Saint Louis* or the dormant starship *Constitution* also residing at Starbase 12 at the time. It has been suggested that the attack was actually aimed at the life of Captain Garth, who later proved invaluable to Starfleet in the blockade of Axanar. This naturally presupposes non-causality and time travel, since the historical significance of Garth of Izar was not yet known in early 2246.

Pyotr Velikiy / Beowulf

Heavy cruiser / support cruiser
2239-2268 (Pyotr Velikiy)
2252-2312 (Beowulf)

Completed:	28 total: 20 *Pyotr Velikiy* / Mk I heavy cruisers built in 2239-48 8 *Beowulf* / Mk II support cruisers built in 2248-52 and 14 converted from Mk I 6 Mk III support cruisers converted from Mk I in 2248-52
Length:	250.3 m
Beam:	169.1 m
Height:	36.5 m
Mass:	780,000 tons (original) 770,200 tons (*Beowulf*, refit 2250-52, NCC-1670-74, 1678, 1680-83, 1686-89) 730,100 tons (refit 2250-55, NCC-1675-77, 1679, 1684-85)
Officers:	80
Crew:	420 (Mk I) 332 (Mk II) 305 (Mk III)
Cruise speed:	w 5
Max. speed:	w 8.3
Endurance:	3 years
Weapons:	<u>standard weapons fit 2239-51:</u> 4 laser emitters (130 nm / 4.0 GW) in 2 twin banks on port/stbd primary hull corners 4 laser emitters (130 nm / 4.0 GW) in 2 twin banks port/stbd of ventral sensors 2 Type L phased particle cannon (800 GJ / 1.2 TW) on dorsal bow 2 Type L phased particle cannon (800 GJ / 1.2 TW) on ventral bow 2 medium fwd torpedo tubes w/ 100 torps at dorsal bow <u>standard weapons fit 2251-2268:</u> 6 phaser VII emitters in 3 twin banks, port/stbd primary hull corners and on dorsal bow 6 phaser VII emitters in 3 twin banks, port/stbd of ventral sensors and on ventral bow 2 medium fwd torpedo tubes w/ 52 torps at dorsal bow
Shields:	2-layer conformal forcefield Navigational deflector at ventral bow

Auxiliary navigational deflectors at bow

Laboratories: 2 GP, 2 planetary sciences, 2 astrophysics, 1 medical, 1 signals intelligence

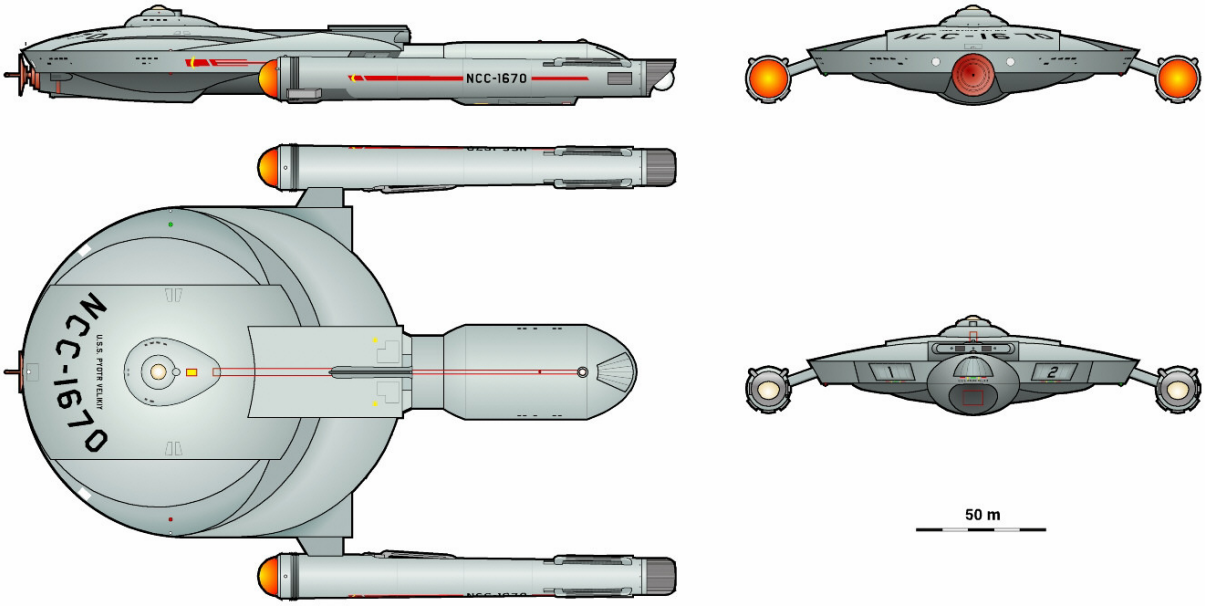
Transporters: 4 GP (6-pad), 4 emergency evacuation (22-pad), 4 cargo; Mk II

Auxiliaries: 12-14 light shuttles, 4 work pods (original)
8 medium assault barges, 2 light shuttles, 4 work pods (support cruiser)

Ships of historical interest:

USS Dauntless (NCC-1697), *USS Beowulf* (NCC-1690)

SOURCES: (D Starfleet Museum / Masao Okazaki)
(N Starfleet Museum / Masao Okazaki, Marco Palmieri *Vanguard:Declassified*, LUG, Diane Carey *Wagon Trail*)
(H Starfleet Museum / Masao Okazaki, Marco Palmieri *Vanguard:Declassified*, LUG, Diane Carey *Wagon Trail*)



The light cruisers of *Amchitka* class and the medium cruisers of *Rochester* class were insurance against the strategic consequences of a possible crippling delay of Project Starship. Starfleet also had to cover its bases against other types of setback, though. The smaller cruisers were to ship partial Starship armament on a compact spaceframe with low-risk but also low-performing engines and powerplant. If instead it was the ambitious structural solutions and the dilithium reactor that failed on the *Constitution*, though, Starfleet might be left with perfectly working PB-30 engines, 'Wolf' torpedo launchers, and heavy lasers, but without a starship large enough to accommodate them or the vast conventional reactor needed to stand in for the hoped-for *Constitution* powerplant.

To ensure that a new heavy cruiser of some sort would be in service with Starfleet by 2242, Admiral Shrelev IV of Andor suggested that a second Starship project involving less risk be undertaken with a reactor expected to be available in the near term rather than half a decade away, if ever. The sights would not waver from the goal of carrying full Starship gear, though: the main navigational deflector and sensor suite, armament, deflector shielding and defensive systems, command superstructure, life-support systems, and even major computer systems and programs would be common to both heavy cruiser efforts.

Conservative Andorian warp field theorists still felt that the greater cruising efficiency of a warp field with a minimal frontal profile outweighed the disadvantages of lower rates of roll, pitch, and

yaw in comparison with the dual-lobe warp field favored by Earth designers. Accordingly, *USS Pyotr Velikiy* (NX-1670) featured a bulbous command hull remniscent of the *Mann* one, with nacelles barely protruding from its shadow on extremely short lateral supports. A complex arrangement of overlapping truncated ellipsoids appeared an odd an expensive choice for the shape of the dorsal hull surface, yet was marketed by the warp engineers as 'beneficial for the boundary-layer transhull dynamics of the close-hugging warp field'. Others saw here an effort by structural engineers to regain at least some of the volume lost to warp streamlining by adding a bulge here, another there whenever field shapes allowed. Certainly the single-lobe field of the *Pyotr Velikiy* was more forgiving in this respect than the two-lobed *Constitution* one that was giving endless headache to Project Starship hull shape designers.

The main navigational deflector traded a large frontal profile for a longer resonance tunnel and was attached to the front ventral part of the command hull. The SSWR-XIIIB forcefield focus m/am reactor was too large to be integrated into the command hull and was placed, along with its associated fuel stores, in a separate engineering hull connected directly aft by a short, thick neck. Twin main shuttlecraft bays straddled the root of the neck, while a third, smaller bay was placed at the stern of the engineering hull mainly for fuel transfer purposes.

Because the *Pyotr Velikiy*, like the *Constitution*, was intended to operate far beyond the borders of the Federation on independent missions, sustaining high warp for extended periods of time, maintenance of warp capability far from support facilities was a primary concern. Because the SSWR-XIIIB reactor needed to operate at higher percentages of maximal output to achieve desired cruising speeds, constantly risking failure, the warp drive was designed to retain operability at lower speeds (wf 3.2) on fusion power alone. The 'impulse' system was abnormally large and powerful and was supplied by two large deuterium tanks in the rear ventral command hull. If the antimatter drive were to experience irreparable malfunction or complete failure, the now-redundant engineering hull would be detached to decrease weight. The nacelles, which were attached directly to the command hull, could continue emergency warp operations with power from the fusion reactor. The fusion reaction could also be used to supplement the m/am reactor to achieve higher warp speeds. Such conservative redundancy made the *Pyotr Velikiy* an exceptionally large and heavy vessel for its time, rivaling the largest Geering battle cruisers in hull mass.

The development and construction was allocated to Salazaar, and proceeded quickly and without major difficulties. Indeed, the *Pyotr Velikiy* had already been flight-tested at warp speeds with temporary 'Merlin II' nacelles and power from its fusion reactor alone in December 2238, less than 2 years into development. In April 2239, the main m/am reactor arrived from Hellas Planitia and was installed in the secondary hull, followed by PB-30 'Sabre' nacelles in September 2240. Full-up testing culminated in July 2240 in a sustained speed of warp 7.7. Armament was then installed, paralleling the *Constitution* arsenal in most respects but featuring a lighter, two-tube version of the 'Wolf' torpedo launcher. The *Pyotr Velikiy* was officially handed over to Starfleet above San Francisco in March 2241, justifying by mere months the project's status as a remedy for *Constitution* delays.

As the competing inaugural Starship in 2242 retired to recover from her early combat experiences, the *Pyotr Velikiy* got the chance to prove herself in service with the 4th Fleet. She undertook the first survey mission beyond the Hammadi-Burke Hollow, an area of dense interstellar matter impenetrable to long range sensors. She charted 15 star systems and made successful first contacts with two neighboring, newly warp-capable races, the Laag and the Konnir, previously unknown to the Federation and even to each other. Yet exploration prowess was relatively far down the list of

Starfleet priorities at the time, and the Salazaar builders struggled with rationales for the completion of further *Pyotr Velikiy* units beyond the five that filled in for the recuperating *Constitution* and her admittedly somewhat delayed sisters. The Andorian government was asked to intervene to purchase the remaining 15 keels for national defense purposes, but the competing and highly successful *Loknar* project undermined any arguments about shortcomings in the national self-defense scheme, and in any case it was Chiokis with its sterling export successes that had the government's antennae for the time being.

The fifteen did end up being built, but with Terran rather than Andorian patriotism coloring their naming choices; to add insult to injury, the proud heavy cruisers were immediately relegated to missions of combat transport and Marine landing support. In many ways, they were eminently suited for these tasks. There was interior space to spare in the portly hull, despite the requirement for 20% more operating crew than a *Constitution* even in full deep space rig would call for. Fuel and consumables reserves originally intended for the depths of unexplored space were available for sharing, too. Even lack of agility was something of an asset, making the *Pyotr Velikiy* a steady and stalwart platform for orbital bombardment. Defense Command was a satisfied customer and purchased a further eight hulls in 2248.

A change of guard above Ragnar VI sees both the Constitution *and the* Pyotr Velikiy *in modern 2260s livery. Also modernized is the main power system and weapons suite of the veteran starship on the foreground, allowing her to operate beyond her support mission parameters in this frontier assignment.*

In the 2250s, many *Pyotr Velikiy* units were given smaller and more powerful SSWR-XVB reactors to bring their performance closer to modern cruiser standards. There was little change in propulsive specifications, but the new powerplants made a world of difference for shields and energy weapons, and allowed top-notch phasers to be fitted. In some ships, designated Mk II but often known as the *Beowulf* subclass after the first of eight newbuilds, the large engineering hulls were retained, and the spaces vacated by the more compact reactor arrangements were converted to other uses, such as assault barge and cargo stowage. In others, the engineering hull was completely removed, leaving only the bobbed stump of the connecting neck. Decreasing the displacement by some 50,000 tons

significantly improved the impulse performance of these Mk III vessels. This was not translated to combat agility, though, but was utilized for towing twin cargo containers in planetary assault support duty.

Although individual ships continued to perform important missions of diplomacy and exploration, Defense Command never released the *Pyotr Velikiys* to deep space adventures en masse. Having performed their originally planned role as backups for the *Constitution* with distinction in 2240-45, they went on to justify their series production with equal merit in forty years of (admittedly steadily diminishing) supporting roles, releasing more capable units to serve as Starfleet's frontline heavy cruisers. Andorian Self-Defense Forces utilized its five initial units until 2268, choosing the indigenous *Andor* class cruiser as the rightful replacement.

USS Dauntless (NCC-1697) was badly damaged in combat at Xarant in 2259 and saw extensive repairs at Starbase 7. A further engagement with Klingon rogues in 2268 required virtual rebuilding at Starbase 11; the beleaguered ship subsequently tackled the Feline Xindi in two major battles, and after a brief respite, rejoined the *Beowulf* combat tender force just in time to see action in Operation Grey Ghost, then retired with exceptionally full honors in 2278. *USS Salah Ad-Din* (NCC-1683), the last original *Pyotr Velikiy* to be retired, is now on display at the Starfleet Museum.

2240-2270 - The Final Frontier

The latter half of the 23rd century resulted in many political changes, but the time between 2240 and 2270 was a relative lull in interstellar politics and warfare. Two potentially disastrous conflicts with the Klingons resulted in a nondestructive if not peaceful outcome in 2246 and 2267. The first effective measures were taken to counteract piracy in the UFP fringe areas. The Federation was firmly established as a balancing factor and a source of prosperity among its member worlds.

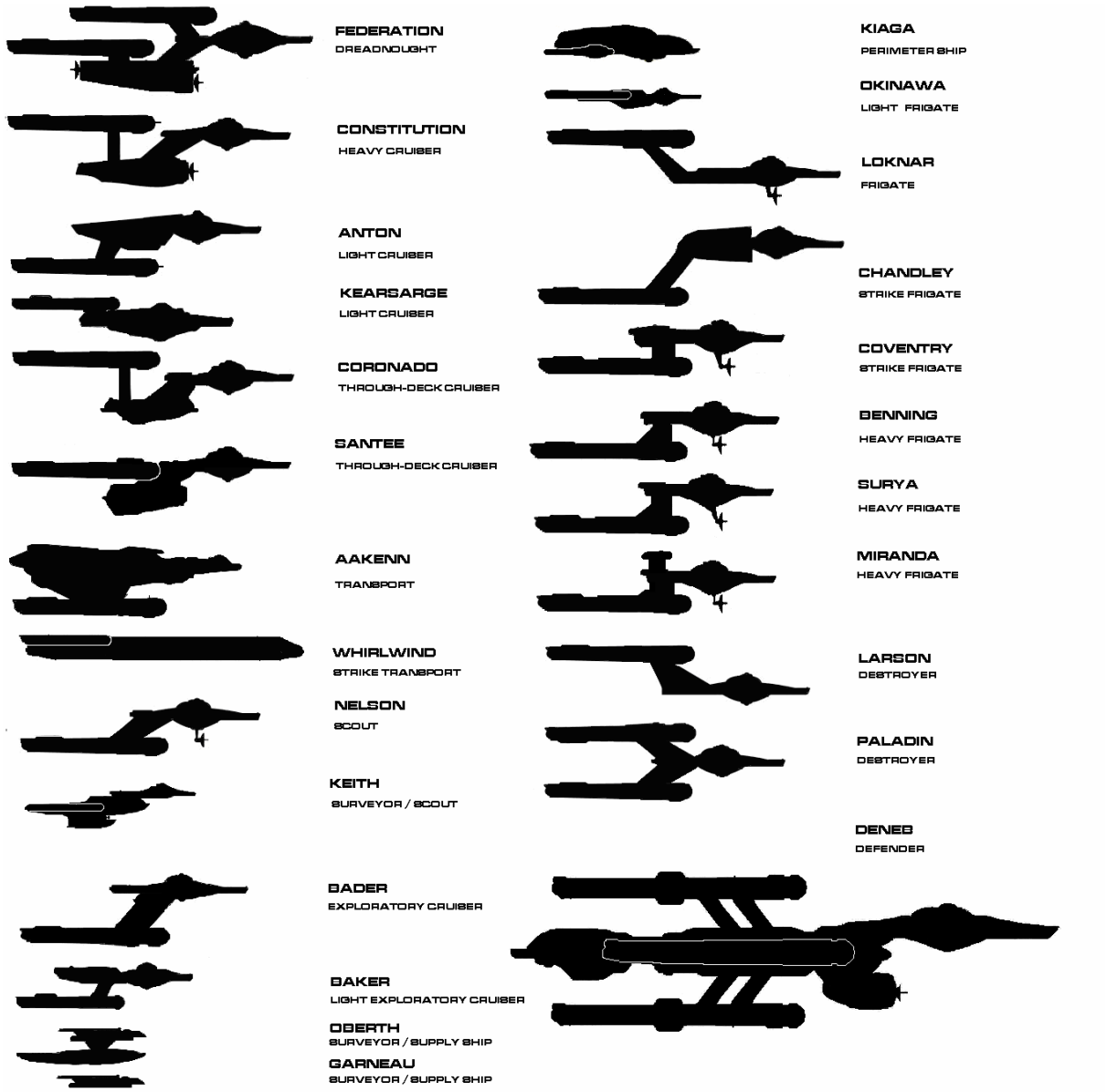
But Starfleet suffered from the results of overescalation, especially after the Organian Peace Treaty forced upon the UFP and the Klingon Empire by an alien race. Political resistance in the Council increased after the election of Lorne McLaren as the President of the UFP. Some rather ugly counterreactions also sprung up inside Starfleet. The Rittenhouse scandal was the first attempt at a military coup within the UFP, and was kept secret with great effort to prevent a public uproar. But this incident paved way for the gathering of other conservative forces, for people who reached for high positions in Starfleet in preparation of a major restoration of 'fighting honor', of 'the proper establishing of the humanity in its rightful place'.

The Organian Treaty was a blessing for the UFP despite its artificial nature. It provided the Federation worlds with enough time to actually study the Klingon culture and to try to understand the motivations of its military leaders (indeed, the whole concepts of 'military' and 'leader' in the Klingon context). Major reshuffling in Klingon High Council in the late 2260s–early 2270s was still badly misinterpreted by many Starfleet representatives, who felt a galactic war was inevitable in the immediate future.

Furthermore, the Romulan period of exploring the territory acceded to the Star Empire in the Treaty of Algeron, and assessing the resources inside it, was nearing an end. Soon enough, Romulan efforts would be concentrated on finding ways to break out of the stranglehold of the Neutral Zone. The easy way out, antispinwards, only led to a star desert. Rimwards lay the Klingon menace, corewards the Great Barrier. Spinwards there were riches to be taken, debts of honor to be paid – but also a Starfleet too strong for Romulan forces to challenge, patrolling a fortified and increasingly well monitored stretch of frontier. Only the cloak of invisibility developed in the 2260s would provide the Romulans with the means to circumvent the UFP siege in this strategic direction.

Technologically, the main advances on the Federation side were in the field of warp coil design, resulting in the linear plasma feed coil type and indirectly in the transwarp project. Also, photon torpedo technology was perfected, and small, shuttle-sized interstellar drives put to operation. Unbeknownst to the majority of the UFP, time travel was also made practical for the first time in human history. The technology was kept a closely guarded secret, along with many other dangerous or alien technologies the humanity stumbled into in this century. What was made public of the vast technological advances was sufficient to give the era the grandiose name 'The Great Awakening'.

Almost all of the pre-2220 ship types were retired in the 2250s, giving way to a wholly dilithium-powered fleet. Laser armament was replaced by phasers in a fleetwide upgrade program, and warp transporters introduced on the majority of vessels. The development of new destroyer starships was gradually downscaled during this period, and a fleet consisting mainly of frigates, cruisers and science scouts was formed. Many of the ship classes built in this period still have their representatives in operational reserves, reflecting the advances in shipbuilding technology and ship durability.



The principal ship classes of the Great Awakening in comparison view. Diversification along 'familial' lines is now evident in hull and engine design alike.

Constitution

Heavy cruiser
2239-2275

Completed:	36 total:
	14 C*onstitution* (including prototypes NX-1017 and NX-1371) built in 2239-45 16 *Bonhomme Richard* built and 10 converted from *Constitution* in 2248-52 6 *Victory* built in 2263-65
Length:	281.3 m (NCC-1017, NCC-1371, original) 288.2 m (NCC-1017, early operational; NCC-1371, operational) 288.6 m (NCC-1700) 289.0 m (*Constitution*) 286.7 m (*Bonhomme Richard*, *Victory*)
Beam:	127.1 m

Height: 70.2 m (NCC-1017, original)
71.9 m (NCC-1371, original)
72.6 m (NCC-1017, early operational; NCC-1371, operational; 1700)
71.5 m (*Constitution*)
70.9 m (*Bonhomme Richard*, *Victory*)

Mass: 595,000 tons (NCC-1017, original)
696,200 tons (NCC-1017, early operational)
599,100 tons (NCC-1371, original)
699,900 tons (NCC-1371, operational)
598,400 tons (NCC-1700, original)
699,600 tons (NCC-1700, operational)
679,300 tons (*Constitution*, typical)
682,000 tons (*Bonhomme Richard*, *Victory*, typical)

Officers: 69 (original)
50 (2250s standard)
43 (2260s standard)

Crew: 392 (original)
293 (2250s standard - figures vary considerably according to upgrade status)
387 (2260s standard)

Cruise speed: w 6

Max. speed: w 8.0 (*Constitution*)
w 9.0 (*Bonhomme Richard*, *Victory*)

Endurance: 5 years

Weapons: Standard weapons fit 2243-51:
6 laser emitters (130 nm / 4.0 GW) in 3 twin banks, port/stbd of bridge and fwd of ventral sensor array
4 Type L phased particle cannon (800 GJ / 1.2 TW) below bridge, 2 fwd, 2 aft (2 fwd only in NCC-1700)
2 Type M phased particle cannon (900 GJ / 1.4 TW) below bridge, 1 fwd, 1 aft (except NCC-1371, 1700)
4 fwd medium torpedo tubes w/ 80 photon torpedoes on ventral primary hull
Standard weapons fit 2251-2270:
6 phaser VII emitters in 3 twin banks, port/stbd of bridge and fwd of ventral sensor array (installed and lasers removed, except for NCC-1371)
6 fwd medium torpedo tubes w/ 150 photon torpedoes on ventral primary hull (installed in place of original torpedo systems, and particle guns removed, except for NCC-1371, NCC-1711)
Auxiliary weapons fit 2255-2270:
2 aft medium torpedo tubes on dorsal aft secondary hull (NCC-1700-1, NCC-1708, *Victory*)
2 phaser VI emitters on ventral secondary hull (NCC-1701-3, NCC-1706-8, *Victory*)
2 phaser VI emitters on dorsal aft secondary hull (*Victory*)
2 phaser VI emitters below bridge (NCC-1701-3, *Victory*)

Shields: 1-layer conformal forcefield
Primary navigational deflector on fwd secondary hull
3 secondary navigational deflectors on fwd primary hull

Laboratories: 12, in varying configurations (*Constitution*, *Victory*)
14, in varying configurations (*Bonhomme Richard*)

Transporters: 4 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II (original)
All ships brought or built to Mk III standard after 2260

Auxiliaries: 2 to 4 light shuttles and 4 shuttlepods, later also 1 heavy shuttle, 4 work pods;
various special environment and tactical craft sometimes carried (*Constitution*, *Bonhomme Richard*, *Victory*)
4 light or 2 medium shuttles and 4 shuttlepods, 4 work pods (NCC-1700)

Ships of historical interest:

USS Enterprise (NCC-1701), *USS Republic* (NCC-1371), *USS Defiant* (NCC-1764)

SOURCES: D TOS, ENT
N TOS (SFTM, SotSF, FASA)
H TOS (SotSF, FASA)

In the early 2240s, the *Constitution* class heavy cruiser program could easily have been considered a spectacular failure. More than twenty years behind the schedule, five times past the budget, the behemoths taking shape in distant construction yards were apparently hidden from publicity because of the embarrassment of major program setbacks. Hull components were reportedly being gleaned from

past shipbuilding programs, two decades out of date. Yet, those who had seen the *Bonaventure* demonstration knew better. What was emerging was nothing less than a revolution in spaceflight, the first operational incarnation of Project Starship.

Project Starship development logo adorns the dockyard work pods in this romanticized painting by Bardemeyer, depicting the birth of Starship Constitution*. In reality, the first starships were completed in tight secrecy and the project logo not used even in classified correspondence, let alone painted on utility spacecraft!*

The basis of the new cruiser design could be found in studies made way back in 2210 for an improved *Horizon*-size cruiser. Undisturbed by the poor propulsive performance of the *Indomitable* battle cruiser upgrade, Chiokis had promised that combining a *Horizon* secondary hull with the company's trademark saucer section and modernized engines would result in significant warp performance increases. In 2220, Starfleet had granted Chiokis the use of two relatively low-fatigue *Horizons*; first *USS Constellation* (NCC-1017), which had suffered major battle damage to her bow structures a year earlier, and later also *USS Republic* (NCC-1371), the victim of a rampant internal fire and extensive contamination from fire suppressants. Their command saucers as well as their mounting structures, the navigational deflectors and the main weapons array were removed.

After two years of iterative design effort, Chiokis managed to mount a new connector structure to the engineering hull, making possible the attaching of a new command section in the most optimal position for hull and warp field interaction. At first, mere placeholder hulls were used for dynamic testing, and no actual ship's systems were installed. The warp engines were removed from pylon stems outward, and new, long and spindly yet immensely strong pylons mated to the respective positions on the hull; then, structural testing was performed with a pair of inert engine nacelles. All *Horizon* weaponry was naturally removed from the secondary hull prior to refitting.

In 2226, after favorable yet badly delayed test results, the *Constellation* received a finalized version of the primary hull and the first set of PB-30A third-generation nacelles with massive ramscoops, finlike intercoolers, and extremely modern and hideously expensive 17-section, solid-state warp coils. Drive plasma was channeled from an advanced compression fusion main powerplant in the engineering hull, the largest yet built, and the ship set sail for early trial runs.

Results from early trials dealt a major blow to Chiokis. Apparently, the hull form did not agree with optimal warp fields after all. Inaccurate (indeed, outright faulty) computational models had failed to

predict a potentially disastrous resonance that could be generated in at least three locations, namely the saucer topside and two areas aft of the secondary hull bottom vertex. Solutions were sought using further computer simulations, subscale models and a structural test article for a remodeled secondary hull. Economics precluded the altering of existing *Horizon* hulls, so Starfleet suggested that Chiokis leave the designing of an optimized configuration for a future production batch and proceed with the existing hardware in the meantime. Despite this, precious time had been wasted, especially as it was in 2235 finally shown that the *Horizon* hull configuration was perfectly useable with a slight altering of engine placement. Computer models of warp dynamics in the 2230s simply weren't up to the task of accurately predicting such solutions – only the test flights of the *Bonaventure* finally verified the results.

By 2238 the program was back on track, with a crucial improvement: a dilithium-regulated antimatter reactor had been substituted for the original 4:1 m/am spicing, compression fusion powerplant. As design details were being finalized, *USS Constellation* was reactivated as NX-1017. The *Horizon* type secondary hull was used as intended, yet its structural interfaces modified, now featuring reshaped and lengthened engine pylons for the PB-31 engine, and a strengthened connecting fin for mounting the primary hull. The streamlining of dorsal superstructure immediately below the bridge was also performed, while the development and installation of a new lower-profile bridge module was dropped for budgetary reasons. The test runs with this vessel were successful, and the preproduction standard (still lacking main armament) was in essential parts applied on *USS Republic* as well, validating all construction machinery and methods. Based on this finalized design, Starfleet dockyards in May 2239 received a go-ahead for a production model of the new heavy cruiser class.

It took some 36 months to complete *USS Constitution* (NCC-1700). In the meantime, refitting of *Baton Rouge* cruisers with the new power system gave Starfleet confidence in the dilithium-based technology, as well as a much-needed breather in the struggle against the Klingons. This by no means amounted to a cease-fire; xenoanalysts expressed doubt as to whether the Klingons even recognized such a concept. In February 14th, 2242, a distress call from the Donatu system sent Starfleet scrambling for ships to defend the frontier colony. A piecemeal battle of attrition developed, claiming the cruisers *Endeavor* and *Yorkshire* before Starfleet's trump card could be played. Hastily diverted from an evaluation cruise, the *Constitution* fought off almost singlehandedly a succession of D5 and D6 battle cruisers, buying time for the main contingent of Starfleet reinforcements to arrive.

The badly hurt starship would spend three long years licking her wounds, while Starfleet reconsidered its investment – and the San Francisco dockyards toiled on an improved cruiser that featured the wider secondary hull after all. Other long-delayed improvements included a more capable impulse engine and radically improved torpedo armament and computational systems. This was to be the definite production standard: *USS Enterprise* (NCC-1701) was a nearly 700,000 ton vessel capable of warp 6 cruising, armed with heavy lasers and a mixture of phased particle cannon and torpedo systems and the latest-standard shields, and equipped with hypermodern sensors and navigation equipment. The official launch for the vessel came in 2245, and commissioning ceremonies were held almost concurrently with those of the *Constitution*.*

USS Constitution *and* USS Enterprise *compared. The recycling of* Horizon *and* Saladin *components is evident in the former vessel, while the contours of the latter are subtly yet crucially refined. Weapons and sensor placement also separates the two vessels. Concealed here is the significant difference in internal arrangement.*

The *Constellation* was reworked close to this production standard as well, in order to establish the costs and difficulties of altering the *Horizon* hulls. Both proved quite prohibitive, and Chiokis had to abandon the plan of using *Horizon* components for further cruiser production. The *Republic* received a far less extensive overhaul and was utilized in defensive missions until relegated to training duty in 2248. The remaining badly outdated *Horizon* class vessels were in turn all retired by 2249, as Starfleet was fully convinced that the new cruiser class would be a perfect replacement for them.

There was some debate as to which of the four ships initially completed would have the honor of becoming the class ship. The working name, 'Project Starship', had been used on the dedication plaques of the two *Horizon* conversions, and was applied as a placeholder class name to the first two production ships as well. The third newbuild off the dockyards, *USS Farragut*, was thus the first to carry the official nomer of '*Constitution* class'.

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Once the agonized development and prototyping stage was over, the veil of secrecy was finally lifted from the Starship design. Official commissioning ceremonies for the initial four vessels were public events and propaganda triumphs for Starfleet, and extensive onboard tours were provided to UFP representatives and dignitaries. Procurement of twelve production models was secured largely thanks to the unconventional yet thorough demonstration cruises arranged by Capt. Robert April, commander of the *Enterprise* and strong proponent of her use in expanding the nonmilitary role of Starfleet.

The finalized *Constitutions* incorporated two hulls of roughly equal volume but different configuration and role. The primary saucer hull contained main crew quarters, weapon systems, sensors and multiple laboratories as well as impulse engines, and the ovoid secondary hull housed engineering facilities, the shuttlecraft hangar and some redundant habitation and research functions.

The two PB-31 warp nacelles were mounted on exceptionally long, straight *Bonaventure*-style pylons extruding from the top of the secondary hull in a side angle of about 45 degrees, far enough from the crew compartments to protect onboard personnel from the effects of the field and to ensure unobstructed jettisoning. The actual reasons for this placement were dictated by warp field geometry, though, and Starfleet even issued multiple statements reaffirming the safety of the more traditional nacelle configurations. The coils of the production model were certified for warp 6 cruising and a top speed of warp 8 with dilithium-regulated, total-conversion antimatter power – fusion power was no longer available for warp propulsion in this or later designs.

On top of the saucer was the main bridge of standard Class One design, well protected by the forcefield shields and an outer buffering shell of sensor access spaces. Below this was a two-deck weapons station. Originally intended to hold two to four *Saladin*-type Mk 1 photon torpedo launchers,

the station instead came to feature forward and aft particle cannon; later variants that eschewed with these weapons substituted other facilities, typically including a laboratory complex and a scientific airlock. The torpedo system was still included at a corresponding ventral saucer position, and provided the second spike of the deadly trefoil of the superships. On the widest levels of the saucer were crew facilities, with sickbay, auxiliary control and the computer core best-protected in the middle. The extreme bow held a multi-emitter secondary navigational deflector, as in other Chiokis designs.

Two twin projected-energy weapon banks at the top and one at the bottom of the saucer comprised the standard main armament of this type, originally featuring 4 GW lasers. In a sense, referring to this final component of the trefoil as the 'main' armament is misleading, since the phased particle cannon and the improved photon torpedoes actually offered greater destructive potential against most targets. Yet starship captains generally preferred engaging the enemy with lasers whenever possible; and when phaser VII banks in the 2250s replaced the lasers, the saucer emplacements indisputably secured their position as the main combat system of the cruisers. Nonstandard weapon fits were common, even more so than 'standard' weapon complements. For example *USS Republic* retained laser armament until her deactivation in 2257, mainly due to her training ship status, and was stripped of energy weapons altogether with her reactivation for schoolship use in the late 2280s, save for a single saluting gun.

USS Defiance *(NCC-1704) in standard grey paint scheme in 2263. Pennant designs first used in the* Bonaventure *were applied on the early* Constitutions*, and eventually became a fleetwide standard. By the sixties, competing schemes had already begun to emerge, but the* Constitutions *were slow to adopt them; most retained their initial decorations until the round of extensive refits in the early 2270s.*

At the aft end of the saucer was the impulse engine unit, in NCC-1700 essentially a *Saladin* SBE impulse system with four accelerator coil assemblies placed together. From NCC-1701 on the system was scaled up to almost double the original size and power, to the SBA standard, firing through only two forcefield-vectorable nozzles. Two fusion generators provided both auxiliary power and helium propellant. Main power came from the antimatter reactor via a primary power trunk on connector fin trailing edge, but limited impulse power was available even when mains were off-line.

The secondary hull front end was reserved for the powerful primary navigational deflector system. The compartments behind this featured engineering subsystems, main engineering with the still highly classified dilithium reaction chamber, multilinear antimatter bottles, and a large shuttle landing bay and hangar. The latter facility was considered something of a relic when the first ships were completed – it was originally intended as a flight deck for defensive sublight fightercraft and various shuttles, but the former were already obsolete and the latter were to be replaced by transporters. Later, when the

persistence of transporter technology limitations despite the duotronic improvements became obvious, the engineers would congratulate themselves for being farsighted enough to retain the hangar. Indeed, a variant would later be built with a 'through-deck' shuttlebay for carrying of fighters, assault shuttles and miscellaneous auxiliary craft.

Several laboratories were located around main engineering, forward of the shuttle hangar; workshops were clustered below the hangar. At the bottom of the ship were antimatter tanks refuelable and jettisonable through access doors on the ventral surfaces, and the main tractor beam assembly. In a mid-2250s refit, select vessels would receive two aft-firing torpedo launchers in specifically prepared compartments above the shuttlebay, while twin phaser emitters would appropriate some of the space originally reserved for an auxiliary cargo hold in the fantail. These weapons were intended to help cover the blind spots not within the cone of fire of the ventral primary hull phaser bank, and to compensate for the lack of heavy rear armament created by the omission of rear particle guns. However, they never really proved satisfactory in solving the blind spot problem; future designs derived from the *Constitution* class would feature phaser emitters atop and at the bottom of the secondary hull for a better overall solution.

Since the *Constitutions* were the fastest ships available, they were given facilities to respond to all kinds of emergencies on the remote colony worlds they were to protect. Thus, capacious holds in the secondary hull usually held everything from genetically improved grain seeds to temporary habitats and atmospheric regulators. The ships could be let to conduct colonization missions because, for the first time, they would have the speed to respond to more urgent military crises elsewhere. The element of 'bringing in the reinforcements' was thus reintroduced to space combat, as demonstrated dramatically at Axanar.

In the decisive move of the battle of Axanar, the Constitution *dives into a Klingon D5 formation, phase cannon blazing. The bold tactics of a former destroyer commander proved devastating against the Klingons, and inspired other Starfleet commanders in the battle as well. The resulting success also prompted the adoption of highly aggressive operating doctrines for the heavy cruiser fleet; the hyperexpensive vessels were risked in a manner that gave indigestion to traditionalist naval commanders.*

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The *Constitution* class was upgraded and overhauled several times; in the 2250s, a major upgrade was accompanied by the fielding of fourteen newbuild ships, the first of which was *USS Bonhomme Richard* (NCC-1712). The main systems to be upgraded were the early PB-31 engines, replaced by PB-32 mod 3 units. Lasers were replaced by Type VII phasers, emitter by emitter. The early Lockheed 447 series units were rather unreliable and delicate pieces of equipment that could seriously overheat after just two or three shots. As the Agusta RI series became something of a fleetwide standard, RIN-8 was considered for the heavy cruisers as well. Such plans never bore fruit, however: the necessary

physical modifications, either to the integrated, closely spaced twin emitter assembly or to the more widely separated weapon berths of the ship, were deemed prohibitively expensive.

The separate particle cannon were removed, the loss more than compensated by installing a six-tube Selenia 'Wolf' Mk 2 photon torpedo battery on Decks 8 and 9. A few years later, the ships received the Mk 12 upgrade, introducing loaders compatible with improved direct-annihilation warheads. Select units were also given additional phaser coverage, in the form of two single phaser VI emitters at the bottom of the secondary hull; these compact, modular weapons were referred to as amidship phasers. Although Starfleet also experimented with installing emitters on the superstructure below the bridge, only the amidship phasers went on to become a permanent fixture of future starship generations.

The *Bonhomme Richard* configuration was found highly satisfactory in all respects; so satisfactory, in fact, that further upgrading of the *Baton Rouge* era cruiser fleet was discontinued, and two more *Bonhomme Richards* completed. Also, all the surviving first-batch *Constitutions* except the *Republic* and *Potemkin* went from original standard through three or four routine overhauls to *Bonhomme Richard* standard. Finally, the commonalized fleet was in the mid-2260s reinforced by six vessels known as the *Victory* (NCC-1760) subclass, featuring every possible element of the 'optional' upgunning and going straight to the TacFleet special military response force. An accompanying battle cruiser modification with sturdy horizontal pylons and a significantly increased torpedo armament, the *Richelieu* (NCC-1750), was abandoned without any keels laid, however.

Plunging into the Fire Swamp nebula on a seeming exploration errand on March 12th, 2276, USS Victory *(NCC-1760) in fact begins a daring infiltration mission into the Romulan Star Empire. The specifics of the evident break in Romulan-Klingon relations after the Klach D'Kel Brakt betrayal could not be confirmed via conventional diplomatic channels, so Starfleet was willing to risk war with armed reconnaissance. Although the* Victory *mission logs remain classified, the gamble of Operation Grey Ghost apparently paid off, as close military and diplomatic ties with the new Romulan government could be established soon thereafter.*

During the fifty years of conflict with the Klingons, a total of 35 heavy cruisers of the *Constitution* family (plus 13 export variants of the slightly less capable *Achernar* standard) were thus completed for Starfleet and its allies. Of these, six were lost in action and a handful of others damaged but later salvaged. The ill-omened *Valiant* was the first to go, following her three immediately preceding namesakes to 'missing in action' records just eight months after her commissioning. Ten years later, the *Farragut* lost almost half of her crew to a barely physical yet utterly lethal lifeform. Yet the successes of the exploration program offset the defeats, and deep space sorties continued uninterrupted.

Fate was kind to the cruisers again for a decade thereafter, but took cruel vengeance on the original *Constitution* batch in the first year of Organian peace. The *Constellation* and the *Intrepid* were attacked by leviathans of possible extragalactic origin, and the *Excalibur* devastated by a bizarre computer malfunction during wargames. The crew of the *Exeter* was all but wiped out by a deadly pathogen; the intact but contaminated vessel had to be withdrawn from service. The *Defiant* and the *Rivoli* were subsequently lost in TacFleet service at the rimward frontier, and the *Kongo* would yet suffer a crippling onboard explosion in 2277 – but surprisingly, none of the *Constitutions* was ever destroyed by Klingons. Space proved to be dangerous enough even without this menacing enemy. The McLaren administration, already wary of increasing Starfleet expenditures, considered the losses indicative of a misguided exploration policy, and major cutbacks were suggested and in some cases also effected in the late 2260s. Fleet Admiral Heiharchio Nogura, veteran of the prolonged Klingon conflict and strong proponent of the *Constitution* exploration program, resigned in protest.

There were valid arguments against the program, however. More and more power was being concentrated on starship captains distanced from the councils of the Federation by gulfs of space and ideology. Moralizing, even patronizing attitudes towards less driven cultures were assumed, and a type of techno-protectional imperialism began to grow within the ranks of Starfleet. Several captains of the new starships grossly exceeded their authority, bending the letter and defying the very purpose of the protective Prime Directive adopted early on in UFP history. This could be seen as an effort to forge a closer union with near-human races, a natural counterreaction in the aftermath of Axanar. On the other hand, this protectionism was also an important factor in quietly establishing Earth as the political and economic 'strong man' within the Federation while officially following the principles of 'one world, one vote'.

Central to all these arguments was the fact that the *Constitutions* represented a quantum leap in power, speed and range – a leap so great that they could not help but shape anew the goals and policies of the UFP. Indeed, it was the ultimate success of the exploratory program, embodied by the heroics of surviving starships *Enterprise*, *Hood*, *Lexington* and *Yorktown*, that finally prompted the McLaren administration to agree on the extensive refit project that would in the early 2270s introduce the LN series of linear engines and ultimately revigorate the entire Starfleet.

*) Hidden from the public eye, NCC-1701 had already performed a covert mission in the direction of the Romulan border. This apparent validation run of engines and navigational system is rumored to have included weapons testing as well, but full details are yet to be released as of 2375.

Anton

Light cruiser
2239-2252

Completed:	5
Length:	248.0 m
Beam:	127.1 m
Height:	59.8 m
Mass:	659,500 tons (w/ final armament and exploration gear)
Officers:	31
Crew:	259
Cruise speed:	w 6
Max. speed:	w 8.0

Endurance:	2 years
Weapons:	6 laser emitters (130 nm / 3.2 GW) in 3 twin banks, port/stbd of bridge and fwd of ventral sensor array 2 Type M phased particle cannon (900 GJ / 1.4 TW) below bridge 1 Type L phased particle cannon (800 GJ / 1.2 TW) below bridge 4 fwd heavy torpedo tubes w/ 60 torps on ventral primary hull (NCC-1228 only)
Shields:	1-layer conformal forcefield Navigational deflectors on fwd secondary hull
Laboratories:	None (initial prototypes) 1 GP, 2 planetary sciences, 1 astrophysics, 1 life sciences, 1 linguistics (final light cruisers)
Transporters:	2 GP (6-pad), 1 emergency evacuation (18-pad); Mk II (initial prototypes) 4 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II (final light cruisers)
Auxiliaries:	2 medium and 2 light shuttles

Ships of historical interest:

USS Silversides (NCC-1226)

SOURCES:	(D FASA) (N FASA) (H own, FASA)

Among the numerous ship designs related to Project Starship, the *Anton* class light cruisers deserve perhaps little more than a footnote. Yet however unsound their engineering solutions, however unwieldy their design, they ultimately defined the shape of the future for a major element of Starfleet's strength. Often derisively considered the 'second-rate starship', this configuration represented a compromise between the high warp performance of *Constitution*-like vessels and the economy of a ship with inboard engines and a single hull. It would later become the shape of the *Surya* and *Miranda* lines of heavy frigates and light cruisers, the *Hokule'a* medium cruisers, the *Springfield* class of frigates, the *Nebula* explorers, and will no doubt be how Starfleet's counterpart to the modern *Sovereign* class will turn out in the late 2370s.

In the 2230s, however, the shape of *USS Anton* was mainly a point of ridicule. As the Chiokis Corporation met with failure after failure in integrating the sleek hulls of *Horizon* heavy cruisers and modern *Saladin* destroyers into the first Project Starship spaceframe, it was finally forced to consider alternatives. A hull of *some* kind had to be fielded to test the PB-31 engines, operationally connected to duotronic control computers and a full-scale powerplant, or funding would evaporate. The structure of choice for Chiokis was the *Baton Rouge* angular secondary hull. A hectic integration effort resulted in a mongrel of design philosophies whose aesthetics could only be commented on in the rudest of terms. Still, what was significant was that this ship could fly. By 2235, *USS Anton* (NX-1225) had established beyond doubt the correct performance figures and operational procedures of the PB-31 engine, and thus removed the final obstacles on the way of the launch of *USS Constitution* and *USS Enterprise*.

Essentially, the aft half of the *Anton* was constructed of two *Baton Rouge* secondary hulls mated side by side. These hulls were nearly complete system integration test articles that featured almost all the gear of a fully completed cruiser. Each hull still housed its navigational deflector machinery; the beam projector was simply moved underneath the hull, to fire past the lower sensor dome of the saucer-type primary hull from port or starboard. Also, each hull contained a shuttle hangar with all its accessories, mainly for the reason that removal of these facilities would have resulted in unnecessary expenses. Antimatter tankage was also retained almost unchanged.

The crucial pieces of equipment aboard were brand new, however. The RMR-124 antimatter reactor featured a short multilinear core assembly and long plasma conduits extending athwartships and then down canted pylons, in a configuration that was as close a mirror image of the upcoming *Constitution* assembly as possible. The impulse engines were of the type being installed on the NCC-1701 as well, with a modified nozzle arrangement but with 87% component commonality. The pylons were only slightly shorter than the ones that would be used on the heavy cruiser starships. And the sole difference between the PB-31 Mod 0 engines of the *Anton* and those being welded onto the *Constitutions* was the presence of extra monitoring instrumentation in the former.

Between 2236 and 2238, the *Anton* was joined by four sister ships, each with a different agenda in testing the components of the Project. However, on the background hovered the company's ambitions of eventually selling these vessels to Starfleet for operational use. The dockyards had already been machined for producing the aft hulls out of all-new components, for greater structural strength, simplicity and efficacy. Mass production could proceed if the word were given.

The *Antons* remained unarmed, sparsely equipped Chiokis testbeds until 2238. At that point, Chiokis was fighting the final battle for the custodianship of Project Starship, and the one thing it still lacked was weapons integration expertise. The very modestly armed *Amchitka* class vessels Chiokis had been producing as a stopgap measure did not represent the required state of the art in photon torpedo and phased laser and particle gun systems, nor in fire control hard- or software. Now was the time to arm the *Antons* and provide proof of the company's skills.

Sporting a full operational fit of weapons and sensors at last, USS Anton *(NCC-1225) in 2240 begins an exploratory mission in the direction of Serpens. Persistent engine problems would send the ship back within fourteen months out of a planned 24, but meaningful data could still be gathered on the area of space long neglected in survey programs.*

The heaviest weaponry for the *Antons* was of *Constitution* standard, featuring the same primary and secondary phase cannon types but in fewer mounts. Only forward-facing weapons were installed, both out of necessity of hull geometry, and to spare the existing cannon for installation on the heavy cruisers. Laser armament was very potent, yet of slightly smaller caliber than the *Constitution* counterpart, with 3.2 GW emitters only. Fire control sensors and computers represented full heavy cruiser standard.

In 2239, Starfleet finally agreed to purchase the *Antons*. Under a light cruiser designation, and carrying a crew of 290, they were dispatched on two-year missions of exploration towards uncharted and unchallenged space. The only ship to renew such a mission was *USS Silversides* (NCC-1226); Starfleet found to its disappointment that the piecemeal construction of the testbed ships had resulted in labor-intensive vessels of limited utility. Ownership of the other four vessels was returned to Chiokis, but with indications given that Starfleet would be interested in an improved version in the near future.

When refined versions of the design emerged from 2242 onwards, they achieved major fame under the *Surya*, *Miranda* and *Coventry* class names. Chiokis took special pride in the ugly ducklings it had used as the basis of its success, somewhat misleadingly declaring the successor designs 'subvariants of the *Anton* class'. The swan song of the *Antons* themselves was already sung, though. The light cruisers languished in reserves until stricken from Fleet strength altogether in the 2260s.

Capella

Surveyor / supply ship
2239-2276

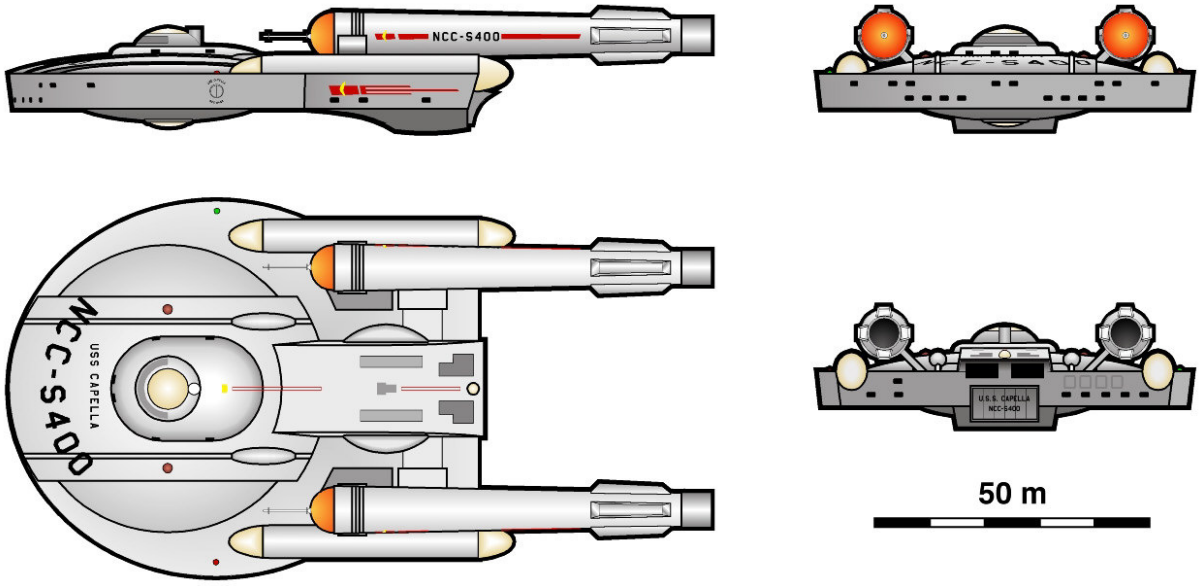
Completed:	100 total: 58 Mk I surveyors built in 2239-42 42 Mk II surveyors / supply ships built and 17 refitted from Mk I in 2249-52 1 Mk III supply ship refitted from Mk II in 2270
Length:	127.7 m (original) 138.0 m (PB-34 refit) 145.0 m (WD-4 refit)
Beam:	68.0 m
Height:	22.4 m (original) 25.7 m (PB-34 refit) 27.0 m (WD-4 refit)
Mass:	220,700 tons (original) 230,500 tons (PB-34 refit) 290,600 tons (WD-4 refit)
Officers:	18
Crew:	88 + up to 50 researchers (original) 97 + up to 20 researchers (refits)
Cruise speed:	w 3 (original) w 5 (refits)
Max. speed:	w 4.8 (original) w 7.1 (PB-34 refit) w 7.3 (WD-4 refit)
Endurance:	1 year
Weapons:	Original: 2 laser emitters (130 nm / 600 MW) port/stbd of bridge Refit 2259: 2 phaser VI emitters port/stbd of bridge
Shields:	1-layer conformal forcefield Navigational deflectors on dorsal cowlings
Laboratories:	1 GP, 1 planetary sciences, 1 astrophysics, 1 life sciences Up to 12 additional modules for up to 4 themes optionally carried
Transporters:	2 GP (6-pad); Mk II (original) 2 GP (6-pad), 2 cargo; Mk III (refit)

Auxiliaries: 1 light shuttle, 1-3 shuttlepods

Ships of historical interest:

USS Hypatia (NCC-I624/NCC-S415)

SOURCES: (D Masao Okazaki, Allen Rolfes)
(N Christopher Bennett)
(H Masao Okazaki, Christopher Bennett)



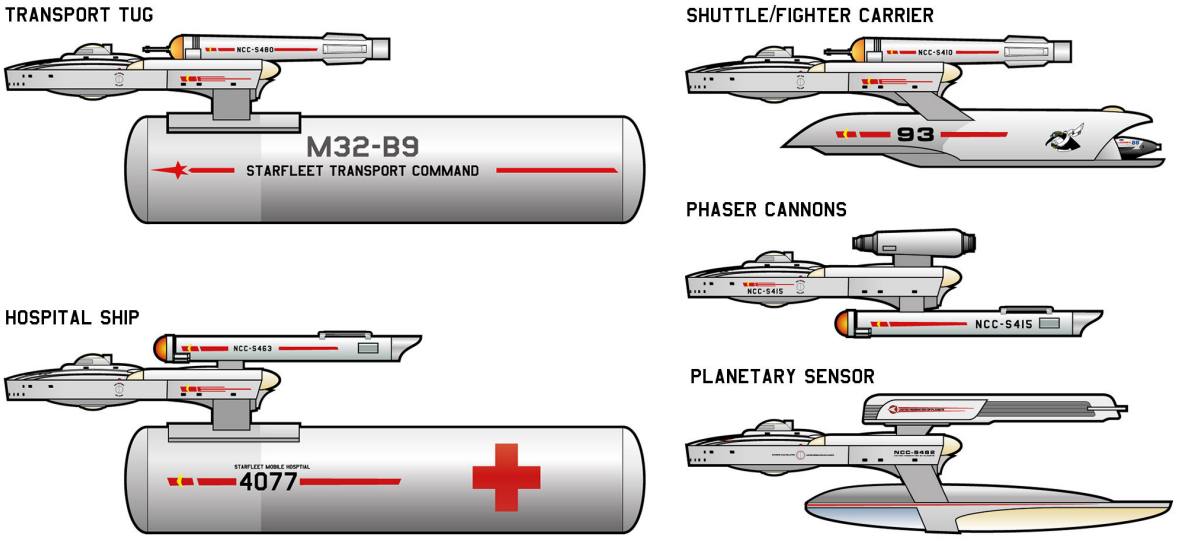
The delays met in Project Starship did not completely paralyze Starfleet procurement in the 2230s. While primary and some secondary combatants were put on hold pending the outcome of the Project, plans for smaller support types continued to receive funding and access to the latest in propulsive, power production and computing technology. In 2238, Salazaar was tasked with creating a high endurance, deep space survey and surveillance type for the needs of the intelligence community, replacing the *Hale* class and emphasizing affordability over the technological ambitions that had hobbled the earlier program.

The dockyards managed to sketch the required compact design in record time using *Pyotr Velikiy* solutions. Key among these was the use of complex, nested hull shapes to efficiently graft a compartment for a king-size warp core onto the mission-specific parts of the ship. The bridge and surrounding officer accommodations were sunken halfway into a flat, round dome, which in turn was topped by a rectangular cowling that provided headroom for analysis rooms and space for armament, support gear and computing systems. This second deck was offset forward with respect to the oval planform of the next two decks, providing room and easy access for the labor-intensive SSWR-XVIII reactor amidships. A rectangular stern extension housed the remaining vital systems: a dorsal cowling for twin impulse engines was matched by a ventral protrusion for a miniature shuttlebay and adjoining cargo hold, while the upper corners of the extension sported canoe fairings for compacted deuterium, giving the vessel the required interstellar endurance.

That the initial mounting of two heritage PB-23 nacelles yielded a pedestrian performance of warp three cruising and warp 4.8 dash speed in the 2239 trials was an anticipated and accepted outcome at this stage of the process. Much like *Pyotr Velikiy*, the tiny surveyor had been built with robustness as the leading criterion: the short and sturdy pylons could mount a variety of nacelles in

the 70,000-100,000 ton, 60-80 m size range, paired either dorsally or ventrally, or even in combinations of four. While the quad-nacelle combination was abandoned for a range of practical reasons, *USS Capella* (NCC-I609) tested a ventral positioning for PB-23C even as nineteen sister ships were already undergoing structural assembly. A dorsal mounting was eventually selected for the entire class, but the alternate hardpoints were retained.

In 2240, the *Capella* class entered survey and surveillance duty along the Klingon border, armed with two 600 MW lasers and a host of sensors, the latter domed at the forward and aft ends of the fuel canoes as well as above and below the main hull. The 58 vessels embarked crews of up to a hundred and fifty, accommodating researchers and other specialists as needed and carrying up to sixteen compact laboratory modules at times. As with the *Hale*, a light F class shuttle and up to three D class pods could be squeezed into the hangarette for planetary forays, although not efficiently maintained for long missions. Despite the seeming flexibility and versatility, missions soon ran into hardware and space limitations – by no means an unexpected turn of events for a ship this small. Normally, SF Exploration Command and Intelligence would have been satisfied to retire the class after a couple of decades of service, starting anew from a clean slate.



A menagerie of payloads, warp engine types and placement options demonstrates what could be done with a fleet of Capellas*. Any individual vessel would still be limited to a fairly narrow range of missions.*

Yet the late 2240s offered a tempting alternative. The *Procyon* corvettes and their offshoot couriers and scouts transcended small vessel propulsion doctrine with their PB-34 engines and compact dilithium-focus powerplants – both technologies easily applicable to the *Capella* spaceframes. The generic, already somewhat archaic hulls would not make for superb corvettes, couriers or scouts, but they would provide a cost-effective basis for a jack of three trades. With modern sensors and all-new duotronic mainframes now propelled through deep space at warp five cruising speed, the *Capellas* could take on practical courier loads, bring sensors to bear on fairly distant targets, and even provide point defense with the increased power now available to the lasers. In addition, the interiors were built to be more reconfigurable than ever, accommodating fabricators, special cargo holds or triage rooms with minimal downtime at spacedock.

In this dorsal bow view, the Hypatia *reveals many of the features upgraded in her 2249 refit at a glance. In evidence are the sleek PB-34 nacelles with their proudly extended deflector spires and the curved source-end field visors of the B variant; the QIK-09 tactical sensor domes aft of the 130/.6 laser mounts; the dorsal antennas of the new cargo transporters; and even the modern pennant paint used to indicate the general support status of the vessel over her previous intelligence gathering identity. Unseen go only the ventral cargo grapple fixtures, holding a modest sensor pallet on this mission but capable of hauling a frontline refueling module or even a cargo container if needed. The* Hypatia *also tested ventral mounting of warp engines for the duration of the heavy 'Absalom' phase cannon trial runs.*

Some forty new keels were also laid down in 2249 to make best possible use of the new capabilities, utilizing lightweight materials and simplified structural solutions. As no ventral engine hardpoints were installed this time, the newbuilds could not mount a cargo grapple there like the seventeen refitted original *Capellas* did; nevertheless, the entire class received new registries, switching from I to S prefix to emphasize the general support role. Thanks to the modernization, the class could continue frontline service for two more decades, easing the *Hale* class to much-awaited retirement and providing welcome overlap with the follow-on *Garneau* survey and supply ships. Various minor further upgrades were performed, including the installation of Type VI phasers and two rounds of sensor refits. WD-4 engines were also trialed on the *Bellatrix* (NCC-S462), and cleared for general use. By the 2270s, the *Capella* class was hopelessly outdated nevertheless; the last units were retired in 2276, donating the class name (and several individual ship names) for thematic use by the *Tikopai* fleet of deep space cruisers.

Larson

Destroyer
2240-2283

Completed:	89 total: 9 *Larson* destroyers Mk Ia and 10 Mk Ib built in 2240-42 34 destroyers Mk II built and 7 converted from Mk I in 2250-53 26 destroyers Mk VI built and 30 converted from Mk II in 2261-63
Length:	268.8 m
Beam:	133.6 m
Height:	62.9 m
Mass:	332,400 tons (NCC-4300-4308) 332,200 tons (NCC-4309-4318) 330,750 tons (NCC-4319-4352) 337,000 tons (NCC-4353-4378)
Officers:	45
Crew:	150 (*Larson* Mk I, II) 155 (*Larson* Mk VI)
Cruise speed:	w 5 (original) w 6 (refit in 2260)
Max. speed:	w 8.0
Endurance:	2 years
Weapons:	<u>Original:</u>

2 laser emitters (130 nm / 2.0 GW) in twin bank fwd of bridge
4 laser emitters (130 nm / 2.0 GW) in 2 twin banks port/stbd of ventral sensor array
1 Type L phased particle cannon (800 GJ / 1.2 TW) on dorsal primary hull (NCC-4300-4308)
4 fwd medium torpedo tubes w/ 40 photorps (NCC-4309-4318)
Refit 2250:
6 phaser VI emitters in twin banks in former laser positions (Mk II)
4 fwd medium torpedo tubes w/ 40 photorps
Refit 2260:
6 phaser VII emitters in twin banks in former laser positions (Mk III)
4 fwd medium torpedo tubes w/ 40 photorps

Shields: 1-layer conformal forcefield
Navigational deflectors on fwd hull

Transporters: 4 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II

Auxiliaries: 6 work pods

Ships of historical interest:

USS Alesia (NCC-4454), *USS Cromwell* (NCC-4477), *USS Sheridan* (NCC-4463), *USS Thelenth* (NCC-4405)

SOURCES: (D FASA)
(N FASA)
(H own, FASA)

The first half of the 2240s was the climax of Starfleet's attempt to close the gap between Klingon and UFP military strength. The *Saladin* program had provided the fleet with large numbers of anti-ship weapon platforms, but even after the dilithium upgrade these vessels could be considered attrition units at best. The more potent *Detroyats* were in theory more to Starfleet's liking, but were built in low numbers due to their complexity. In 2239, Starfleet initiated the development of a dilithium destroyer that would finally combine the affordability of the *Saladins* and the potential of the *Detroyats*, and become a worthy stablemate for the *Constitution* heavy cruisers.

It was still argued that the warp maneuverability of a two-nacelle system would not be required in destroyer operations; the task of intercepting could be handled by photon torpedoes. Even though still rather clumsy and inaccurate, the most recent torpedo designs far outperformed the *Detroyat* main weaponry and would thus compensate for the lack of warp agility of the launching vessel. A less expensive one-nacelle configuration would then arguably be cost-efficient and battleworthy. Performance goals were set at an initial-standard cruise speed of warp 5 and a rather high top speed of warp 8. The ships would be fielded in relatively large numbers to accompany the already numerous *Saladins*; the new cruisers and heavily armed twin-nacelle frigates, both featuring groundbreaking technology from Project Starship, would add to Starfleet's torpedo firepower as well.

Even though the PB-31 engines were lifted directly from the latest *Saladin* upgrade program, the original *Saladin* field configuration was modified by inverting it and flattening it slightly to imitate a two-lobed field. The nacelle was supported above the primary hull by two triangular struts that each housed extensive cooling arrays in addition to the plasma conduits. Antimatter power machinery, which had become more compact in three years of development, was housed within the saucer hull and a slightly protruding dorsal compartment at the stern. All ships immediately received dilithium drives with multiply-redundant warp core ejection and nacelle jettison systems. However, there was a small deuterium-tritium fusion reactor system for auxiliary power and also for production of impulse engine power and propellant.

The ships were armed with three powerful twin 2 GW laser emitters, again in an inverted arrangement in comparison with the *Saladin* systems. Primary firepower was to be provided by a four-tube Mk 2 'Wolf' torpedo system, much developed from the Mk 1 *Saladin* incarnation. This

development did not proceed without problems, though. The first six-tube 'Wolf' systems tested aboard heavy cruisers had a progidous rate of misfires, and the four-tubers introduced the further idiosyncracy of mechanically jamming when commanded to disarm. Selenia struggled hard to make the systems behave; still, many of the destroyers were initially fielded with a *Baton Rouge* -type particle cannon in place of the torpedo system. When the Mk 2 launcher finally was delivered to frontline units, it still proved bulky and somewhat unreliable. Highly capable growth variants were nevertheless soon mounted on the *Surya*, *Coventry* and *Constitution* classes.

A crew of 195 operated the ship, their living quarters sharing the space on the seven decks with weapons, impulse and warp powerplants, sensors and support machinery. Lifeboats were provided for the crew behind jettisonable hull hatches, but actual onboard auxiliary craft were limited to work pods; four six-pad transporters were installed for personnel transport needs. A planetary landing could be performed with the nacelle jettisoned. One such emergency landing did take place in 2261, when *USS Cromwell* (NCC-4477) took refuge on δ Canaris VI after the nacelle was ripped out and life support compromised by a relativistic-speed meteoroid cloud (perhaps extragalactic visitors, perhaps projectiles from an ancient war?). Recovery and repairs were successful and returned the vessel to service by 2263. *USS Sheridan* (NCC-4463) had fared worse, losing all but three of the crew on her maiden voyage to a power system explosion that could not be contained. Nacelle jettison systems were indeed notoriously unreliable even in the case of the largely self-contained mid-23rd century circumferential engines – and problems are confounded in the modern distributed designs where high-energy plasma leads to the nacelle have to be cut, sealed and purged before jettisoning.

USS Larson *(NCC-4400, here 'ghosting' as NCC-3702 for an assignment to the Epsilon sector of the Klingon border) pays honors to an entire lineage of Starfleet heroes, from Admiral William Larson, the distinguished leader of Earth's first true interstellar war, to Captains Glen and Penelope Larson of contemporary career years. The class was virtually the only one in UFP Starfleet to follow the past custom of honoring recent military leaders. Explicit decisions against such naming schemes have never been made, but it is the tacit policy of Committee for Starfleet to avoid the controversy of 'rewarding large-scale acts of violence', no matter how just these seem from the viewpoint of the era.*

As many as eighty-nine of the modern destroyers were built under the class name *Larson*, in four distinct batches, although just nineteen were procured in the initial configuration, divided more or less evenly between phase cannon and torpedo types. Each ship was named after a famous Earth – or, in the single case of *USS Thelenth* (NCC-4405), Andorian – military commander, later also after famous battle sites. Registries were frequently changed, warp signatures fiddled with, and ships shuffled and reshuffled between starbases to hide the true numbers of these ships, the 'ghost numbers' ranging from low 3700s to high 4400s. While the trick was beginning to lose its effectiveness as Klingon intelligence forces gained in experience, later examining of Klingon archives has revealed that the Empire did initially overestimate the number of *Larsons* by an

impressive hundred hulls. Apart from the perimeter ship deceptions, this was the greatest such counterintelligence victory against the Klingons, but also among the last.

Even when not backed up by 'ghost ships', the destroyers provided Starfleet with considerable anti-ship attack power at minimum possible cost and maximum effectiveness. Some 34 were added to Fleet strength in the early fifties. However, the wisdom of *Larson* procurement was repeatedly brought to question in reviews ordered by the Ixan administration of 2247-53. Despite initial high hopes and continuing insistence, the destroyers were quite unsuitable for exploration, research or rescue operations. Also, as materials and transporter-fabrication technologies advanced, questions were raised about the necessity of such 'contingency' warships in general. Thanks to the new technology, many formerly prohibitively expensive designs like the twin-engine frigates of *Miranda* family were now available for the role of 'attrition units'. Finally, the mission requirement of challenging enemy capital ships of superior strength began to sound hollow in view of continuing Romulan isolation and post-Axanar Klingon aimlessness. Again, there were factions that claimed that the ships would be useless against the Klingons and overarmed for anything else. As a result, three attempts at further production were deferred between 2253 and 2261.

In the early sixties, all remaining ships were gradually brought to full phaser VII standard and equipped with duotronic systems. With a simple change of some plasma seals and MHD turbines, the engine system was uprated to warp 6 operations, of which the coils were already capable. At the same time, newly militant Klingon attitudes led to growing support of Starfleet escalation, and the opposition to destroyer-class ships diminished. However, the period of Klingon aggressions culminated not in a war, but in the Organian peace treaty; this soon brought back to surface the anti-destroyer sentiments. The *Larson* class was among the classes most affected by budgetary cutbacks, first by the bleeding off of funds for the *Defender* program, then by the early years of the McLaren administration austerity: requests for engine upgrades to PB-47 standard were categorically denied, as were sensor updates. By 2268 the class seemed certain to be retired almost entirely within the next five years.

A Larson *destroyer cruising placidly against a nebula background is by no means a typical sight. Long patrol cruises were not part of the destroyer mission profile, and single deployments of* Larsons *on deep space missions were exceedingly rare in the 2260s when this picture of* USS Coral Sea *(NCC-4402) was taken. The Fleet never used its own* Larsons *in anti-piracy or local defense duties, either. However, as distribution of retired* Larson *vessels to allied fleets was authorized after a token 'neutering', many foreign operators subsequently pressed them to independent combat and patrol duty. The Orions were also quick to utilize this design as they had used numerous others, creating true 'pirate copies' for their usual purposes.*

The introduction of linear warp engine technology briefly brought promise of a less gloomy future. In a refit begun in 2268, a baker's dozen of *Larsons* were pulled in for the so-called Mk VII

modification that would equip them with LN series warp engines and modern sensors. This extensive upgrade is described later in an entry of its own. Despite its advanced features, the modernized design did not find a niche in the now frigate-permeated Starfleet. It ended up playing a relatively minor role during the 2270s - 80s and was relegated to reserves according to Khitomer treaty cutbacks in the mid-2290s.

The heyday of the *Larson* class was definitely the period between the 2260 upgrade and the Organian peace treaty. The very existence of the ships is credited for keeping the Klingons at bay in most fronts. The class enjoyed a 'threshold weapon' status similar to that of the *Detroyats* and *Apaches* in the 2220s-40s, presenting the aggressor with an unsolvable equation: how to penetrate the swarms of medium-cost destroyers to inflict damage to the actual enemy capital ships and installations, without losing disproportionate numbers of one's high-cost strike units? Neither the *Saladins* nor the *Larsons* alone could not have created such a deterrent, not with their poor warp maneuverability – but a modern destroyer still was quite capable of forcing a Klingon battle cruiser out of warp with her torpedoes, exposing her to other types of defensive fire. Indeed, no fewer than sixteen *Larsons* are credited with warp intercepts of Klingon ships during the frequent raids these aggressors made to UFP territory between 2260 and 2265; all these engagements ended in Klingon retreat and minimal Starfleet casualties.

Offensive success using flotilla tactics was limited. An expeditionary five-ship was lost in contested space near Romulan territory in 2263, only the severed warp nacelle of *USS Alesia* (NCC-4454) remaining to tell of its demise; this brought total losses for the class to eight hulls. Starfleet reports cited poor long range sensing and signal analysis capabilities as the main vulnerabilities. Clearly, the destroyers were far better suited for mixed-type fleet operations where the sensing and analysis power of coordination ships or cruisers would be available.

The *Larsons* survived the Organian cutbacks slightly better than the older *Saladin* lineage. About half the surviving fleet was put in mothballs in the mid-seventies, leaving two flotillas to serve alongside the Mk VII –modified units. This force was allocated two *Monoceros* scouts for coordination and sensing, efficiently pairing like performances. The flotillas were disbanded by the end of the decade, however, for the days of the circumferential warp drive were over, in the destroyer force at least.

Starfleet has never officially regretted its decision to scrap the vast numbers of decommissioned destroyers. Admittedly, the *Larsons* were technically outdated, represented a poor balance of offensive and defensive systems for the post-Khitomer environment, provided inadequate crew accommodation standards and were economically unviable. Granted, a conversion to linear warp drive had been attempted and found wanting. And to be sure, the factual scrapping only took place after certain Khitomer clauses made it both mandatory and verifiable by Klingon and impartial observers. But many starship enthusiasts have expressed anguish over the totality of the extinction: not a single *Larson* remains for display in the Fleet Museum, nor are there recoverable hulls on any of the Fleet surplus depots or junkyards. The three generations of starship captains trained to command this type of vessel are long gone, and no good literature has been written on the subject. Thus, the exploits of this significant part of Starfleet strength in the mid-23rd century remain mostly undocumented and unavailable to the public.

Nelson

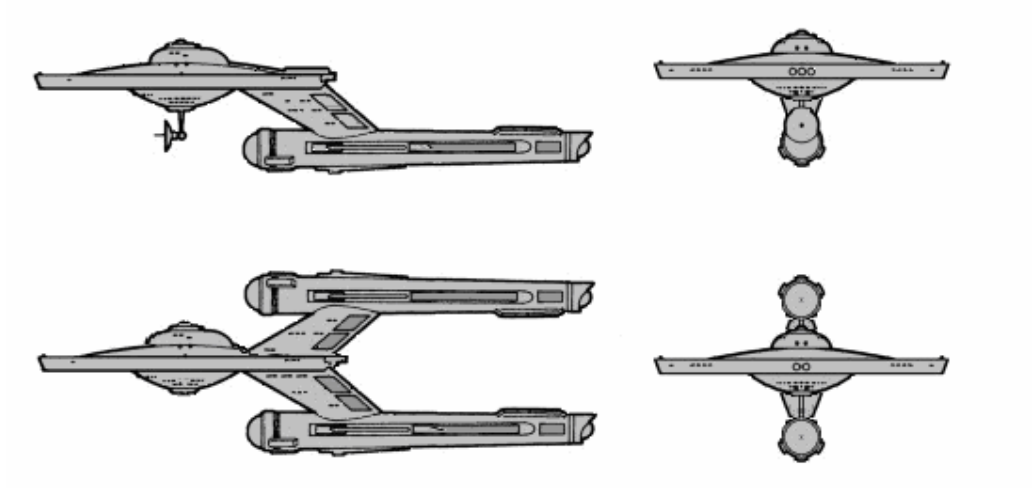
Scout / destroyer
2240-2301

Completed:	26 total: 14 *Nelson* built in 2240-42 2 *Moisanen* converted from *Nelson* in 2260 8 *Sager* converted from *Nelson* in 2260 and 2 from *Moisanen* in 2262 14 *Paladin* built in 2258-60 12 *Wilkerson* refitted from *Paladin* in 2270-78
Length:	263.1 m (*Nelson*, *Paladin*) 240.0 m (*Wilkerson*)
Beam:	127.1 m (*Nelson*, *Paladin*) 141.7 m (*Wilkerson*)
Height:	60.0 m (*Nelson*) 84.5 m (*Paladin*) 60.1 m (*Wilkerson*)
Mass:	329,700 tons (*Nelson*) 330,600 tons (*Nelson* refit) 332,300 tons (*Sager*) 332,900 tons (*Moisanen*) 585,600 tons (*Paladin*) 662,500 tons (*Wilkerson* refit)
Officers:	30
Crew:	146 (*Nelson*) 150 (*Nelson* refit) 154 (*Sager*, *Moisanen*) 160 (*Paladin*) 170 (*Wilkerson*)
Cruise speed:	w 5 (*Nelson*) w 6 (*Sager, Moisanen*, *Paladin*)
Max. speed:	w 9.9 (*Nelson*) w 9.0 (*Sager, Moisanen*) w 10.0 (*Paladin*) w 11.0 (*Wilkerson*)
Endurance:	3 years
Weapons:	*Nelson*: 2 laser emitters (130 nm/750 MW) fwd of ventral sensor array *Nelson refit, Sager, Moisanen*: 2 phaser VI emitters fwd of ventral sensor array *Paladin*: 2 phaser VI emitters in twin bank fwd of ventral sensor array 1 phaser VI emitter aft of bridge 1 medium fwd torpedo tube w/20 photorps below bridge *Wilkerson*: 4 phaser VI emitters in two twin banks, port/stbd of bridge 1 light fwd torpedo tube w/20 probes or 10 photorps at bow 1 light aft torpedo tube w/20 probes or 10 photorps at stern
Shields:	1-layer conformal forcefield Navigational deflector on structural support Secondary navigational deflector on fwd hull
Laboratories:	1 GP, 1 astrophysics, 1 life sciences, 1 geology None (*Paladin*)
Transporters:	1 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III (*Nelson*, *Sager*, *Moisanen*) 2 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III (*Paladin*) 3 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk IV (*Wilkerson*)
Auxiliaries:	2 shuttlepods, 2 work pods

Ships of historical interest:

USS Conrad (NCC-4491), *USS Moisanen* (NCC-4485), *USS Sager* (NCC-4483)

SOURCES: (D FASA, David George 'Crucible')
(N FASA, David George 'Crucible')
(H FASA, David George 'Crucible')



As soon as the first batch of PB-31 –propelled *Larson* destroyers was approved for production, Starfleet repeated its 2220s move and set aside a number of registries at the high end of the range intended for the combatants. These would again be dedicated scout companions to the destroyer force, lavishly equipped for fleet coordination duties. Grand wheels were in motion to send Starfleet deeper into space than ever before, far beyond the fixed fortifications that could serve as command assets; the *Nelson* scoutships would play an elemental role in keeping the Fleet together during this great push into the unknown.

Close to a hundred *Larsons* were planned for; NCC numbers from 4480 to 4499 were to be painted on the scout companions, with about half coordinating the new destroyer formations, the other half accounting for Fleet assets of other types. Yet to meet the operational requirements, the scouts would not be mere carbon copies of the *Larson* design. Older *Hermes* units, already victims of attrition, would accompany the slower *Saladin* and *Siva* flotillas. The new *Nelson* class, propelled by the advanced solid-state PB-31C, was to enjoy a cruise speed of warp six from the outset, and hence keep up with the most modern units of the cruiser force if necessary.

The secret to achieving this great speed lay not in the PB-31C common with the modern destroyer force, but in the Kiratovani KR10-L dilithium double reactor customized for the type. To accommodate the paired linear system and its array of 6+6 antimatter bottles, the scout was constructed with two broad connector pylons, each with its own set of plasma expanders. Fuel consumption would be impressive, but so was the projected top speed: dashes at warp 9.9 were considered perfectly doable. The launch of *USS Nelson* in April 2240 proved the warp-propulsive capabilities. However, it also discredited the initial estimates on costs, and prompted Starfleet to urgently downscale its procurement order. There would be fewer *Larsons* to escort, too, the first batch having been truncated at nineteen hulls. The appropriate number of *Nelson* companions was set at fourteen, all of which were completed by 2242 on the multiple destroyer dockyards reserved for the purpose.

In lieu of major flotilla maneuvers, the superfast units found themselves assigned solo duty. Their basic navigation gear was that of *Larsons*, with an integrated deflector system and the Mandor

sensor suite. For fleet control, they received compact duotronic systems, leaving plenty of room for long and short range surveillance and survey sensors and making possible onboard, realtime analysis of a wide range of tactical situations and phenomena. Indeed, such was their utilizability that they were sent to deep space on missions of strategic reconnaissance and scientific survey rivaling those of *Constitution* cruisers, despite only sporting a pair of 130/.75 lasers forward of their ventral sensor cluster.

Klingon aggression in 2246-50 resulted in many near-disasters, out of which the *Nelsons* extracted themselves only thanks to their superior speed. The *Valdez*, less fortunate than her sisters, was captured in 2248 and apparently pressed to privateer duty for the Klingon Empire. An emergency refit program was launched that year to give the ships better protection, in the form of Prentice-Schafer Type F shields, a C-3 impulse propulsion system and, ultimately, light phaser armament. The program could not be completed before the end of the active Klingon campaign, and the scout force was back in operation in 2252 only. Despite the improvements, two back-to-back losses were soon suffered, as the *Brazzaville* and the *Providence* fell to forces associated with Tholians in 2254. For the following years, deep space was considered a high risk environment, preventing the *Nelsons* from achieving the sort of scientific results the 2240s had brought. Many acted as command units for Project Locust relatively close to home, wastefully idling their powerful engines.

Yet the class was considered a priority asset for the exploration program, and immediately received the PB-32 deep space engine when it became available in 2260. Two lines of modernization were pursued: *USS Moisanen* (NCC-4485) and *USS Manzer* (NCC-4489) were fitted with the advanced FIE-2 impulse system to compensate with the upward creep of total mass, but proved disappointments in every respect, and ultimately returned to the more common standard spearheaded by *USS Sager* (NCC-4483). The ships of this standard sported Type H shielding and a pair of Armscor-Hindustan FH-7 destroyer phasers, and were perfectly capable of fending for themselves even in areas of conflict. The modernization was completed by 2264, and several vessels were sent to accompany the second wave of *Constitution* exploration into the distant reaches of the galaxy.

This, however, was the full extent of refitting possible for the design. As the sixties brought about the promise of linear excitation warp technology, it was realized that a refit would be wasted on the already hypercomplicated and compromised *Nelsons*. The surviving contingent of nine, variously known as *Nelson (II)* or *Sager* class, was retired by November 2270 to comply with Organian commitments on the total number of heavy scouting units.

The vessels for which the retirement made room were *Nelsons* themselves, in a sense at least. The *Paladin* subclass had been constructed in 2258-59 for tactical purposes having little to do with the original fleet coordination mission, and even less with the independent exploration role of the multiply refitted original batch. The *Paladins*, rather more successfully mounting the FIE-2 impulse deck and also introducing a strengthened phaser armament of three Type VI emitters of the latest FH-8 model, were intended to act as the eyes and ears of the dreadnought fleet, either boldly scouting ahead or then quietly probing the battlefield with advanced sensors. Their engine type still was PB-32C, yet a second nacelle and double reactor were now carried on the dorsal side for a top speed of warp 11. There was no provision for exploration or survey duty, as laboratory spaces were omitted in favor of a single medium Mk 11 torpedo launcher, in effect making the *Paladins* the fastest and most agile destroyers in Starfleet arsenal. The literal double pun for a subclass name, Paired *Saladin*, belied the fact that the new destroyers actually carried *four* times the propulsive power of that older near-lookalike class. The expensive *Paladins* were a welcome addition to the

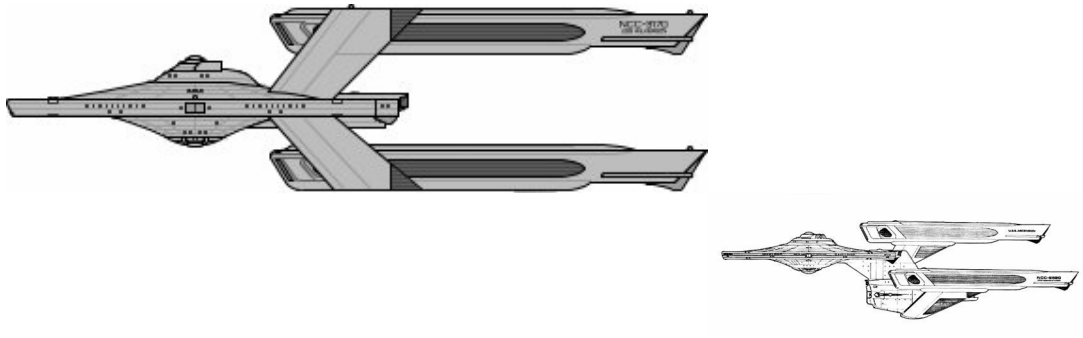
tactical scout force, a category to which all the surviving *Hermes* variants also belonged at this time of exploratory backpedaling.

The two-nacelle configuration of the Paladin *class yields surprisingly little complications to warp field dynamics while providing a practical way of channeling more power to the cylinder field. The doubled mass of warp coils is partially compensated for by the introduction of the advanced FIE-2 impulse engine.*

Given the low fatigue and as yet uncluttered internal layout of the *Paladins*, ten of the fourteen vessels were considered suitable recipients of a linear warp engine upgrade. The program, initiated with *USS Wilkerson* (NCC-4704) in 2270 already, was very different in structure from the other refits performed on that decade. Only one vessel at a time was processed, not so much in order to maintain constant force strength but to dedicate just one dockyard to the task in the middle of other, more pressing programs. The design of the power and propulsion systems of the scouts facilitated an exceptionally trouble-free installation of LN-63 engines, comparable to that of *Larson* re-engining. Moreover, the *Larson (II)* project had given the engineers ample warning of the problems ahead. Making use of subspace field interaction data from that project, a light Mk 14 launcher was installed at the very bow for deploying probes and another added astern, in place of the rear phaser. As the system was fully compatible with torpedoes as well, the vessels could in practice still be considered destroyers with a simple swap of ordnance. Organian treaty limitations naturally precluded public admission of such capabilities.

The *Wilkerson* vessels did officially concentrate on scouting tasks even when regularly practicing for destroyer deployments. It was not on one of the risky intelligence-gathering missions but on a routine military exercise that the first, disastrous casualties were suffered: at the end of the Solid Force maneuvers of 2274, *USS Carmichael* and *USS Henley* collided in a tractor beam misfire while pulling alongside a replenishment station. The scouts both lost containment, killing 730 personnel aboard and stationside. These were the only major losses during three decades of successful operations, though. *Wilkerson* units accompanied dreadnought deployments, performed independent scouting runs, and operated in concert with *Larson (II)*, *Akula* and *Cochise* destroyer units in exercises. Yet none saw active combat with Klingons, mainly because the expensive ships were not risked on operational assignments in regions known to be hunting grounds for Klingon raiders.

The silver bullet nature of the various *Nelson* models, combined with their deep space deployment mode, kept them largely off the public eye. All types were well liked by their crews, but their basic philosophy was held suspect by a wide range of critics. Giving cruiser-standard engines to vessels of limited mission profiles was and remains a wasteful practice, in part explaining why scouting in support of primary fleet combatants is increasingly performed by the primary combatant types themselves.

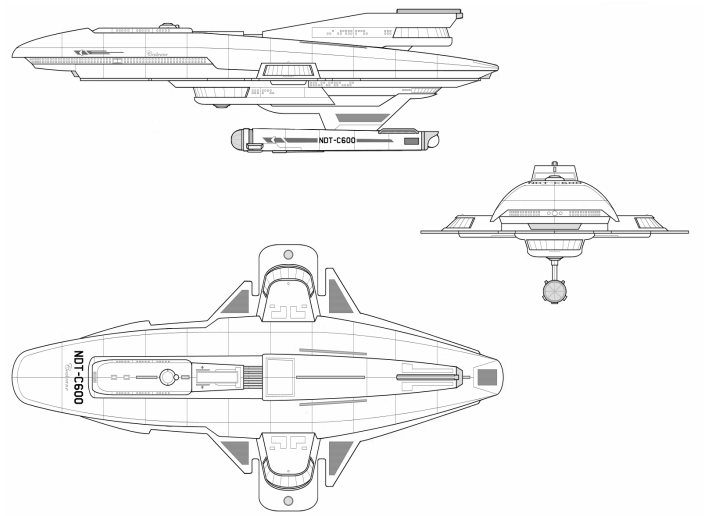


A Wilkerson *at full speed could credibly accompany a dreadnought on a typical combat sortie. Maneuverability at warp was quite limited, however, and the design was further handicapped at impulse by the excess mass of the dual coils. Thus,* USS Ganju Lama *(NCC-4709) here maintains a respectful separation from the dreadnought* Sussex *even in an obvious publicity picture pose.*

Cochrane

Colonizer
2241-2327

Completed:	368 total: 206 PB-29-engined colonizers constructed in 2241-59 162 PB-31-engined colonizers constructed in 2254-63
Length:	330.1 m
Beam:	182.0 m
Height:	96.7 m
Mass:	241,400 tons (batch 1) 311,150 tons (batch 2)
Officers:	5
Crew:	31
Passengers:	2,400
Cargo:	240,000 tons
Cruise speed:	w 5
Max. speed:	w 6.0
Endurance:	6 years
Weapons:	2 phaser V emitters on dorsal and ventral fwd hull
Shields:	1-layer conformal forcefield Navigational deflectors amidships port/stbd
Transporters:	10 GP (6-pad), 4 heavy cargo, 8 light cargo, 8 emergency evacuation (22-pad); Mk II (batch 1) 10 GP (6-pad), 4 heavy cargo, 8 light cargo, 8 emergency evacuation (22-pad); Mk III (batch 2)
Laboratories:	None (standard) 2-4 planetary sciences, agricultural, medical (optional)
Auxiliaries:	12 heavy, 4 medium and 4 light shuttles, 2 shuttlepods, 8 work pods (typical)
SOURCES:	(D FASA) (N FASA) (H FASA)



Starfleet's transition from the spooled warp coil to solid-state technology in the 2240s was a godsend to SF Colonial Operations. Struggling to make a meaningful contribution to the ongoing expansion of Federation settlements, the organization was hampered by the lack of high speed, long range transports.

The last time Starfleet had operated vessels large enough to found a viable colony at one stroke had been in the 2180s; the *Murmansk* class of heavy transports had been barely capable of warp three cruising, and could carry less than 50,000 tons of cargo, bud had by and large met the needs of the era. The civilian counterpart, the *Merchant* class, still existed in marginally upgraded form, but could no longer reach the outer colonization zone within reasonable time and expense limits. Updating hinged on the availability of warp engines – and the ambitious, Fleetwide introduction of the PB-31 meant that a whole generation of preceding designs would now be donating their spool units to the cause.

The first PB-29 engines were vacanted by the *Siva* destroyer conversion program in early 2239, and swapped dock boxes at Martian orbit. The recipients were immense monohull transports 330 meters long, built to press the PB-29 to its limits. A wide-chord ventral pylon connected the nacelle to a set of four dilithium-regulated reactors within a two-deck engineering section. Twin navigational deflectors flanked the control facilities at the midpoint of the section. At the forward end, 180 degree panoramic doors protected a wing of ten light and medium auxiliaries. Astern were the twin nozzles of the impulse propulsion system.

All this was support infrastructure: the payload – accommodation for 2,400 colonists and 240,000 tons of equipment – rode atop the ventral section. A stressed-skin duranium hull, very similar to the Chiokis saucers in construction but curved in elegant slipper shape, was manufactured by Shintoi Heavy Industries to exacting, super-lightweight standards. Two gigantic loading bays athwartships provided direct access to the vast cargo holds, and featured large platforms as approach aids in place of precision tractor beams. Adjacent to the platforms were radiator surfaces for the life support equipment. The forward parts of the hull contained principal accommodation, the aft parts the equipment and supply holds. Above the aft holds was a tall but narrow third loading bay, also serving as a maintenance hangar for a dozen heavy cargo shuttles. Atop the almost featurelessly smooth forward hull, a superstructure one deck high housed those parts of the operating crew and systems that were not held within the ventral engineering spaces.

The bridge module riding on the superstructure was of full Class One standard, and served as the nerve center of shuttlecraft and transporter operations in addition to being the navigation nexus of the vessel. The shuttles themselves were to be flown by the colonists, who would also operate virtually all onboard systems pertaining to their own sustenance. This division of labor was Colonization Ops' concession to the testy attitudes and independent views of colonial hopefuls. The Starfleet crew strength of just 36 also stood testimony to the reliance the organization placed on dilithium focus technology at this point of time. Far less faith was put on modern stasis technology; it had all but replaced cryosleep aboard small colonizers by the turn of the century, but only because such ships by design lacked the infrastructure to cope with awake passengers across meaningful colonization ranges. Indeed, the massive Starfleet colonizers were partially a response to the 2225 *Osceola* disaster where brief stasis synchronization failure had cost the lives of 277 colonists.

The first colonizer of the new *Cochrane* type was laid down in 2237, received her engine in 2239, and was launched in 2241. Production picked up pace soon thereafter. By 2245, the supply of PB-29 engines from the destroyer and fleet control ship conversion programs and their spares stockpiles had been exhausted, resulting in forty *Cochrane* class vessels. Manufacturing of PB-29 units continued, however; up to ten *Cochranes* per year could be constructed and assembled at Mars, and the goal was set at an ambitious hundred vessels. This was well beyond the existing needs of Federation colonizing programs, but Starfleet expected the vessels to last for at least a century, probably closer to two. In that time, new engine technology would be introduced to the hulls, keeping the ships apace with the hoped-for expansion of the Federation.

The suddenly renewed Klingon onslaught in 2246 rearranged Starfleet priorities. However, manufacturing of the PB-29 was now virtually disconnected from Defense Command acquisition programs. Production of duranium exceeded consumption many times over. The docks dedicated to *Cochrane* construction would not produce warships; even after reallocation of facilities to transport construction, including the so-called Liberty ship conversions of warship wreckages into impromptu freighters, Mars could churn out ten *Cochranes* per year. It helped matters that the *Cochrane* was a superb troop and vehicle transport, pressed to duty on multiple fronts. However, the colonizer was not properly shielded, and her armament of two single phaser V emitters was far from sufficient for frontline duty. The experiences of the 'Four Year War' were enough to discourage Starfleet from using the *Cochranes* in real combat.

The awe-inspiring sight of ten Cochranes *offloading on low orbit is something of a nightmare scenario for the corvette* Dortmund*, tasked with managing the flow of traffic. Nevertheless, colonization of Snakehead was among the smoothest during the colonial boom triggered by Organian peace, far less of a chaos than most of the late 2260s pushes to coreward space.*

The Klingon conflict had other consequences for the program. In the fifties, production goal was reset at 200 units, and eight more docks at Ganymede were allocated. Recovery from the conflict freed further resources, including solid state warp engines. A second batch of some 162 vessels was propelled by the PB-31, by far the most numerous ship class to utilize the engine (even if *Loknars* carried a greater total of engine units).

The last *Cochrane* slid off Ganymede box dock 25 in January 13th, 2263. Some thirty colonizers had been expended one way or another, ninety sold to commercial concerns, yet two hundred remained in service. The largest single sortie had been the 2255 founding of the Star's End colony, with 42 *Cochranes* and a hundred smaller cargo vessels shuttling between Izar and the target system. The most tragic loss in turn was that of six fully laden *Cochranes* en route from Kessik to New Deimos in 2261, fanning two sets of flames: some blamed the disappearance on the mysterious Delta Triangle, some on the enigmatic Gorn. Common now was the distrust on single-stroke colonization efforts, due to the obvious humanitarian risks involved.

Financial risks were not inconsiderable, either. The Star's End colony project proved a massive failure from the economics standpoint, and its shipping aspect a huge drain on the meager Colonial Ops funds. Maintenance of the military-standard warp engines was beggaring the organization, and by 2270, a third of the *Cochrane* fleet was idled. By 2275, thirty further *Cochranes* joined the mothball fleet, and use of the remainder was denied from the 64,000 hopefuls heading for the Occult system to found Belle Terre. However, financing was a complex issue, and the 34,000 people aiming at Ivor were in 2289 quite able to afford a full *Cochrane* fleet to carry them.

Ultimately, it was not financial issues that killed the *Cochrane* program, but issues of self-determination and federal authority. The dangers that befell the Belle Terre expedition prompted the Federation to assign Starfleet escort to any deep space colonization party larger than 500 people. Counterreaction was swift, with some 90 % of expeditions in the 2280s opting for small vessels and batches of less than half a thousand colonists. The subsequent drop in demand was catastrophic to Colonial Ops, whose operating budget hinged on expeditionary income. The *Cochrane* fleet was pared down to fifty vessels, all from the PB-31 –engined second batch; no linear engine refitting was forthcoming. Lighter colonizers of *Osprey* or *Davenport* types soon were dominant in Colonial Operations' arsenal, just as in the commercial field.

The last major *Cochrane* operation, resupply of Jouret in 2327, was followed by deactivation of the last vessels of the type. Sixteen conversions to *Coronet* repair ships / tenders continued service till 2341, sporting PB-47 engines and a shield upgrade but omitting all armament. Commercial concerns have purchased a lion's share of the mothballed transports, putting them to mercantile use. Several are still operated in the heavy goods delivery role, although some dozen have reportedly been converted to fightercarriers for use in assorted neutral or semi-friendly navies.

Loknar

Frigate
2242-2296

Completed:	100 total:
	48 *Loknar* built in 2242-51 52 *Lactra* built in 2250-67
Length:	290.2 m
Beam:	127.1 m

Height:	56.0 m
Mass:	609,000 tons (early *Loknar*) 615,800 tons (*Loknar*) 640,400 tons (early *Lactra*) 645,975 tons (*Lactra*)
Officers:	18 (*Loknar*) 21 (*Lactra*)
Crew:	108 (*Loknar*, early *Lactra*) 113 (*Lactra*)
Cruise speed:	w 5
Max. speed:	w 7.2 (*Loknar*) w 9.1 (*Lactra*)
Endurance:	1 year
Weapons:	4 laser emitters (130 nm / 1.2 GW), port/stbd of bridge and ventral sensor dish 8 phaser V emitters in 4 twin banks in former laser positions later refitted on all vessels 1 fwd medium torpedo tube w/ 28 fusion torps (*Loknar*) 3 fwd medium torpedo tubes w/ 48 photorps (*Lactra*) 1 aft light torpedo tube w/12 photorps (*Lactra*)
Shields:	1-layer conformal forcefield Navigational deflector on fwd hull
Transporters:	3 GP (6-pad), 1 emergency evacuation (22-pad); Mk II (original) All ships brought to Mk III standard after 2256 Most ships brought to Mk IV standard after 2270
Auxiliaries:	2 work pods

Ships of historical interest:

USS Bodiri (NCC-2717), *USS Morgan City* (NCC-2704), *USS New America* (NCC-2706)

SOURCES:	(D FASA) (N FASA) (H own, FASA)

A design contemporary and in some ways parallel to the *Larson* class, the *Loknar* class of frigates was mainly produced by Chiokis for Andorian defense needs. The original goal was to field a relatively light, laser-armed ship with modern warp engines for system defense and shipping lane patrol of Federation core regions. The opponents there would be lone intruders or Federation lawbreakers, or possibly Orion pirates; a heavily torpedo-armed ship was not needed, but rapid reaction capability was essential.

In the long shadow of the Klingon offensive, however, questions were raised about the dedication of resources for such a 'civilian' program. The answer amounted to the inauguration of the concept of 'active reserves', a central Starfleet tenet in the following century. The *Loknars* would double as wartime border defense combatants in addition to enforcing core region law in peacetime. The speed and range of modern warp drives would facilitate the double role; a single medium torpedo launcher would in turn provide the punch needed for anti-shipping operations and border combat.

The double role meant a considerable increase in mass and size over initial plans that had merely aimed at replacing the earlier *Burke* patrol frigates. The ships featured a two-nacelle warp propulsion system, with the cruiser-caliber PB-31D instead of the originally planned light PB-35 nacelles mounted high above and behind a thin saucer hull, on angled pylons with control and cooling systems and engineering access. Externally, the design bore a resemblance to the pathfinding *Enterprise* cruisers of the 2150s, as well as to the more recent *Proxima* battle cruisers.

The pylons were each attached to a blocklike engineering section, and these engineering compartments themselves to the trailing edge below the saucer, with two twin impulse engine nozzles between them. Yet there were significant differences in systems placement. The whole engine and power system was duplicated, each set of coils having its own intermix chamber, and each impulse engine having its own fusion reactor. Plasma feeds were interconnected, however, so that power could be cross-shared; also, antimatter was stored in a joint centerline compartment, facilitating maximum protection and centralized refueling and ejection arrangements.

In cruise mode, only one powerplant at a time was in use, while the other acted as a backup. In combat or pursuit, both powerplants would be brought online. The extra power would be essential in operating the potent Prentice-Schafer Type H shield generator and the heavy directed energy armament simultaneously. The *Loknars* originally carried four Lockheed 130/1.2 accelerated lasers, replaced in the 2250s Mk II model (or *Lactra* subclass, as it never was called) by four twin phaser Vs, and could thus mount an effective defense against small and medium ships. Further punch was provided by the single Selenia 'Wolf' Mk 1 medium torpedo launcher firing enhanced-penetration fusion warheads. The final, nearly cruiser-standard torpedo armament consisted of three such tubes forward plus a light tube aft, using up all the space originally reserved for exploration gear and depriving the ships of a multi-mission future.

Internally, the frigates were usually configured to Andorian standard, and their crew quarters optimized for Andorian physique and culture. Besides accommodation and life support, the saucer offered little room for anything beyond the most essential command and communication facilities. In the four-tube configuration, the hull already held far more systems and ordnance than corresponding destroyer or even cruiser hulls. A simple docking bay at starboard engineering hull stern served as the primary cargo transfer point, yet actual cargo holds were almost nonexistent, and the onboard auxiliary craft contingent limited to two work pods. However, three transporter pads provided ship-to-ship or ship-to-surface transportation, allowing the Andorian Self-Defense Forces to fight their preferred kind of battle. The single 22-pad evacuation unit was also adopted as a boarding/assault unit by some adventurous Andorian captains, even though it provided no means to retrieve the boarding crew if the assault failed. In any case, the *Loknars* could not accommodate a Marine contingent, so any boarding action would mean bloodletting (figurative or literal) from the regular crew, a price only Andorian operators would be ready to pay.

The steady if somewhat protracted production differed from the Starship and Star Frigate programs in only involving a low number of dockyards at Salazaar and Saturn, yielding a low annual output of hulls. As many as 35 ships went directly to ASDF, and were primarily utilized for core world defense. A further 30 were deployed on starbases near the Romulan neutral zone, for rapid deployment in case the Romulans attempted a surprise break-out, and for deep space law enforcement missions in peacetime. Five were sold to the Andesian guardianship for protecting Federation interests in the Orion-contested sectors of the Dilithium Belt. A final 30 human-manned craft with slightly different interior layout were attached to defense fleets operating on the Klingon front, providing base defense and sometimes escorting larger Starfleet and civilian vessels.

Despite the piecemeal ordering and procurement, a common naming and registry scheme was used, featuring Federation colonies and other member world locations. Naming was sometimes downright predatory, with thematically fitting names adopted as soon as a previous holder of the name was declared lost or otherwise stricken from strength; competition for stellar names with the *Procyon* corvettes was especially fierce. Registries for this exceptionally numerous class were slotted to the 2700-2799 range in anticipation of several such major ship procurement programs. Most of these

programs failed to materialize, though, leaving the *Loknars* the highest-registry combat ships in Starfleet service until the 2270s.

Two Loknars *in Andorian colors kindly escort* IKV Soq *back towards the border following an 'unfortunate navigational error' that took the cruiser to within five lightyears of Procyon. Sorting out meek Imperial reconnoitering missions from reckless privateer raids or the frequent yet futile invasion attempts by weak Klingon factions was a constant pain for Starfleet border defense forces throughout the late 2240s. Klingon behavior returned to more predictable tracks after the end of the Empire's Wars of Internal Dissension, and the odds of enemy cruisers penetrating into traditional* Loknar *hunting grounds decreased significantly.*

Despite being 'peacetime' ships, the *Loknars* saw combat duty in many undeclared wars. The receding of the Klingon threat made several minor players like the Lesser Orions, Elasi and Landorians bolder in their efforts to disrupt Federation traffic. *USS Bodiri* (NCC-2717) of Andorian Self-Defense Fleet saw action against Lesser Orion pirates in 2249, twarthing an invasion of a prime directive -protected class L world in the Secundi Bahia system. In the fifties, Andorian forces often clashed with the Landorians in the Xaridian region until decisive political measures were taken to pacify the latter. Persistent negotiations finally led to the reabsorption of this fringe group into the Andorian society in the 2340s, at which time several other groups on Andor already vocally expressed their secessionist demands. On the whole, though, the 2250s action against Landorians led to a surprising and unpreceded solidification of the multifaceted Andorian society.

Between 2246 and 2265, there was very little direct, coordinated military action against Klingon forces; even though their piracy raids never truly ceased, they lost much of their intensity and coherence. Yet, the uncertainty of Klingon intentions and lack of intelligence about the inner functionings of the Empire forced Starfleet to position its forces in anticipation of the worst. The destroyers and cruisers had to constantly stand prepared for major offensive or defensive deployments at the borders, so *Loknars* and other frigate types took charge of anti-piracy patrols. Starfleet often succeeded in turning back the intruders by swift deployment of large numbers of these fast combatants, without having to resort to actual use of deadly force.

Lone *Loknars* on border patrol were quite vulnerable, though. Their modest long range sensing capabilities made it possible for a fast and determined enemy to take them by surprise. *USS Morgan City* (NCC-2704) fell prey to a Klingon strike in 2246, was captured and repaired, and adopted as part of the Klingon forces. The fake frigate lured many UFP freighters to their doom until drastic measures were taken: the entire *Loknar* fleet was recalled for the duration of a three-month hunt for the pirate vessel, and the *Morgan City* had to withdraw to Klingon space.*

The fate of the *Morgan City* was unique in more than one respect: usually, the *Loknar* frigates did not loiter beyond Federation boundaries. Also, civilian heroics were more usual for the *Loknars* than military accomplishments. In a major media event of 2258, *USS New America* (NCC-2706)

tractored to safety a Federation starliner that had suffered an impulse drive malfunction on approach of Procyon and was in danger of plunging into the cromosphere of the star with 400 people aboard. *USS Gaikos* (NCC-2740) in turn proved that a *Loknar*, too, could carry 400 people in a cinch, when she evacuated a failed terraforming outpost from under severe tectonic trouble.

The type was well liked among the Andorian crews, tolerated by the human operators, and initially fought well in the budgetary rat race. But in the 2270s, frigate funds were directed to the *Daran* and *Knox* designs; these were used to replace the *Loknars* with smaller numbers of faster, more advanced and more affordable ships. All human crews were reassigned to the newer types by 2286, leaving the ten surviving vessels active in bookkeeping terms only. In the meantime, a new player was introduced to the field: a heavily armed family of corvettes took over most of the law enforcement and local defense mission. The evolutionary niche of the frigates thus moved up a notch, prompting Starfleet to concentrate resources on the *Miranda* family of heavy frigates and their derivatives.

The *Loknars* were no match for these versatile and complex vessels. Starfleet had long since opted out of any upgrades to its *Loknar* force, but three refits had been performed on the Andorian-operated units. Yet when the heavily armed *Knox* and superfast *Ianar* classes were introduced to augment the *Darans*, Andor saw no need to modernize its aging frigates further. As the last of the three lifetime extension programs expired, the final representatives of the *Loknar* class were retired from the Blue Fleet in 2299.

* The Klingons have long maintained that the capturing of the *Morgan City* was not the work of Klingon forces, but 'a treacherous plot worthy of Romulans only'. The theory has generally been dismissed, yet the thawing of relations with the Star Empire has yielded new data on Romulan covert operations in the 23rd century that suggests that there may indeed have been some Tal'Shiar involvement in the incident. Several so far unverified sources also indicate connections between the renegade Klingon Admiral Kamato and a faction of the Romulan Praetorate.

Miranda

Heavy frigate
2242-2295

Completed:	49 total: 10 *Miranda* 39 *Surya*
Length:	237.4 m
Beam:	127.1 m
Height:	70.8 m (*Miranda*) 60.5 m (*Surya*)
Mass:	637,000 tons (*Miranda*) 639,000 tons (*Surya*) 637,500 tons (NCC-1859) 640,200 tons (NCC-1877) 635,000 tons (NCC-1885)
Officers:	55
Crew:	265
Cruise speed:	w 6
Max. speed:	w 8.0
Endurance:	4 years
Weapons:	*Surya* original:

4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of bridge
2 fwd medium torpedo tubes w/50 photonic or pulse wave torps on dorsal primary hull (not NCC-1885)
Miranda original:
4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of bridge
2 fwd medium torpedo tubes w/ 30 photonic or pulse wave torps on dorsal pod
1 aft medium torpedo tube w/ 10 photonic or pulse wave torps on dorsal pod
Surya refit 2255:
6 phaser VII emitters on 3 twin banks, port/stbd of bridge and fwd of ventral sensors
2 fwd medium torpedo tubes w/ 55-70 photorps on dorsal primary hull (not NCC-1885)
Miranda refit 2255:
6 phaser VII emitters on 3 twin banks, port/stbd of bridge and fwd of ventral sensors
2 fwd medium torpedo tubes w/ 30 photorps on dorsal pod
1 aft medium torpedo tube w/ 10 photorps on dorsal pod
Surya refit 2265:
6 phaser VII emitters on 3 twin banks fwd, port and stbd of bridge
6 phaser VII emitters on 3 twin banks fwd, port and stbd of ventral sensors
2 single phaser VI emitters on aft hull
2 fwd medium torpedo tubes w/ 80 photorps on dorsal primary hull (not NCC-1885)
Miranda refit 2265:
6 phaser VII emitters on 3 twin banks fwd, port and stbd of bridge
6 phaser VII emitters on 3 twin banks fwd, port and stbd of ventral sensors
2 fwd medium torpedo tubes w/ 30 photorps on dorsal pod
1 aft medium torpedo tube w/ 10 photorps on dorsal pod

Shields: 1-layer conformal forcefield
Navigational deflector on forward hull

Laboratories: 2 GP, 2 signal processing/astrography (*Miranda*)
2 GP (*Surya*)

Transporters: 1 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk II (original)
All ships brought to Mk III standard after 2265 (*Surya*) or 2266 (*Miranda*)

Auxiliaries: 2 medium shuttles, up to 7 shuttlepods or tactical craft, 4 work pods

Ships of historical interest:

USS Alexandria (NCC-1842), *USS Athena* (NCC-1841), *USS Lantree* (NCC-1837), *USS Rutherford* (NCC-1835); *USS Atlantis* (NCC-1865), *USS Avenger* (NCC-1860), *USS Resolution* (NCC-1877)

SOURCES: (D SotSF/aridas sofia)
N Omnipedia (SotSF)
(H SotSF)

A quarter of a century of military escalation against the Klingons altered many of the basic concepts of Starfleet. Many mission classes were neglected during the arms race, while others changed much in description. Especially the frigate mission underwent drastic changes. When Starfleet found itself in need of fifty to seventy antimatter-powered deep space escort vessels in 2238, the ship type it chose for the mission was a potent mixture of frigate, destroyer and cruiser properties – multiple-tube torpedo launchers, heavy lasers, sizeable shuttlebays and advanced fire control systems seldom seen in ships smaller than cruisers, as well as many navigation and computing technology innovations stemming from Project Starship. The new ships were a good deal heavier and more capable than the *Detroyat* destroyers from which they descended. But destroyers were no convoy escorts in the Starfleet scheme of mission classes, so the designation chosen for the type was 'heavy frigate'. *

Two programs were run side by side to create the heavy frigates. A new keel was laid in 2239 for *USS Miranda*, based on *Detroyat* blueprints but introducing a refined hull form and new PB-47 nacelles mounted on simplified *Anton*-style vertical pylons. The antimatter powerplant for the ship was of completely new design, optimized solely for the type. Simultaneously, the old powerplant assemblies of the *Detroyat* class *USS Resolution* were ripped out and partially replaced with a modern power system. The plasma conduitry and auxiliary power systems were retained, though. Here, too, the nacelles were changed to the more economic PB-47 system, and the control facilities were housed in a reconfigured aft section in the saucer hull. The boxlike ventral extension was cut

off, and engine pylons reshaped to curve farther down in a 'two-kink' configuration. With the modifications, there was now plenty of room for two midsize flight decks around the power machinery, enabling the frigates to carry numerous small craft for patrol and liaison duties.

The old, bulky laser machinery of the destroyer was replaced with more efficient double laser units, and a twin 'Awalt' torpedo launcher by Racal FMC of Ardana was installed in the specialized torpedo deck under the main bridge, replacing the former single-tube main weapon and giving the *Resolution* an exceptionally heavy weapons complement for a frigate. For the *Miranda*, the suite was heavier still, as the vessel was fitted with a podded triple mount that featured an aft tube in addition to the two forward-firing ones. The navigational deflector dish at first received a support strut for mounting directly under the saucer, as well as a new series of emitters and control software. The system was eventually trimmed down to fit between the bow sensor units, and standard navigational shields applied by using normal hull grid systems; the ventral dishes disappeared from the ships in 2265-66, taking with them some long range sensing capabilities.

USS Miranda (NCC-1833) was completed first, leaving her drydock in May 2241. Her internal arrangement was highly modular and lent itself to the installation of various experimental sigint and ccm systems, a dozen combinations of which were tested during the test runs in 2241-42. Extensive tests were also performed by the half-finished *Resolution*, now reshaped closer to the *Miranda* hull form and re-registered as NCC-1850. The tests verified the viability of the configuration (even though discrediting the economy of converting further *Detroyats*) and gave Starfleet confidence to order the construction of as many as 72 heavy frigates, initially divided evenly between the two sub-configurations. The *Resolution* donated her registry number to *USS Surya*, the first newbuild of the ex-*Detroyat* configuration and thus the first member of the *Surya* class; the *Miranda* initiated a class of her own when she was finally commissioned in February 2242.

An archetypal example of the Miranda *class.* USS Bombay *(NCC-1838) had a Federation-spanning career of deep space escort and exploration behind her when she was in 2264 attached to Starbase 47. Yet this assignment as 'sector watchdog' proved to be the most demanding period in the ship's history, putting to use both the advanced sensors and spacious cargo facilities of the type – and ending abruptly in a six-on-one engagement with Tholian cruisers at Ravanar IV.*

By 2242, it had become clear that the initial order for 72 vessels had been grossly oversized, and that the balance between the heavy frigates and the lighter *Loknar* class should favor the latter. Hull numbers NCC-1833-42 were now assigned to the *Miranda* class, and NCC-1850-89 to the *Surya* class. The external differences between the classes ranged from gross to subtle. The *Mirandas* featured a lower hull profile due to the shorter and simpler pylon assemblies, yet always carried the podded torpedo launchers high above the stern; they also had slightly differing navigational

deflector strut and antimatter venting systems, as well as a more acute, *Constitution*-like teardrop shape for their torpedo-less superstructure. Internally, the *Suryas* carried a heavier selection of equipment, including magazines for 50 torps to the 30+10 of the *Miranda* pods, the inclusion of seven short-range targeting scanners to *Miranda*'s three, a range of 11 ly for the main navigational sensor to *Miranda*'s 8 ly, all amounting to a total mass of 539,000 tons vs. *Miranda*'s 535,000 tons. On the winning side, the *Mirandas* had superior astrogation and sigint systems and were more readily reconfigurable. Both types had plenty of room for installation of laboratories, but only four were fitted on *Miranda* and just two on *Surya*.

The extremely heavily armed frigates would not be built in as large numbers as the lighter *Loknar* class, but in the end, 37 of the *Suryas* (plus the modified *Resolution*) were completed for deep space escort duty. Also, *USS Noshiro* was built as a hybrid design, with kinked pylons but with a narrow-teardrop command pod, phaser-only armament and *Miranda* sigint systems, and 'adopted' to the *Surya* class with registry NCC-1885. She was extensively used for special operations under the auspices of the so-called TacFleet special force. All ten true *Mirandas* were also built, and fielded for border patrol duties. Both classes fulfilled the requirements of their respective jobs better than the *Larson* and *Saladin* destroyers, trumping the competition in endurance, sensor range, agility, computing power and even economy of operations – at least in peacetime. Delighted by their success, Starfleet began promoting heavy frigates at the expense of further destroyer development when the favorable solution at Axanar temporarily lessened the Klingon threat.

Two *Miranda* losses in the early fifties made acute the issue of upgunning. A refit begun in 2255 gave the ships cruiserlike phaser armament of six Type VII units in place of the original six lasers. The number was doubled after 2265 on *Suryas* and after 2266 on the remaining *Mirandas*, when the ships assumed several light cruiser duties (but retained the heavy frigate designation). Gunports were omitted in this refit, and the phaser emitters were permanently fixed in extended position. Transporters were brought to modern standard in both upgrades. Also, many ships of the *Surya* class received two phaser VI units for rear-hemisphere coverage. Engine upgrades were kept to a minimum, performed mainly to maintain commonality with the other PB-47-engined types in Fleet inventory.

Notable *Suryas* include the venerable *USS Resolution*, recommissioned in 2247 as a *Surya*, with a twice-changed registry now settled at NCC-1877, and later remodified to spearhead a linear-coil upgrade of the heavy frigates. *USS Avenger*, NCC-1860, became the first operational conversion to that class in 2273, with no less than 20 other *Suryas* following suit. Soon thereafter, *USS Miranda* adopted an almost identical linear-coiled appearance, launching the *Miranda (II)* subclass. There was little left of the original subclass to modernize, though. The loss of *USS Cortez* (NCC-1834) in 2254 to the Vulcanoids of Darien 224 had been but the start of woes for the class: further deep space assignments claimed *USS Bombay* (NCC-1838) in 2265 and *USS Buenos Aires* (NCC-1840) in 2268. Ostensibly, *USS Polaris* (NCC-1839) and *USS Aloia* (NCC-1841) were stricken from strength due to faults discovered in their spaceframes – but in fact were extensively modified to the secretive *Soyuz* sigint standard, receiving new names at a clandestine recommissioning and leaving only four further vessels to be turned into *Miranda (II)* units. By the virtue of her slight overall seniority, the *Miranda* became to be considered the class ship of the whole family of sub-types when Starfleet in the late 23rd century drastically simplified ship naming practices.

Two Suryas *escorting a Tellarite convoy 'out there' in the 2260s. Few pirate raids were ever attempted against convoys thus protected, even though the* Suryas *frequented space far more dangerous than the inner areas where the* Loknar *frigates operated. The great firepower of the type is quite evident, and resulted in part in Starfleet's decision to significantly slow down destroyer development in the late 23rd century.*

The *Miranda* can actually be said to have spawned *three* follow-on lineages: the enlarged flight deck *Coventry* frigates, the slightly smaller modern linear-coiled *Daran* frigates with their subvariants, and the direct *Avenger* successors with an impressive spectrum of subtypes. All of these will be discussed in more depth in later entries. The continuing development of the design has ensured virtual immortality for the *Mirandas*, so that some spaceframes built in the 2240s and refurbished in the 2270s are actually seeing combat support service in the 2370s, admittedly after resting for almost a century in mothballs. The last ships of the original *Surya* configuration were retired in 2295 along with the similar-standard *Coventries* and most of the other surviving circumferential-engine starships.

[*] It appears that at this point, Starfleet indeed chose the heavy frigate designation over the more fitting light cruiser one on basis of the intended mission of the ships. Later years would see the heavy frigate designation abused in an attempt to confuse various observers about the true degree of Starfleet escalation. One should also recall the historical background of this terminology, as relates to the primary combatants of the early 19th century United States Navy.

Canopus

Survey cruiser
2243-2266

Completed:	22 total: 15 *Canopus* survey cruisers built in 2243-45 6 *Centurion* reconnaissance cruisers built in 2247-48 1 *Cavalier* reconnaissance cruiser built in 2250
Length:	242.0 m
Beam:	127.2 m
Height:	70.8 m
Mass:	407,700 tons (*Canopus*) 419,000 tons (*Centurion*) 408,900 tons (*Cavalier*, *Canopus*/*Centurion* refit)
Officers:	30
Crew:	205 (*Canopus*) 212 (*Centurion*) 204 (*Cavalier*, *Canopus*/*Centurion* refit)
Cruise speed:	w 6
Max. speed:	w 7.0
Endurance:	10 years
Weapons:	*Canopus*: 4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of bridge 4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of ventral sensor array *Centurion*:

4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of bridge
4 laser emitters (130 nm / 4.0 GW) in 2 twin banks, port/stbd of ventral sensor array
2 laser emitters (130 nm / 4.0 GW) on secondary hull bow
1 fwd medium torpedo tube w/ 30 photonic or pulse wave torps
Cavalier, *Canopus*/*Centurion* refit:
4 phaser VII emitters in 2 twin banks, port/stbd of bridge
4 phaser VII emitters in 2 twin banks, port/stbd of ventral sensor array
2 phaser VII emitters on secondary hull bow
1 fwd medium torpedo tube w/ 40 photon torps

Shields: 2-layer conformal forcefield (*Canopus*)
3-layer conformal forcefield (*Centurion*, *Cavalier*)
Navigational deflector on secondary hull bow
Auxliary navigational deflector on primary hull bow

Laboratories: 10, in varying congfigurations

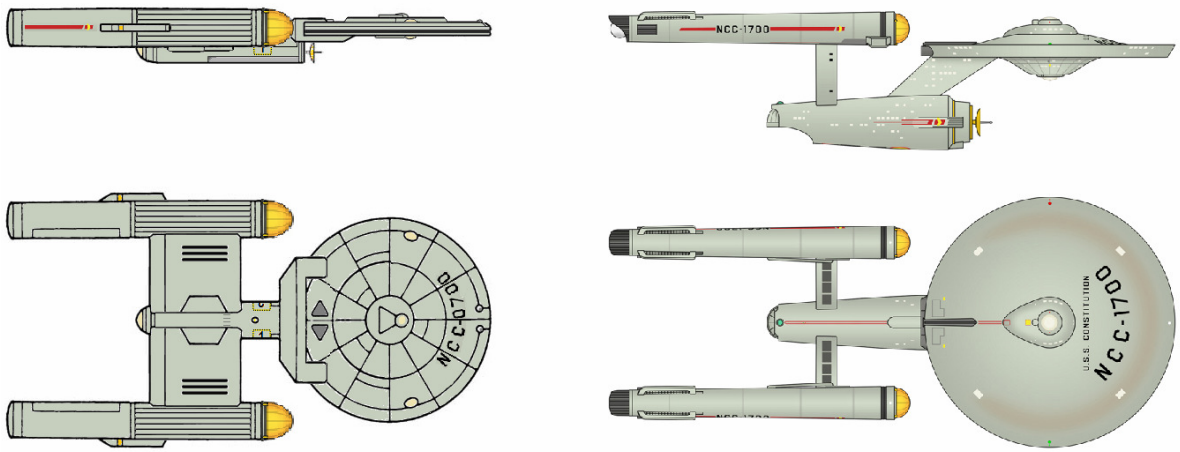
Transporters: 2 GP (6-pad), 4 emergency evacuation (22-pad), 2 cargo; Mk II

Auxiliaries: 2 medium shuttles

Ships of historical interest:

USS Canopus (NCC-O700)

SOURCES: (D SFC)
(N SFC)
(H SFC, FASA Four Years War sourcebook, Steve Bacon)



Unlike so many turning points in history, the technological revolution of the Great Awakening was not identified and romanticized decades after the fact. Rather, it was subject to aggressive contemporary campaigning, inserting a glimmer of hope into a population demoralized by the relentless alien threats to their existence. And none was keener to contribute to the vital propaganda effort than Chiokis Corporation, the chief designer and manufacturer of the most prominent examples of Great Awakening technologies.

Yet the *Constitution* starships always were meant to be spearheads – showpieces, even – for a bold new Starfleet equipped with a range of new vessels and technologies. That they also soon became frontier workhorses did not detract from the perception of them as representing the limit of the possible, not of the practicable. While Chiokis pushed aggressively for further high-strung vessel types related to *Constitution*, other manufacturers benefited from their image as trusted providers of proven, no-frills technologies. It was on this basis that Geering managed to sell its own breed of dilithium-powered deep space exploration cruisers just a few years after Project Starship began bearing fruit.

The *Canopus* class was deliberately aiming low when it came to propulsion, using conservative PB-21 engines solidly engineered for the endurance needs of the transport and patrol frigate fleet a couple of decades earlier. Burdened in this SP model with wraparound plasma expanders and heavy duty ramscoops, they could reach a dash speed of mere warp seven even when fired up by a modern four-chambered dilithium powerplant. What really counted was a reliable cruise speed of warp six, and Starfleet trusted Geering's word that the legacy engine would provide this even for the marathon missions intended for the ship type. Armament was also kept at modest levels, to establish a separate operational niche in exploration and research at uncontested theaters of operations. In other regards, though, the cruisers were close matches of the Chiokis starships, just with classic Geering counterparts to each individual component.

A trademark flat, sharply terraced saucer 99 meters across provided primary habitation and housed most mission gear. A tubular secondary hull accommodated the central parts of the main power system, leaving just enough room for a versatile sensor array astern, a deflector dish at bow, and an archaic-looking pair of lateral doors for accessing the ship's main hangar and hold area in between (two medium shuttlecraft were provided with maintenance facilities, and stowage of up to six further craft was possible). The overall profile of the ship was distinct mainly due to lack of a connecting neck, the saucer being bolted directly onto the tube via an angular adaptor that allowed for emergency separation. In dorsal view, the very broad gullwing pylons for the warp engines were also evident; such a viewpoint in turn hid the reliable SAA impulse engines at ventral mid-wing, in a powerful double twin configuration.

In 2241, when the first keels were laid, Starfleet was intent on dedicating these vessels to a grand project worthy of the pomposity of its propaganda terminology: a Great Leap across the Grand Rift to the Sagittarius arm of the galaxy, in the tradition of the *Byrd* adventures but with the persistence and momentum of a fleet of two dozen vessels. A few twin 130/4 lasers were to suffice for tactical needs, while supplies and gear would be carried for decade-long missions. Yet when the first vessels were completed two years later, a memorandum already explored the possibility of introducing a torpedo launcher and accommodating modern tactical sensors. At the completion of the initial batch of fifteen, the Axanari defection was grim reality, and missions by *Canopus* explorers were divided sharply in two. Half a dozen vessels had committed to exploring the far side of the Grand Rift, unaware of the events close to home as their 'breadcrumb' communications lines were deemed insecure for discussions of the strategic situation. The rest performed deep space operations of another sort: when not running at the edge of its performance, the PB-21 had a relatively low and indistinct signature and was surprisingly suited for long term reconnaissance deep in enemy territory.

The *Canopus* was at a distinct disadvantage if discovered spying. Many Klingon frontline vessels were able to match her top speed for a brief while, and that was all that was required to bring the scantly armed and lightly protected type to her knees. Five vessels were lost in all, and the rest returned safely home only by virtue of never having been challenged. Yet the information they brought back was of great strategic value, forming a much more comprehensive picture than single sorties by smaller scoutships. Efforts were therefore concentrated on adding to protection, and the second batch was given three-layer shielding plus the long-planned torpedo launcher. Ordnance was still mainly of older type, though. Alas, the six *Centurion* vessels were not completed until the conclusion of the open fighting; absent hurry, the seventh vessel, *USS Cavalier*, came to mark the definite standard to which all earlier, surviving units were refitted.

The O series registry painted on USS Cassiopeia *spells out her newly militant role clearly enough, despite the modern low-albedo paint used. Less evident from the choice of showcase ship is the divergence from the originally planned thematic naming scheme: instead of stars or constellations, the* Canopus *class came to feature twenty-two alliterative names, one of these applied twice (the* Caledonia II*, NCC-O716, was a direct casualty replacement for her namesake, while four other replacement vessels received unique names).*

The returning Sagittarian explorers were among the recipients of the modern torpedo system and heavy phasers, but did not manage to retrofit the new triple shields. Nevertheless, all the vessels were operated in strategic reconnaissance duty now. It was to the detriment of the class that the strategic need for long range missions dwindled rapidly in the aftermath of the open conflict – the *Canopus* in its newest form was too clumsy for short range operations, and too muscular for the sort of scientific research that at the end of the 2250s was again becoming a distinct strategic possibility.

The class did remain in active service longer than other Geering designs, but only through a select few individual ships. The bulk of the force was retired by 2257 already, having been found inferior to the now-recovered *Byrds* in extreme range exploration duty and denied the required refits. The hulls found plenty of use among UFP allies and partners, many being purchased for capital ships in foreign fleets cleared to receive dilithium technology. UFP research organizations also got hold of a few, and it was from one of these that Starfleet Museum in 2290 managed to purchase *USS Canopus* herself, for restoration into its main representative of the design lineage that just barely survived the Great Awakening.

Ares

Battle cruiser
2244-2264

Completed:	1
Length:	228.6 m
Beam:	127.0 m
Height:	49.0 m
Mass:	604,000 tons
Officers:	38
Crew:	231
Cruise speed:	w 5
Max. speed:	w 8.4
Endurance:	3 years
Weapons:	8 laser emitters (130 nm / 4.2 GW) in 4 twin banks on dorsal primary hull 4 laser emitters (130 nm / 4.2 GW) in 2 twin banks on ventral primary hull 2 laser emitters (280 nm / 600 MW) on aft dorsal secondary hull 4 fwd heavy torpedo tubes w/ 60 photorps on secondary hull bow 4 aft heavy torpedo tubes w/ 60 photorps on dorsal secondary hull 6 Type L phased particle cannon (800 GJ / 1.2 TW) in 3 twin banks fwd/port/stbd of bridge

	6 Type L phased particle cannon (800 GJ / 1.2 TW) in 3 twin banks fwd/port/stbd of ventral sensor array
Shields:	2-layer conformal forcefield Navigational deflector on fwd secondary hull
Laboratories:	None
Transporters:	4 GP (6-pad), 1 cargo, 3 emergency evacuation (22-pad); Mk II All ships brought to Mk III standard after 2256
Auxiliaries:	2 medium and 2 light shuttles, 4 work pods

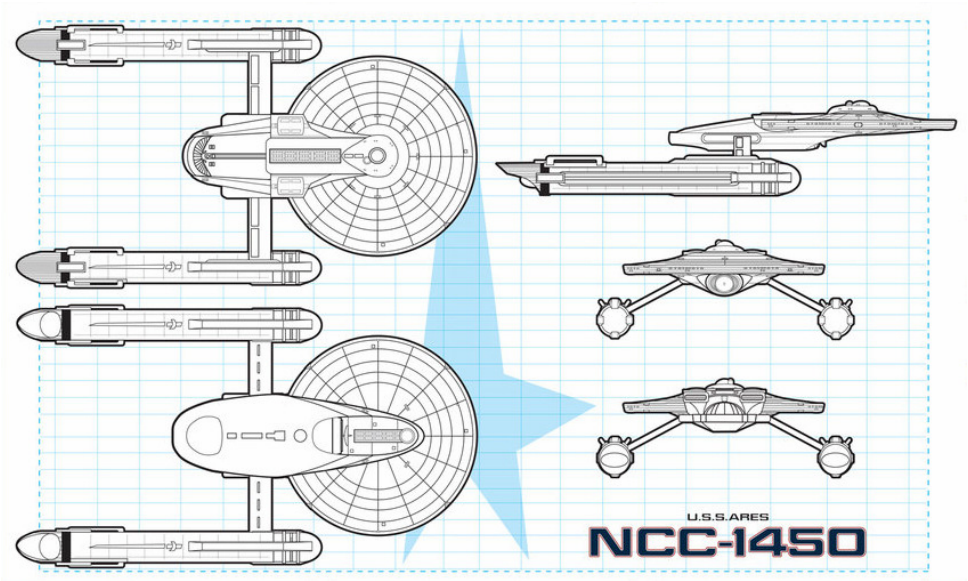
Ships of historical interest:

USS Ares (NCC-1650)

SOURCES:	(D ST:Axanar/Sean Thourangeau) (N ST:Axanar) (H ST:Axanar)

The repeated delays on Project Starship had by the onset of the 2240s become such a serious issue that secrecy on the project was on the verge of breaking down. No shipbuilding project since the days of 'escape velocity' had held this sort of strategic and political significance: Fleet procurement plans, wargaming and diplomacy all underwent dramatic twists and turns as the latest news on progress or lack thereof circulated in the corridors of power, in less and less hushed voices. Chiokis was getting an earful, not just for false promises but for the distinct possibility that the current Klingon offensive was in fact a direct response to the intended yet delayed escalation of Starfleet fighting power.

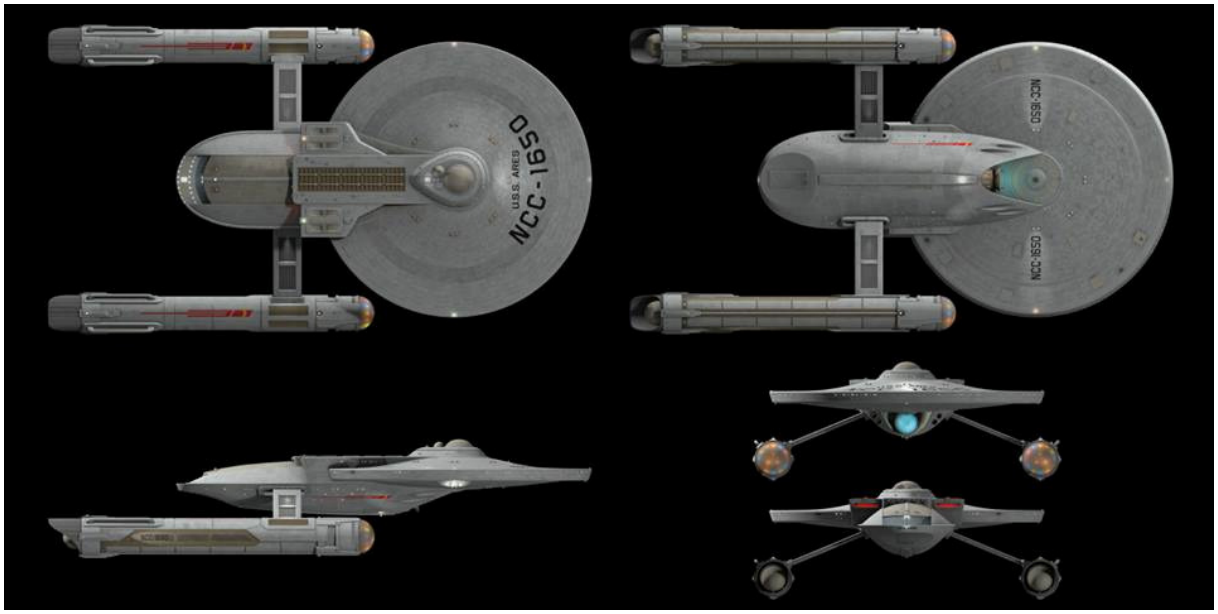
Baseless as the speculation was, it put extra impetus on the effort through which Chiokis tried to save not just its corporate image but the future of the Federation as well. Officially, the effort consisted of a stream of light cruisers and assorted other gapfillers. Unofficially, Chiokis was prepared to drop Starship altogether and unleash something completely different on the Klingon menace. At first engineered around the trusted PB-45 and the *Rochester* patrol cruiser spaceframe, Project Quarterback in 2238 was redrawn into a mighty battle cruiser, mating the PB-30 propulsion and power system of Project Starship with a weapons suite the likes of which had never before been seen.



The original plan, lacking a key ingredient: the smaller secondary hull could not have accommodated the heavy torpedo system. The multipurpose ventral sensor dome would be a casualty in the adoption of the more potent armament. The registry on the blueprints reflects the more limiting mission profile intended for the design at this point.

In 2241, the keel for the inaugural Quarterback was laid on one of the less distinctive box docks around Jupiter. By configuration, Quarterback was a typical piece of Hreedenck art, with multiple positioning options for the ramrod-straight pylons on the ventrally trailing secondary hull; the distinctive anhedral of the *Kitty Hawk* was chosen, providing maximum clearance for both warp fields and the fields of fire of primary armament. Yet the ship was no mere *Rochester* Mk IV, but an altogether more potent vessel, with a *Kearsarge*-style saucer 120 meters across brimming with weapons emplacements. There were no fewer than seven dorsal and five ventral double berths for a mixture of beam weapons, and the secondary hull accommodated a deadly quartet of heavy torpedo launchers, two on each side of the navigational deflector dish.

The juncture of the saucer and the engineering section was dorsally bolstered by a superstructure that housed another, aft-firing quartet of launchers, shunting the four-reactor SAQ impulse engines to the sides. A wide stern shuttlebay remained available for support craft, but this was mere afterthought made possible by the size of a hull segment designed to house the vitally important KR13-O m/am reactor system with sextuple dilithium foci. Power feeds to beam weapon emplacements and warp engines were short, straight and heavily armored. Antimatter bunkerage lay right next to the well-shielded power citadel, yet with direct ejection routes through a series of dorsal hatches so that combat survival need not depend on complete impenetrability of primary defenses. The ability to take massive damage was engineered to the power and weapons system from the very start: "catastrophic failure" was not just an eventuality well prepared for, but an acceptable combat mode.



The ultimate configuration of USS Ares *differs little from that of the preceding generation of battle cruisers, save for the clustering of plasma expanders and intercoolers at engine pylons rather than in dedicated fins. That the lasers have four times the punching power, the top speed is two warp factors higher, and the torpedo launchers fire a projectile six times deadlier is visually imperceptible to an opponent until the action is joined. Even less discerníble would be advances in navigational and tactical computing, involving a massive rocessing core at the heart of the primary hull. Even though many of these capabilities were common with the* Constitutions*, surprisingly little of the hardware was – production Starships would feature larger or more advanced variants.Note the new registry, sequential with combat cruisers rather than exploration ones.*

The same was not true of Starfleet at large. The betrayal at Axanar met every criterion for catastrophic failure save for two: the tactical brilliance of Kelvar Garth and the superior strength of *USS Constitution*. At the conclusion of First Axanar, only one of these remained. With the first Starship knocked out of action, work on Quarterback was finally given official priority orders. Resources were scavenged from wherever they could be spared, and Federation-wide fundraising campaigns initiated to capitalize on the propaganda value of Axanar. In January 2244, the battle cruiser could at last glide out of her construction dock where she had already been fully outfitted for combat. Rushing to reinforce failing defenses at the outer colonization zone, *USS Ares* (NCC-1650) was in mid-deployment joined by her first commanding officer, Garth of Izar.

The baptism of fire at Inverness proved the value of the torpedo armament in a series of easy victories over Klingon battle cruisers. The Starfleet propaganda machine made the best it could of the engagement, releasing stunning visuals of daring maneuvers. What the Offices of Tactical Planning did not wish revealed to the public were the shortcomings found in the shielding of the new fighting machine. A superb tool of offense, the *Ares* had to be wielded with Klingon-like audacity in order to protect her tender flanks, especially her high-strung warp power system that might suffer disastrous feedback from any piercing hits.

When the painstakingly repaired *Constitution* received a second crippling blow at Lea, what Starfleet needed was a defender of great endurance, however. With older battle cruisers falling to pieces left and right of him, Garth saw the hopelessness of a defensive stance, and arranged for a trap worthy of sagas to conclude the war right where it had started. Victory at the Thranstor yards turned the tables on the Klingon Empire that for its turn had to face an acute shortage of capital ships.

It was all the more shocking for Garth, then, to return to the planning offices for the devising of an offensive to take advantage of the situation, and find waiting for him Starfleet orders to cease all work on the *Ares* class. With no Klingon forces remaining in UFP space as defined by prewar borders, the decision had been made to utilize the lull in another fashion – by finishing repairs and construction on the *Constitution* class ships and creating a defense capable of securing the status quo. All 30-series warp coils were to be allocated to the *Constitutions*, all 130/4.2 heavy lasers installed on Starships.

The Ares *returns to her home port and namesake world, unvanquished in combat but defeated by strategic realities. Note the antimatter ejection ports atop the midhull power citadel, and the plethora of laser emplacements.*

The strategy paid off. All subsequent Klingon offensives were isolated sorties strictly limited in duration and scope. Thwarting them called for rapid and potent defensive response at the tactical level, rather than strategic strikes against some sort of a grander scheme. The remaining battle cruiser forces were relegated to use as heavy destroyers, either held in retaliatory reserve or deployed in formations protected and led by the heavy cruisers that now reigned supreme in deep space. The sole exception was *Ares* herself, sometimes utilizing her great speed in solo troubleshooting missions – but more typically cruising around the Federation on assorted promotion tours.

Aakenn

Heavy transport
2247-2319

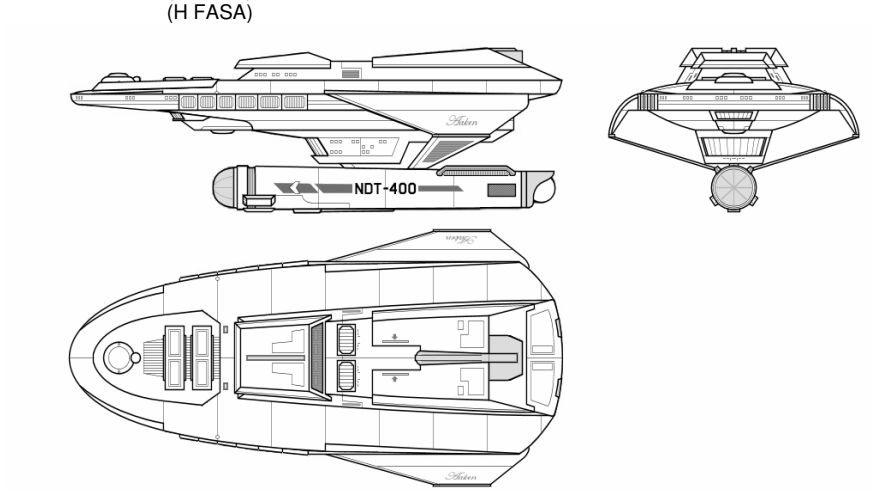
Completed:	145 total: 67 *Aakenn* heavy transports 2 modified *Aakenn* propulsive prototypes 76 *Westminster* heavy transports 6 *Westminster* refitted to *Abbott* heavy repair ships in 2261
Length:	235.9 m
Beam:	124.3 m
Height:	76.5 m
Mass:	320,700 tons (*Aakenn*) 321,000 tons (*Westminster*) 339,200 tons (*Abbott*)
Officers:	4
Crew:	50
Passengers:	6 (standard, cargo configuration)

	700 (maximum, troopship configuration)
Cargo:	109,000 tons (*Aakenn*) 139,000 tons (*Westminster*) 40,000 tons (*Abbott*)
Cruise speed:	w 6
Max. speed:	w 7.0 (*Aakenn*, loaded) w 9.0 (*Aakenn*, unloaded) w 6.2 (*Westminster*, loaded) w 6.0 (*Abbott*, standard load) w 5.8 (*Abbott*, slung nacelle) w 8.3 (*Westminster*, *Abbott*, unloaded)
Endurance:	2 years (*Aakenn*) 4 years (*Westminster*, *Abbott*)
Weapons:	<u>Original:</u> 1 laser emitter (130 nm / 600 MW) on ventral bow 1 laser emitter (130 nm / 600 MW) on ventral stern <u>Refit 2259:</u> 1 phaser IV emitter on ventral bow 1 phaser IV emitter on ventral stern
Shields:	1-layer conformal forcefield Navigational deflector on dorsal midhull
Transporters:	2 GP (6-pad), 4 small and 4 large cargo; Mk II Most ships brought to Mk III standard after 2249 Some ships brought to Mk IV standard after 2270
Auxiliaries:	4 medium shuttles, 2 work pods; 12 lifepods applicable as landing barges

Ships of historical interest:

USS Mundy (NCC-F2022)

SOURCES:	(D FASA, dimensions corrected) (N FASA) (H FASA)



In a matter of a few years, Project Starship and its offshoots had resulted in a quantum leap in Starfleet capabilities and strength. So great in fact was this leap that many support assets were being left behind. This meant in practice a step back, to the sort of circumstances familiar from the early 22nd century. Communications networks no longer covered the whole theater of operations; early warning sensors now guarded the rear instead of the front; and starships operating in the frontier had to barter for supplies, as logistics chains fell well short of starship range.

Fortunately, all the prerequisites for building logistics support vessels apace with frontline starships were now in place. For once, the enemies were known quantities, so detailed procurement policies could be created without having to brace against major surprises. The Fleet had a reasonably strong defensive backbone, and its block obsolescence was not an immediate threat, thanks to the potential for solid-state engine and phaser upgrades. Thus, UFP industrial output could be channeled towards a balanced newbuild program: in addition to cruisers, destroyers, frigates, fleet control ships and tenders of the most modern sort, the shopping list of the 2240s included half a thousand modern transports.

The up-engining of the *Independence* class with PB-35 was one way to meet the transport requirement. There existed a specific demand for a heavier vessel, though. In addition to priority goods, Starfleet was going to haul more mundane materiel to the frontier to support both the next exploration wave and the anti-Klingon operations. For this purpose, a fast vessel in the 100,000 ton cargo capacity range would be ideal. Since none were available in the commercial market, a design was created by Shintoi Heavy Industries to combine destroyer-type propulsion with a heavy spaceframe adapted from the massive *Cochrane* colonizers. Starfleet eagerly accepted the proposal, and promised Shintoi complete PB-31C drive chains off the *Larson* production lines for the transport application.

By 2246, Shintoi had fine-tuned its proposal into a mighty military machine quite on par with the combat starships of the era. Shielded to modern standards, capable of warp nine dash speed when free of load, and hauling more than a hundred thousand tons of cargo at fleet speed of warp six, the *Aakenn* was a class apart from the civilian standard of the day. The sleek pseudo-aerodynamic hull, 236 meters long, was elegantly arranged into functional sections. These included a three-deck-high main level for cargo holds; dorsal structures for the navigational deflector and sensors plus various support and auxiliary power systems; a ventral bay for accepting cargo shuttles or pallets and distributing them to the hold area via internal lifts and transporters; and a stern area for the destroyer powerplant and impulse engines plus fuel tanks.

At the last moment, however, Starfleet withdrew the PB-31C and substituted the D model instead. In addition, demands on onboard sensor, SCM and communications system performance were increased. The most serious change was a requirement for troop transport capacity. All this came in response to the peaking Klingon threat, and presented Shintoi with an engineering and manufacturing challenge – but with priority resources as well. Three Star Fleet Division dockyards at Proxima were now slated for the production, in addition to the Tellar facilities already reserved. With such resources, Shintoi was able to deliver the first twenty *Aakenns* fully on schedule, now dubbed Mk II, and equipped with twelve large lateral lifepods/barges for the up to 700 troops and with a new ventral bow sensor array for tactical scanning, tracking and fire control. Two 600 MW laser emitters were slaved to the sensors and to the Takakura Mk 2 main computer, a somewhat symbolic arsenal that nevertheless had practical applications as well.

There is a very good reason why this convoy of Aakenns *from 2249 features no transports from other contemporary classes: a fleet speed of warp six would have been impossible for an* Independence *or even a fully laden* Ptolemy. *Inhabiting a comfortable niche in cargo capacity between the two classes, the* Aakenn *was the ideal means of transporting materiel to frontier and frontline bases from the forties to the sixties. Competition on UFP trunk routes was harsher, and the* Aakenn *had its shortcomings in the field of point supply and replenishment. Yet Starfleet demand for frontier transport buoyed* Aakenn *production to the point of ultimate general commercial success.*

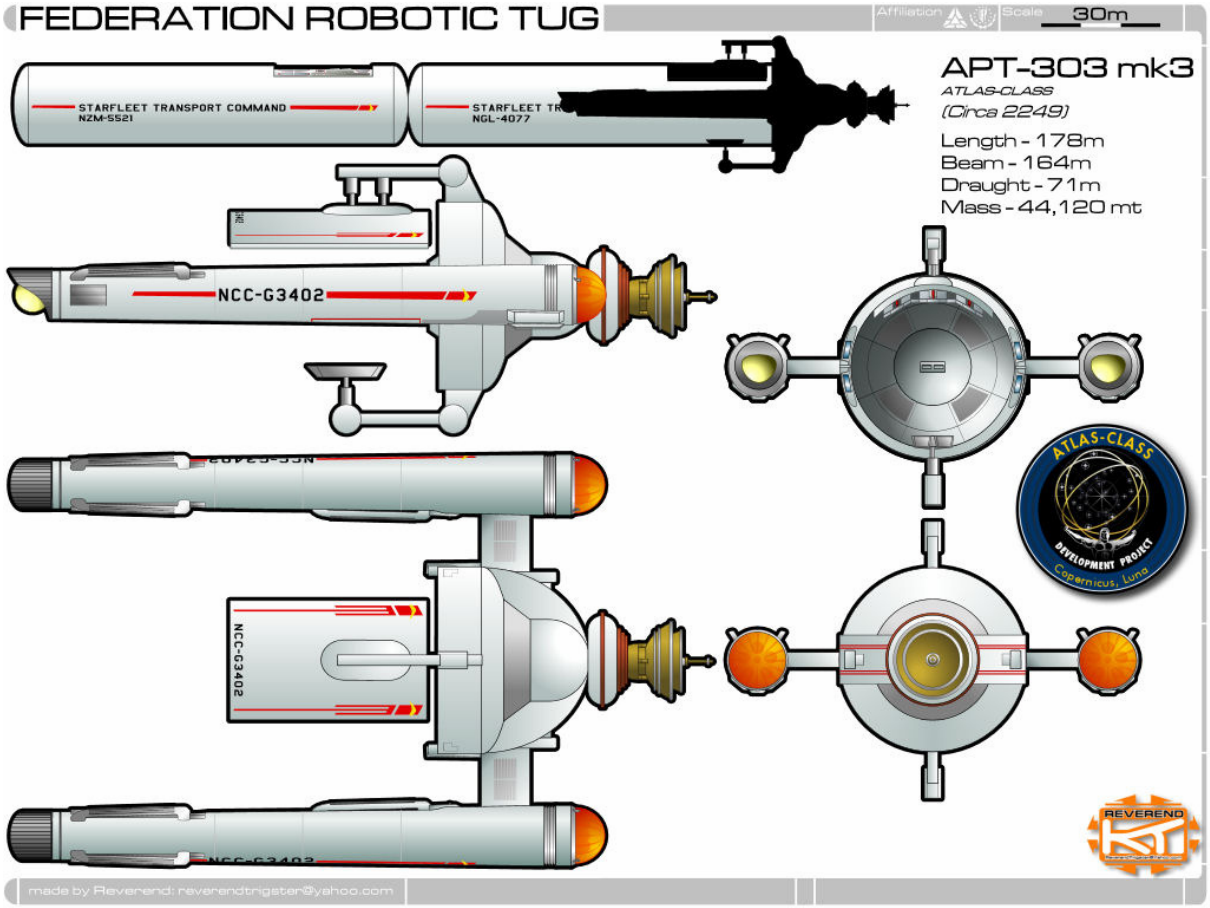
The fact that the Klingon War ultimately dwindled down to border skirmishes did not diminish Starfleet's need for the *Aakenns* one iota. On the contrary, the frontier nature of the conflict called for the special propulsive performance of the heavy transports. Production intensified to encompass 'deep homefront' facilities at Cait, and Shintoi was asked to integrate the PB-32 deep space engine into the latest production batches. The handful of Mk III prototypes were indeed followed with a PB-32D -propelled Mk IV (or *Westminster* subclass) operational variant in late 2254, half a year before the first similarly converted *Ptolemy* would sail out. Yet an increase of maximum cargo load by 30,000 tons and doubling of propulsive endurance was accompanied by a reduction of top speed by one warp factor. Improved shields and computing systems were a more useful change, and phaser IV emitters of Armscor-Hindustan FH-2 model ultimately replaced the lasers.

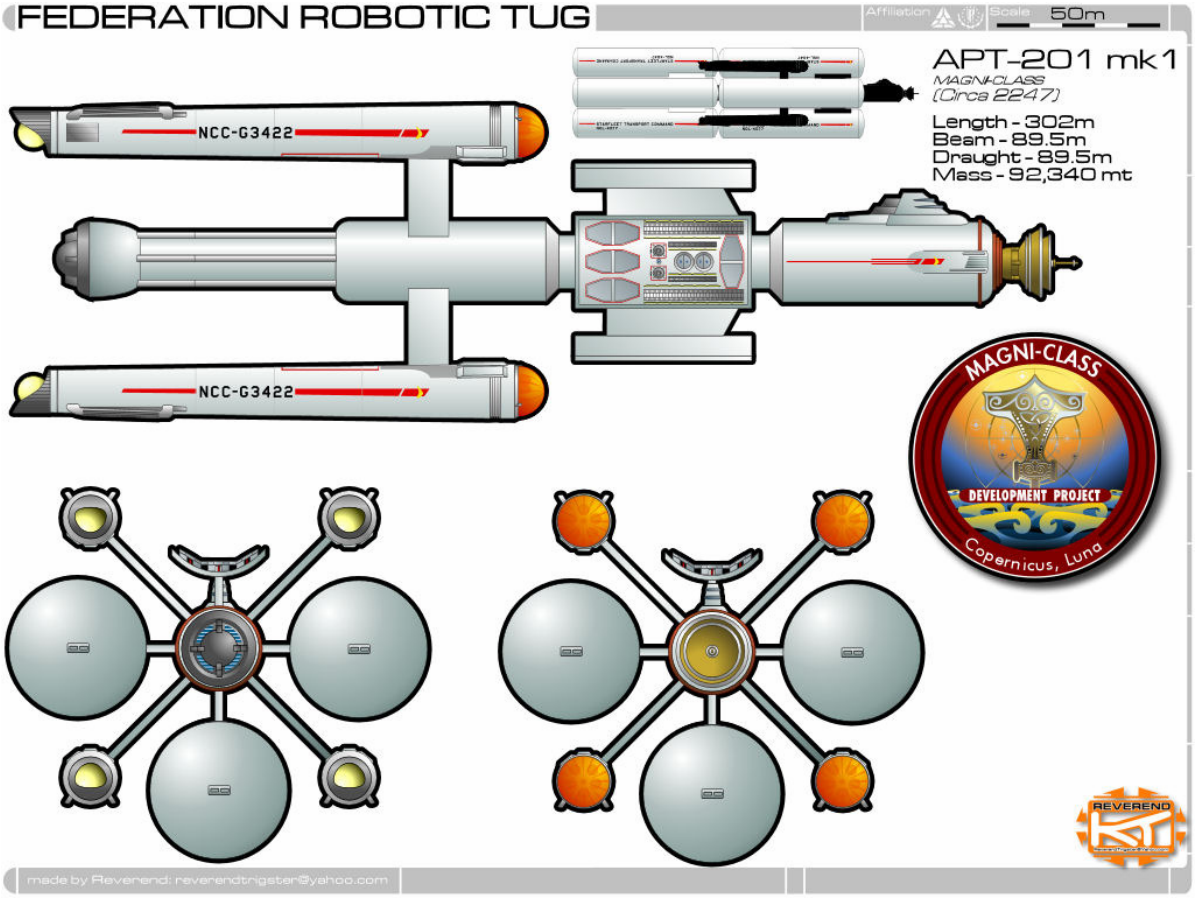
The Mk IV upgrade came several years too late to actually make a difference in the Klingon conflict. Starfleet's craving for the fast and capacious transports would not be satisfied until the production of 76 units, though, rounding out the total to 145 vessels. This did not include the civilian spin-offs, many of which had been licensed to feature PB-31 engines albeit not the other military gear. The availability of such vessels encouraged major UFP cargo operators to return to the formerly Klingon-menaced and still pirate-ridden space lanes, although not yet in sufficient strength to significantly boost the laggard economy. Starfleet Merchant Marine still had to carry its cross: virtually all the Starfleet *Westminsters* remained in service till the end of the century, not as Fleet theater transports but as general cargo vessels for the frontier. Whereas some older *Aakenns* were relegated to training duty early on, many were sold to commercial interests in the seventies. Re-engining was seldom warranted, as transport duty was more forgiving for the sturdy single-nacelle configuration than for the long-pyloned, multi-engined tug designs.

The spectacular demise of USS Malacca *(NCC-F2032) in a covert operations strike at SB 47 was but one of the victories secured by Klingon Imperial Intelligence in the 2260s. The* Westminster *transport succumbed to a series of internal explosions and barely avoided containment failure. It is presumed that such a calamity was the true goal of the Klingon bombers, as it would have crippled the starbase and, along with it, Starfleet operations in the Taurus Reach. However, the explosives were almost amateurishly placed for such an outcome, giving several seconds for the multiply redundant containment protection and ejection systems to work.*

Six of the Mk IV vessels were in 2261-62 modified into *Abbott* heavy repair ships for supporting cruiser operations in deep space. They featured significant amounts of internal gear ranging from conventional workshops to advanced fabricators, and had reduced cargo facilities as a consequence. On the other hand, the *Abbott* vessels had a dorsal cargo sling for oversize components, up to and including a spare PB-32 or PB-47 engine if needed. Hauling of such a burden would reduce speed below nominal cruise value, yet was an essential service in the years of severe *Ptolemy* tug/tender shortage.

Having set completely new standards for transport vessels all across the Federation, the *Aakenns* bowed out in the 2310s. A diverse set of commercial imitators, with slight differences in propulsion configuration, forms the backbone of medium distance cargo traffic even today. On the longest and shortest cargo routes, different solutions have emerged – yet the most significant watershed in UFP transport design history steadfastly remains at 2247, the year the classic Earth container transport and the Rigelian monohull both finally met their better.


FEDERATION ROBOTIC TUG
Affiliation
Scale
30m
STARFLEET TRANSPORT COMMAND
NZM-5521
NGL-4077
APT-303 mk3
ATLAS-CLASS
(Circa 2249)
Length - 178m
Beam - 164m
Draught - 71m
Mass - 44,120 mt
NCC-G3402
ATLAS-CLASS
DEVELOPMENT PROJECT
Copernicus, Luna
REVEREND
made by Reverend: reverendtrigster@yahoo.com



Grayson

Buoy tender
2247-2342

Completed:	400 total: 70 *Grayson* built in 2247-50 150 *Finch* built in 2249-59 180 *Andromakhe* built in 2270-2298
Length:	118.0 m (*Grayson*) 149.8 m (*Finch*, *Andromakhe*)
Beam:	38.9 m
Height:	39.2 m (*Grayson*, *Finch*) 39.0 m (*Andromakhe*)
Mass:	116,300 tons (*Grayson*) 140,300 tons (*Finch*) 137,400 tons (*Andromakhe*)
Officers:	2
Crew:	13 (*Grayson*, *Finch*) 18 (*Andromakhe*)
Cruise speed:	w 6
Max. speed:	w 7.0 (*Grayson*, *Finch*) w 8.0 (*Andromakhe*)
Endurance:	1 year (*Grayson*, *Finch*)

	1.5 years (*Andromakhe*)
Weapons:	None (*Grayson*) 1 phaser IV emitter on dorsal bow (*Finch*, *Andromakhe*)
Shields:	1-layer conformal forcefield Navigational deflector on ventral bow
Transporters:	1 GP (6-pad), 1 cargo; Mk II (*Grayson*, *Finch*) 1 GP (6-pad), 1 cargo; Mk IV (*Andromakhe*)
Auxiliaries:	1 buoy recovery shuttle/drone

Ships of historical interest:

USS Grayson (NCC-R500), *USS Finch* (NCC-R630), *USS Andromakhe* (NCC-R790)

SOURCES:	(D FASA, dimensions corrected) (N FASA) (H FASA)

Boosting the flow of physical materiel was but a preamble of the challenge thrown at Starfleet Logistics Command by Project Starship. Getting the Fleet deployed to the frontier called for more than just fuel and supplies: the bold new ships would be hopelessly lost without a network of sensors and communications relays, never in the right place at the right time. In 2240, the Federation had some six million communications buoys and two million sensor platforms in operational condition. For operating the new fleet in an efficient manner, at least twenty million additional buoys would have to be sown, and regular maintenance performed on the network.

To be sure, Starfleet was not supposed to bear this burden alone, if at all. UFP Transit Authority, founded in 2171 to coordinate the maintenance of spacelanes outside the areas of responsibility of individual star systems, had so far performed the task adequately. The traffic control net was still fragile and subject to local acts of sabotage, but most UFP systems were at least interconnected with realtime or near-realtime commlinks and equipped with Class 1 or 2 approach control facilities. Much of this was achieved with the use of chartered transport vessels for occasional buoy maintenance runs, although some 200 purpose-built or converted buoy maintenance platforms were also in operation.

The expanded theater of starship operations called for tripling of this capacity at the very least. It was obvious that the most significant UFP presence in the areas of expansion would be Starfleet's, and that there would initially be little return from civilian investment there. The Council agreement of 2243 placed the responsibility of traffic control network erection and maintenance on exploration zones between 100 and 1,000 ly away squarely on Starfleet, which delegated the chore to Logistics Command. The division chief, Rear Adm. Martela Nabo Ib, was aware that exploratory starships would be quite tied up with sowing military communications nets, and could not be tasked with traffic control buoy deployment, let alone maintenance. It therefore requested that a new type of tender be developed and fielded for the task.

The Denevan shipbuilder and designer AsTrans had gained a reputation as provider of good, solid working vessels suited for deep space. Until the mid-23rd century, these generally lacked in speed, however. When Starfleet made the solid-state PB-35 engine available to AsTrans, this was no longer a problem: the popular *Karoo* 118 m medium freighter could reach warp seven when propelled by the military engine. With this vessel as the basis, AsTrans in 2247 formulated the desired buoy tender. Beyond the drive system upgrade, minimal modifications were needed, for the mission gear was carried in a separate section that took the place of the freight container. Thus, the actual hull of elegantly curved shapes only need house mission-unspecific utilities. Accommodation

and support for the 15 crew lay on two upper decks, the navigational deflector and sensor suite were cradled beneath, and impulse engines, fuel tanks and stores for consumables were encased in or beneath drooping cheek flanges three decks high on both sides of the deflector array. The main dilithium power system was packaged astern, at the aft end of a narrow strongback that also supported the single dorsal nacelle on a short vertical pylon; both elements of the warp drive could be rapidly ejected in an emergency. The mission pod hung below the strongback on a series of ventral grapples.

The mission pod was a coffin shape 80 m long, 20 m wide and 14 m high. At the bow was an accessway for the crew, at the stern an entry bay for the tenants of the system. A single recovery shuttle could be employed to haul in the buoys, manned or remotely piloted. Two standard relay buoys could be recharged at a time, two manually repaired or overhauled on well equipped workbenches, and ten stored for later deployment. The processing capacity thus was markedly greater than on insystem and short range interstellar tenders, yet not directly proportional to the size of the vessel. With a high percentage of the interior dedicated to spares, little room was left for undue loitering in the cramped workplace. Since the main body of the vessel offered few compensating comforts, it was easy to predict disgruntlement on long mission sorties. Yet with the distances to be covered and the number of stops to be made, six months would be a minimum mission length.

Seventy of the tenders were ordered under the class name *Grayson* for the immediate needs of the buoy deployment program, and crews were trained in a true 'crash program' that resulted in several bumps and bruises to the hardware. The first two years of operations exposed two main shortcomings in the type. The crew discomfort issue was expected; more surprising was the need for self-protection, as the lone vessels full of modern technology and software attracted the attention of pirates and spies.

Both the problems required enlarging of the spaceframe as part of the solution. A longer, more acutely tapering forward section was designed, housing additional crew spaces and a forward phaser IV emitter. A combat shield generator was added on the aft hull. Also, the original mission pod was succeeded by a version of almost twice the beam and mass. Five more crew were brought aboard to manage the new equipment, but overall space per crew member had still been increased to tolerable standards. This despite the fact that the new mission pod was just as cramped as the original, having twice the number of buoy storage slots and a larger maneuvering propellant refueling system.

The enlarged and customized variant was nearly twice the mass and half again the price of the original, yet was ordered in considerable numbers. Some 150 of the vessels, seldom called by the subclass name *Finch*, were manufactured at Deneva, Jaltus and Morena, at a rate matching the demand for replacement hulls. While the original *Graysons* continued operations in areas where their lack of armament was of no serious concern, they were wearing down their PB-35Bs at an alarming rate. The first original batch vessels to go to the reserves in 2262 were sent to mothballs just three years later. Second batch units were also being relegated to reserves at the time, as the deployment phase of the new network was reaching completion. Engine troubles had resulted in delays in the schedule, however, and Starfleet saw a continuing need for the vessels not only in tasks of maintenance, but of network expansion as well.

Maintaining the Firechain. Two crew from USS Bollard *(NCC-R731) of* Finch *subtype work on a stealthy sensor buoy* in situ*, an atypical way of handling repairs on a seemingly intact and controllable device. Modern transporters offered rapid spacewalk access to buoys, though, and might provide the swiftest way to perform simple maintenance tasks. Speed was indeed of essence in keeping the approximately 800,000 sensor platforms of the Firechain operational from the 2250s to the 2280s. So was range, as the* Bollard *here is operating some forty lightyears from the nearest truly secure Starfleet facility.*

In 2270, Starfleet fielded a modernized tender on its own, using the AsTrans spaceframe but adding the LN-61 engine and the associated external power systems. The latter necessitated expanding the aft engineering assembly somewhat, and hull mass increased again, to a destroyerlike total of 62,360 tons sans the coils. Overall mass was reduced, though, thanks to the neatly packaged linear engine that worked with 17 % less coil mass. Also gained in the process was a new dash speed of warp 8, and a 55% increase in endurance. On board now were the latest personnel and cargo transporter models and an augmented targeting system, perfectly adequate for using the vessels in patrol duties in support of corvette assets.

Production of the linear-engined *Andromakhe* subclass was confined to the Morena facilities, and continued till 2298, by which time 180 units had been built. As many as 200 tenders were active in the 2270s, some 170 in the 2280s, and more than a hundred in the 2290s still. UFP Transit Authority resources were gradually catching up with their daunting task, and Starfleet tenders were increasingly directed to purely military duties. In riskiest assignments, the heavy *Derf* units were favored, but *Andromakhes* and *Finches* saw combat action as well. The former narrowly escaped losses, but eight of the latter succumbed to Klingon attacks, often in situations where high speed would have provided protection. Predictably, no enemy kills were ever scored by the tenders, despite the frequent use of the bow phaser on missions intended as non-aggressive.

The bulk of the *Andromakhe* force was assigned to reserves in 2315. The networks projected in the 2240s were now in place and under civilian maintenance; the expansions ordered in the bellicose eighties had either been completed or rendered unnecessary. Treaty Exploration Zones of vastly greater scope had opened up, yet the ships of *Grayson* descent could not hope to operate that far away from their support bases. Increased power and range of shipboard sensors and communication systems alleviated the problems of relay and sensor network maintenance, though. Furthermore, Starfleet did not plan on staking its claim to the zones through extensive fortifying. Simple communications lines were usually deemed sufficient, and the bold new cruiser fleet could sow its own 'breadcrumb' lines with minimal disruption to regular operations. This did not quite mean the retirement of the buoy tender mission class from Starfleet strength; it did mean that the successors to the *Andromakhe* class were built in modest numbers. The last of the *Grayson* family were paid off in 2342.

Coventry / Benning

Strike frigate / heavy frigate
2247-2295

Completed:	20 total: 14 *Coventry* strike frigates built in 2247-49 6 *Benning* heavy frigates built in 2251-53
Length:	245.1 m
Beam:	127.1 m
Height:	54.1 m (*Coventry*) 56.2 m (*Benning*)
Mass:	650,000 tons (standard) 648,900 tons (NCC-1234, 1237, 1239-40) 638,200 tons (*Benning*)
Officers:	51 (*Coventry*, pilots not included; usual complement 15 Marine and Fleet pilots) 48 (*Benning*)
Crew:	264 (*Coventry*) 255 (*Benning*)
Cruise speed:	w 6
Max. speed:	w 8.0
Endurance:	4 years
Weapons:	<u>Original:</u> 4 laser emitters (130 nm / 4.0 GW) in twin banks port/stbd of bridge 2 fwd medium torpedo tubes on dorsal primary hull 1 aft medium torpedo tube on dorsal primary hull (*Benning*) <u>Refit 2255:</u> 6 phaser VII emitters in 3 twin banks, port/stbd or bridge and fwd of ventral sensors 2 fwd medium torpedo tubes on dorsal primary hull 1 aft medium torpedo tube on dorsal primary hull (*Benning*) <u>Refit 2265:</u> 6 phaser VII emitters in 3 twin banks fwd, port and stbd of bridge 6 phaser VII emitters in 3 twin banks fwd, port and stbd of ventral sensors 2 single phaser VII emitters on aft hull on some vessels 2 fwd medium torpedo tubes on dorsal primary hull
Shields:	1-layer conformal forcefield Navigational deflector on forward hull
Laboratories:	1 GP
Transporters:	2 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III All ships brought to Mk IV standard after 2271
Auxiliaries:	4 light shuttles, up to 7 tactical craft. 4 work pods (strike configuration I) 2 light shuttles, 4 assault barges, 8 escort fightercraft, 4 work pods (strike configuration II) 2 light shuttles, 16 hoppers, 8 escort fightercraft, 4 work pods (strike configuration III) 2 light and 2 medium or heavy shuttles, 1 special environment craft, 4 work pods (planetary survey configuration)

Ships of historical interest:

USS Constant (NCC-1236), *USS Sverdlov* (NCC-1238)

SOURCES:	(D *Coventry* SotSF/Evan Mayerle, *Benning* Eric Kristiansen) (N *Coventry* SotSF, *Benning* Eric Kristiansen, *Theseus* LUG) (H *Coventry* SotSF, *Benning* Eric Kristiansen, *Theseus* LUG)

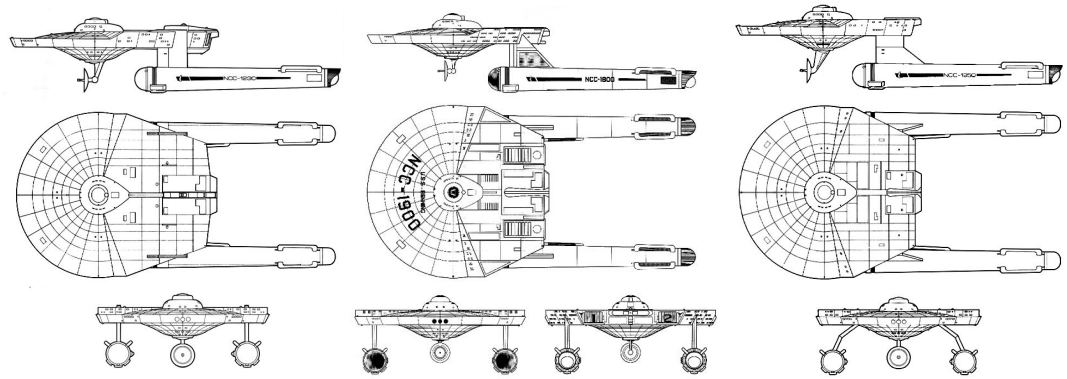
Even before the Klingon fleet was beaten back at Axanar, certain factions of both Starfleet and the Federation Council expressed concern over the unbounded escalation. Most criticism was directed towards the destroyer and frigate programs which rallied for suspiciously high numbers of required

ships. At a time when scores of cruisers were being churned out, the simultaneous procurement of advanced *Saladin* variants and the competing *Larsons* was a heavy burden, and ultimately the *Larson* program was significantly scaled down. Similarly, the *Loknar*, *Miranda* and *Surya* frigates all both filled the traditional frigate niche and expanded to overlap the destroyer and light cruiser roles. Starfleet had never operated such large numbers of ships of such high capabilities, and the admirals had a hard time convincing the Council of the need for the vessels. In this situation, the program for introducing a still heavier frigate variant, and in considerable numbers, was bound to face stiff resistance.

The *Coventry* class braved the odds by the virtue of being the most cost-effective way of providing much-needed hangar decks for ground assault operations; these were presumed imminent if the Klingons continued their advance. The ships were simple and straightforward partial modernizations of the oversized and underpowered *Anton* light cruiser of 2239, and initially they were actually dubbed the *Anton* class Mk II variant. Starfleet decided to play a previously successful card, however, and gave the design a new identity as *Coventry* class heavy frigates.

Even under this politically palatable designation, just ten newbuild ships out of the hoped-for eighteen were authorized. Their introduction in 2245 was a debated move when even many of the warhawks who had supported general escalation now felt that frigates should give way to increased destroyer numbers. Delays in financing (as well as the utilization of the well-known trick of procuring ships under already-approved but delayed NCCs, in this case those of unbuilt *Antons*) meant that the ships were deployed two years later than the basic-configuration *Suryas*, but with NCCs 800 units lower than the *Surya* ones. *Constitutions*, *Mirandas*, *Loknars* and *Larsons* also fell in between these numbers. Three more ships were added to the original production batch in late 2246, and a fourteenth vessel in early 2247, completed in late 2248. A pause then followed as Starfleet decided on the best strategy for obtaining further frigates: should the *Miranda*, *Surya*, *Coventry* or *Loknar* lines be standardized upon?

In early 2249, *USS Noshiro* had been completed to test the blending of *Miranda* and *Surya* attributes. In 2251, *USS Benning* was created to hybridize *Surya* and *Coventry*, chiefly by matching the shorter hull of the former with the sturdy and simple vertical pylons of the latter. An aft-firing torpedo tube was also brought into the mix, but by installing it in the superstructure rather than by adopting a *Miranda* pod. Both vessels were eventually assigned an operational role and the *Benning* was given the official blessing for five successors. Yet in the end, no champion could be summoned from the confused ranks, and the scant funds and political capital were spent on a second run of *Loknars*, fully equipped with the matured technologies of the 2250s.



A side-by-side comparison of Coventry *to the left and* Surya *to the right, with the hybrid* Benning *in the middle. All three views reveal different aspects of the hybridization process.The vertical pylons are the most prominent non-*Surya *element of*

the fore view.The short hull dictates somewhat chopped, triangular pylons for the hybrid, setting her side profile apart from that of the Miranda *class. Evident in dorsal view are the short shuttle facilities and the rounded superstructure with the third torpedo launcher, the key operational dissimilarities with* Coventry.

In technological comparison, the *Coventries* were simple machines. Many systems, including the PB-47 engines, were direct substitutions of old *Anton* hardware with counterparts projected for *Constitutions* and ultimately used in the *Achernar* subclass heavy cruisers. The armament of the *Coventries* in turn originally featured lasers and torpedoes identical to those aboard the *Suryas*. After 2257, they were refitted to the level of the late-standard *Suryas*, save for the installation of a twin phaser VII unit instead of the two phaser VIs, and (in a controversial, expensive and only semi-successful move to increase interoperability with cruisers) the selection of more modern fire control systems. Between 2261 and 2262, eight vessels were also modified for improved anti-ship defenses with the addition of auxiliary deflector spires. Finally, in 2265, the number of phasers was doubled to general fighting frigate standards.

Three different standards were applied on *Coventry* hangar decks. The initial production run of ten featured two bays 45 by 25 by 9.5 meters in dimensions, while the next three ships had longer and higher facilities with somewhat more limiting doorways but with a greater variety of support systems. In the fourteenth ship, *USS Indus*, the two landing bays were joined with a transverse hangar just ahead of the main engineering area. The large hangars could well be utilized for exploration, colony support and rescue missions, de-emphasizing the military aspects of the ships without actually sacrificing any military capacity. In combat duty, the hangars could house as many as twenty small tactical craft or, more usually, four assault shuttles and six fightercraft. The *Benning* vessels embarked a much smaller complement on their shorter bays, and could not credibly receive the strike frigate designation that had helped the actual *Coventries* through the budgetary troubles. Their small craft support facilities were originally even more austere than those of the *Suryas*, yet improvements were introduced throughout the 2250s and 60s; some of these manifested as protrusions of new machinery atop each bay.

The ships equipped with modern duotronics easily kept going even when the main body of the original *Suryas* faced modernization or retirement, and Starfleet decided to run the ships to the end of their structural lives instead of opting for further modernization. A shift in mission profile from convoy escort and local defense duties to a pure planetary assault support role eased the burden on the aging vessels. The most modern assault shuttles, assault barges and sub-impulse assault craft were utilized as the main offensive muscle of the *Coventries*; considered secondary to the mission, the old Awalt torpedo system could well be retained till the retirement of the last ships of this standard.

The *Benning* ships, lacking in excuses, did eventually require a midlife (or, rather, final-quarter-life) upgrade. The updating aimed at maximal commonality with the *Avenger/Miranda (II)* refit, and is mentioned in connection with that project. Option for a torpedo module was included in the 2275-2295 refit, but 'roll bars' were seldom fitted on these frigates, so outwardly the four units ended up resembling the *Miranda (II)* class. A further blow to class identity came from the loss of the lead ship in 2271, just before she was scheduled to be decommissioned for the modifications; this resulted in the quartet nominally being considered the *Theseus* class.

The first loss had been suffered in 2254 already, when *USS Achilles* (NCC-1248) was destroyed in the Battle of Theta Kalyb with all but 53 of her crew. The second *Coventry* to be lost was *USS Sverdlov* (NCC-1238), failing to return from a test run of the new PB-51 series engines in 2258.

Thankfully, Starfleet was soon able to report that the tragedy had only claimed the lives of a minimal testing crew of 42, including sixteen specialists from Chiokis; on the other hand, it ended the PB-51 project, effectively terminating all further PB series linear warp engine research. The last true *Coventry*, *USS Constant* (NCC-1236), succumbed to budgetary cuts in 2295, cutting short her new career as shuttle pilot training vessel; she was followed to the junkyard by the last *Achernar*, *USS Sol* (NCC-1744), bringing another era to an end. The ships brought to *Avenger*-like standards were absorbed into the main body of what would soon be known as the *Miranda* class, and still remain in the inventory.

USS Indus *deploys her sub-impulse, gravitics-propelled surface assault craft, known informally as 'hoppers', for a practice mission at Cygnet VI.* Coventry *class ships supported Marine action in lieu of dedicated shuttlecarriers, resulting in evolution of Marine tactics. A troop insertion by a fast* Coventry *was a far less risky operation than the navigation of a huge shuttlecarrier into enemy space for an assault run. Note the extra phaser VII bank above the hangar.*

Whirlwind

Assault ship
2250-2274

Completed:	40
Length:	286.0 m
Beam:	54.2 m
Height:	22.9 m
Mass:	400,000 tons
Cruise speed:	w 5
Max.speed:	w 8.0 (full internal load) w 7.0 (full external load)
Endurance:	2 years
Officers:	24
Crew:	276
Troops:	1,000
Cargo:	30,000 tons internal Up to 90,000 tons external
Weapons:	Original: 1 laser emitter (130 nm / 600 MW) on dorsal bow 1 laser emitter (130 nm / 600 MW) on port/stbd forward hull 1 laser emitter (130 nm / 600 MW) on dorsal aft hull 1 laser emitter (130 nm / 600 MW) on ventral aft hull Refit 2259:

1 phaser IV emitter on dorsal bow
2 phaser IV emitters on port/stbd fwd hull
1 phaser IV emitter on dorsal aft hull
1 phaser IV emitter on ventral aft hull
1 light torpedo tube on ventral bow (initially not fitted to all)

Shields: 1-layer forcefields
Navigational deflector array on bow

Laboratories: 1 medical/biology

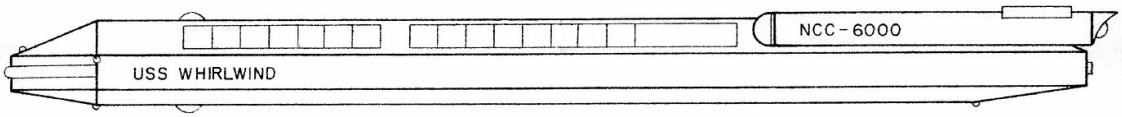
Transporters: 2 GP (6-pad), 4 emergency evacuation (22-pad), 4 cargo; Mk III

Auxiliaries: 2 light shuttles, 2 cargo shuttles, 28 light assault barges or hoppers
Option for up to 12 heavy barges on external grappler plates

Ships of historical interest:

USS Whirlwind (NCC-6000)

SOURCES: (D Daniel Biringer)
(N Daniel Biringer)
(H own)



Starfleet's efforts at upgrading its planetary assault capabilities continued in the 2250s. Even with the *Aakenn* heavy transport production at full swing, it was obvious that the mobility of Federation ground combat forces would remain limited by the lack of suitable transports. Two bottleneck criteria existed: sufficient speed of travel, and sufficient speed of unloading. Conventional thinking dictated that only a large transport could house the powerful warp engines and numerous assault barges required. However, there were many unconventional thinkers in the Fleet. In 2250, a sleek assault transport propelled by two relatively lightweight engines and carrying 28 modern and compact barges defied the expectations and gave a welcome boost to Starfleet troop logistics.

The *Whirlwind* (NCC-6000) relied on PB-45 for warp 5 cruise and warp 8 dash performance. Instead of the complex if flexible hull arrangements of the heavy *Aakenns*, she went for a simple baguette of hexagonal cross section, with the assault barge bays laid out along the upper flanks. A heavy defensive armament of five single 600 MW lasers, later Type IV phasers, was concentrated on bow and stern. So were the ship's utilities: the forward end housed the bridge and command offices at Deck 1, an analysis center on Deck 2, assault planning offices on Deck 3, sensors, deflectors and port and starboard tractor beams on Deck 4, and a small gymnasium on Deck 5, while the aft end featured workshops on Deck 1, warp engineering on Deck 2, upper mess hall and recreation facilities on Deck 3, impulse engineering and auxiliary control on Deck 4, and lower mess hall on Deck 5.

The upper two decks of the long midsection housed the assault barge berths plus two general utility hangars for personnel and cargo shuttles. Internal cargo stowage was available next to the utility hangars, and was provided with two cargo transporters. Deck 3 forward end featured both a well-equipped hospital and a security complex that could hold 30 detainees, while the aft end offered an extensive training space or staging area, all of these ideally placed for direct access to the assault barge deck. Amidships there were fabrication facilities for the needs of the full two battalions that could be shipped. Deck 4 housed one of these battalions, along with the operating crew that included the barge pilots. Deck 5 housed another, in troop cabins of four triple bunks and officer/NCO cabins of one or two bunks. Ship's stores on Deck 6 were served by two additional

cargo transporters, and surrounded by a variety of support systems. There were no troop transporters, as the technology was not deemed suitable for first wave assault, the main task of this heavily armed and protected assault ship.

A solo sortie to a pirate stronghold allows USS Surmass *(NCC-6026) to shine. Each of the two-deck TBL-4 barges launched here carries a platoon of troops, allowing the vessel to disgorge its entire contingent at one stroke. The capacity saw frequent practical application, as solo missions that required battalionfuls of troops generally could be assumed to also pose a grave danger to the mothership: no Marine commander wanted to leave his or her second battalion idly sitting in the bowels of the troop transport during the dangerous deployment maneuver. On the other hand, the* Whirlwinds *were configured to be operable with skeleton crews, allowing some 2/3 of the ship's own complement to join the assault if needed.*

Crew fatigue in the cramped accommodations limited mission duration. Every attempt was made to alleviate the effects, and there were all sorts of amenities such as contemplation rooms with visicom systems, garden areas and variable-gee pools – all with alternate military training applications, of course. Similar measures aboard the much larger *Aakenns* had better odds of success, though, thanks to the sheer difference in legroom. The *Whirlwinds* were true to their name in having been designed to storm crisis spots at fastest possible reaction time. They could also cause some devastation of their own by mounting a ventral torpedo launcher for bombardment purposes. Yet they carried very little in terms of ground combat hardware, beyond what the troops themselves packed or what their TBL-4 light assault barges represented. No hoppers or rollers were typically shipped; some light flitters for command and liaison purposes could be beamed or shuttled down, but they provided no troop mobility. The barges could move the troops on the battlefield, but they were unavailable for general logistics roles then, and in any case unsuited for them. A *Whirlwind* battalion could not carry the battle alone, but absolutely required the material support of a more conventional cargo hauler.

A spearhead force of 40 *Whirlwinds* was nevertheless considered vital, and produced in full by 2255. *Miranda*, *Surya* and especially *Coventry* frigates were ideal escorts for *Whirlwind* formations, offering their own logistics shuttlecraft and heavy bombardment weaponry to the mix. By the 2260s, the transports had been upgraded with phasers, and all of them had received the ventral torpedo launcher as well; independent operations against hot spots now became a distinct possibility. On the other hand, conventional assault capabilities were boosted by the addition of grappler plates on the dorsal and ventral surfaces: some 60,000 tons of external load could be attached, resulting in reduced speed and endurance but allowing for meaningful battlefield logistics. Instead of the TBL-4 barges, the ships might now load up on *Benares* or *Coronet* hoppers in the berths and carry larger barges on the grapples, providing a new balance of equipment and tactics.

This forced versatility translated to extreme fatigue. By the 2270s, the fleet was rapidly approaching the limits of spaceworthiness, and mainly persisted because the follow-on *Makin* program of fast troop transports had met with delays. No reengining was attempted, as a switch from PB-45 to the

structurally compatible LN-61 or LN-23 would have meant a performance reduction. Nor was there much point in upgrading the weapons, as the 'happy time' when a *Whirlwind* had been a competent individual combatant was long over. Between 2270 and 2274, the ships were only given solo assignments to 'lukewarm spots', but did excel in such duty. On the other hand, several losses were suffered in the feline Xindi campaign; the remaining force was retired as soon as the *Makin* was perfected and fielded.

T'Pari

Surveyor
2250-2291

Completed:	30 *T'Pari* built in 2250 16 *K'Kmarak* converted from *T'Pari* in 2272
Length:	189.0 m
Beam:	68.4 m
Height:	34.5 m
Mass:	154,200 tons (*T'Pari*) 158,000 tons (*K'Kmarak*)
Officers:	22
Crew:	68 + 30 research staff (*T'Pari*) 71 + 30 research staff (*K'Kmarak*)
Cruise speed:	w 5
Max. speed:	w 6.0
Endurance:	3 years (*T'Pari*) 4.5 years (*K'Kmarak*)
Weapons:	2 phaser IV emitters in twin bank on dorsal bow (*T'Pari*) 2 phaser IV emitters in single banks port/stbd of bridge
Shields:	1-layer conformal forcefield Navigational deflectors on port/stbd dorsal main hull
Laboratories:	2 GP, 2 planetary sciences, 1 astrophysics, 1 life sciences, 1 astrography
Transporters:	2 GP (6-pad), 1 cargo / evacuation (22-pad); Mk II (*T'Pari*) 2 GP (6-pad), 1 cargo / evacuation (22-pad); Mk IV (*K'Kmarak*)
Auxiliaries:	2 heavy shuttles, 2 work pods

Ships of historical interest:

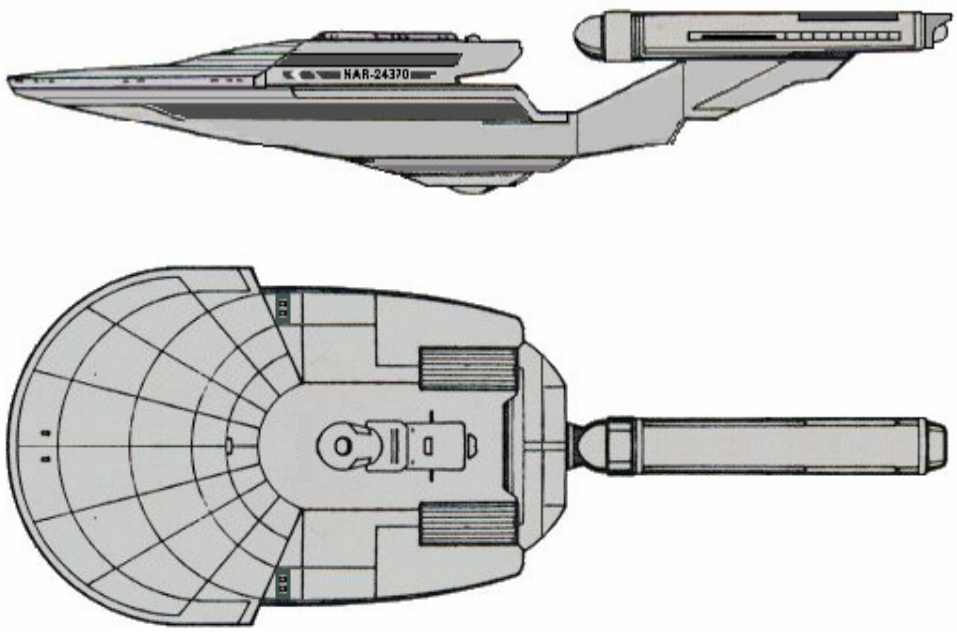
USS Ratha (NAR-24309), *USS T'Pool* (NAR-24307)

SOURCES:	(D FASA, dimensions corrected) (N LUG, FASA) (H LUG, FASA)

The *T'Pari* surveyors built in the 2250s exemplify the trusting spirits of the time, prompted by the lifting of the Klingon menace and the opening of the frontier for exploration once more. These vessels were constructed by Vulcan yet for Starfleet use; even though they received NSP or NAR registries and served alongside numerous auxiliary cruisers, they were purpose-built designs that featured a proper balance of equipment and facilities for multi-year survey work in accordance with Exploration Command mission parameters. On the other hand, they carried virtually no weaponry and were very lightly shielded.

Key to *T'Pari* performance was a voluminous hull, necessary even when operating crews typically came from Vulcan. Using *Procyon* corvette structural members as a starting point only, the design expanded from a bow half-saucer into an elongated shape somewhat resembling the heavy frigate hulls. At the aft quarters were bays for medium exploration shuttlecraft, indispensable for the mission profile. Forward of the service hangars were processing rooms for planetary samples of various type, as well as extensive laboratories for their analysis. Holds between the hangars stored survey gear and ground vehicles, which could be moved down to the target planet via the heavy Class B shuttlecraft, or via a large combined cargo and personnel transporter just ahead of the holds. For lighter surface forays, two independently working GP transporters were provided, along with staging rooms and an immediately adjacent decontamination area and sickbay.

Further ahead at ship centerline was a general purpose laboratory complex, adjoining the main computer room and a briefing room, and linking to the athwartships research facilities as well. Superstructures amidships held both the necessary command facilities and versatile astrophysics instrumentation. The whole bow hemisaucer volume was thus available for crew and officer accommodation, offering relative comfort for the basic operating and research crew of up to 120 for great lengths of time. A number of specialists could be accommodated for shorter periods. Guest quarters could also be configured for atypical environmental parameters, to facilitate exchange of information with the broadest range of exotic lifeforms encountered.



The only operational casualty of the T'Pari *class,* USS T'Pool *(NAR-24307) was crippled by an unexpected coronal mass ejection during a standard nova survey in 2272. After the crew was evacuated aboard* USS Agincourt *(NCC-4314), the survey vessel was set adrift with marker beacons activated. Yet attempts at locating the* T'Pool *again were unsuccessful.*

Navigation and propulsion systems were detached from the mission hull in a manner typical of civilian vessels. Only the navigational deflector emitters were embedded in primary hull structures ahead of the shuttle hangars and laboratories. An engineering keel extended down from the mission hull, accommodating a horizontal twin-chambered linear reactor. Primary plasma was fed to an impulse engine at the tapering aft end of the keel, as well as up along an angled pylon into a single PB-35E engine, in an arrangement very much resembling the *Remora* escort propulsive system.

Similar warp 6 maximum performance was provided, this time without the help of additional scooping coils. Endurance and persistence at survey target depended more on the secondary power systems, again benefiting from PA experience with tapping the main reactor at low power levels for extended periods of time. Battery backups were naturally available, and significant fuel reserves could be stored within the keel.

An initial flight of ten *T'Paris* was launched under Vulcan authority towards the rimward exploration zones in the late 2250s, preceding and preparing the even deeper surveys soon to be launched; *VSS T'Plana-Hath* would extend her mission all the way to the Galactic Barrier, performing detailed studies from a safe distance for several year-long stretches in a row. Out of the following twenty vessels, eight were given Starfleet registries and operated in support of specific Exploration Command programs. These vessels were upgraded in 2262-64, theoretically now carrying the subclass name *Thuringia* although few actual modifications were made to the ships proper. The increase of some 850 tons of mass came in the form of an expanded FTL sensor suite, required to support modern charting operations. The mission profile of the upgraded ships did tend more towards astrophysics, even if the ships were fully equipped for planetary surveys as well. No major changes to propulsion or power generation were warranted during the decade of successful operations, and general overhaul periods between three-year cruises seldom exceeded three months. No shortcomings in other fields made themselves evident, either, and all vessels returned safely when the surprise recall orders were issued in 2268.

Shut off from deep space by policy changes, the *T'Paris* still made themselves useful in local survey work during the transitionary period of the early seventies. Curiously enough, they never were considered to be in need of a linear-engine refit. Instead, a shield generator upgrade and weapon system repositioning saw the vessels decommissioned between late 2271 and early 2278, after which the resulting subclass of improved defensive potency was released for operations. While the subclass name *K'Kmarak* might have been theoretical only, the vessels in fact achieved considerable public fame under this name. Charting of rimward space was resumed, with now fully Vulcan crews continuing the work of the *T'Plana-Hath*. The surveyors made numerous first contacts at a time when the Fleet's exploration-capable heavy units were otherwise disposed.

All but six of the Vulcan and three of the Starfleet vessels were idled by the mid-2280s due to the increasing Klingon threat. Ultimately, only *USS Ratha* (NAR-24309) was retained for 'technology evaluation purposes', carrying classified equipment whilst operating in the vicinity of Ω Leonis. The far larger and more heavily equipped *Nineveh* class took over frontier survey operations, often with armed escorts for protection.

Ohio

Light fleet tug
2251-2287

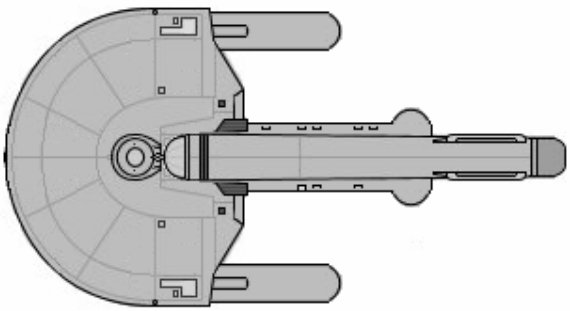
Completed:	168 *Ohio* 15 *Hephaestus*
Length:	109.0 m
Beam:	57.4 m
Height:	68.2 m
Mass:	131,300 tons (*Ohio*) 132,900 tons (*Hephaestus*)
Officers:	4

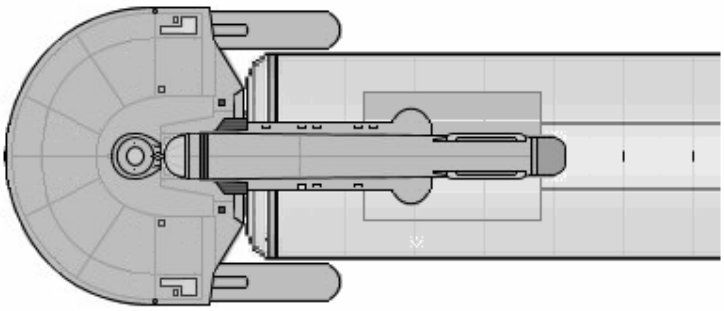
Crew:	35 (*Ohio*) 42 (*Hephaestus*)
Cargo:	120,000 tons
Cruise speed:	w 5
Tow speed:	w 5
Max. speed:	w 6.2
Endurance:	2 years
Weapons:	None
Shields:	1-layer conformal forcefield Twin navigational deflectors port/stbd 1 auxiliary navigational deflector on bow
Transporters:	1 GP (4-pad); Mk II
Auxiliaries:	None

Ships of historical interest:

USS Montana (NCC-F663), *SS Dakota* (NDF-8302)

SOURCES:	(D David George 'Serpents Among the Ruins', own) (N own) (H LUG, own)





A rapid expansion of the operational theater for Starfleet's defensive and exploratory arms soon followed the introduction of Project Starship technology. As usual, logistics were slow to follow the expansion. Initially, Starfleet could rely on the independence of its deep space vessels and expect them to operate out of existing bases. Sooner or later, major investments would have to be made on infrastructure, though: new starbases would have to be built, the comm networks expanded, and more and faster tenders and transports fielded. This time, there would be no fallback option of

buying support services from older, better established UFP member species – even the Vulcans had not traveled this far before.

The *Aakenn* heavy high speed transports provided only a partial solution. Despite the performance of these vessels, Starfleet was neither ready nor willing to abandon the use of standard cylindrar cargo pods, which were incompatible with the *Aakenn* concept. The whole idea behind these containers had been to alleviate the demands placed on the ship herself, by providing key services and features in the cargo pod instead. A vessel the size and complexity of the *Ptolemy* class was far from the ideal container hauler, and indeed performed the task only as a secondary or tertiary mission. Meeting the challenges of the expanded theater of operations and taking proper advantage of the container concept called for a significantly smaller design. Yet the mercantile tugs of the day lacked speed and range. Up-engining and militarizing the likes of the common *Chariot* or *Dubuque* classes would have been technologically demanding and financially near-prohibitive.

Despite the inescapable facts of the situation, it took until 2250 for Starfleet to actually set a Staff Requirement (226/2250/14d) for a fast tug-type transport. The primary goal was for a tug capable of hauling a single standard cargo pod at warp five, with minimum cost and crew, yet with endurance in excess of one year. Such a vessel would significantly reduce the burden on heavy tugs of *Ptolemy* descent, yet be quite sufficient for most Fleet support work. As no auxiliary craft capacity was specified, the tug would not be an ideal colony resupply vehicle – moving cargo from a container to a planetary surface by site-to-site transporting was not a feasible technique in the 2250s, even though theoretically possible. Most supply missions would have to be performed to locations equipped with proper orbital cargo handling stations.

By early 2251, the basic structure for the tug had been chosen. A saucer some 57 meters across and two decks thick would suffice as the primary hull. Topped by a tiny Class 5 bridge and furnished for accommodating 37 crew and some 250 tons of internal water-equivalent cargo, the structure was not the most spacious or comfortable starship hull imaginable. Yet omission of all weaponry and associated targeting and power systems markedly increased onboard space over, say, the *Capella* multipurpose support vessels of comparable dimensions. Shielding was minimal, comprising an Avondale GS-50 'Gekko' generator for conformal one-layer combat shields plus an XFD field-biasing coil for stretching the protection across the cargo container. Computing capacity was strictly limited to the basics of navigation and propulsion management, so that even the standard UESPA survey packages had to come equipped with their own data processing and storage systems.

The aft rim of the saucer was dented in the middle by a towing fixture that featured full umbilical connections and passageways for ship-to-container interfacing. Port and starboard, two impulse pods fired past a container in tow; at their forward ends, there were twin navigational deflector dishes for protection at fully loaded trim, backed up by a single auxiliary unit at the center of the bow.

Atop the hull, a single pylon held a PB-35E nacelle almost flush to the container dorsal surface, for an ideal cylindrar monolobe warp field. The RMR-220 military standard matter/antimatter powerplant required few components within the hull, save for fuel tanks. The thick nacelle pylon was used for housing venting and cooling systems for the plasma feed.

The February 2251 launch of *USS Ohio* (NCC-F550) was followed by series production of the type on light starship yards that a few years earlier had been upgraded for perimeter ship production and then idled again. Up to 168 units were produced by 2255, on 21 separate construction yards. A

further 149 units were completed by and for civilian enterprises, minus the shield generator and military communications systems. Starfleet also ordered fifteen ships of the tug design permanently integrated with a cargo module of a special type, with pressurized workshops and fabricators at the bow and an enclosed repair dock comprising some 80 % of the container volume aft. Work pods and waldoes were carried in abundance aboard these *Hephaestus* tenders, specializing in frontline repairs of small and medium vessels.

The Treaty Exploration Zones quickly swallowed up the entire production run, leaving the Fleet still starved for light towship resources. At this point, Starfleet could have opted for further procurement of the *Ohio* type, but chose to introduce a double-capacity, twin-nacelle type instead. With twin engines also came higher deployment speed without load, making the investment in this *Mo'Kal* class a more advantageous one than at first might seem.

Ohio class operations moved farther and farther away from home in the 2270s, as piracy near the core worlds was finally brought under control and civilian commerce there could again flow in relative safety. Few civilian entrepreneurs ventured into the 200 ly zone of new starbase and outpost construction, though – it was left to Starfleet tugs to ply the semi-secured routes there and back. The unarmed *Ohios* suffered surprisingly few losses on these outmarches, with only *USS Montana* (NCC-F663) going missing near Izar. Equally surprising was the loss of SS *Dakota* (NDF-8302) to Romulan forces in a rare raid across the RNZ. The crew was saved by the light cruiser *Hunley* in a grisly real-life enactment of the famed Starfleet Academy no-win scenario.

A fully laden Ohio *laboriously accelerates to warp. Unlike the powerful twin-engined* Ptolemies*, the* Ohios *took up to two days to reach full cruising speed under load. Directional control at warp was also limited.*

The basic and robust spaceframe and propulsion systems of the *Ohios* warranted no major upgrades or refits during the thirty years of active operations. Navigation software kept evolving, though, and for once the programmers had to stay within the limits of hardware already running at full capacity. This did not result in an unqualified success story, but at least the numerous navigation mishaps involving the light tugs did not translate into costly accidents, either. To compensate for the somewhat lacking navaids, the ships did receive modern communication gear in the early 2270s, and a new sensor package was in the planning when the decision in 2287 came to retire the class.

Some old *Ohio* tugs still serve in civilian transport role across the Federation, hauling internal cargo only. Crew requirements have typically been reduced to a dozen, but true competitiveness in personnel expenses would require further automation, negating the financial advantages. While the single-nacelle small freighter configuration remains popular in the civilian world, Starfleet has not utilized it for tugships after the 2280s.

Arcadia

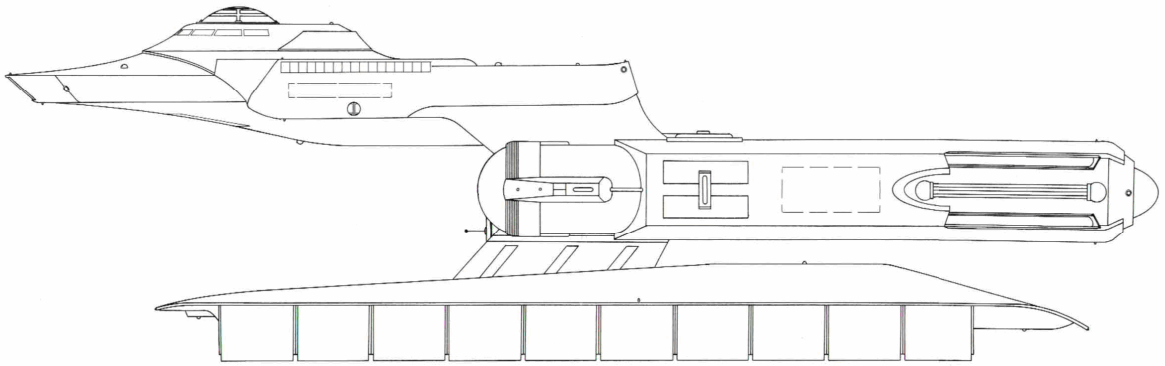
Fleet tanker / tender
2252-2296

Completed:	48
Length:	237.0 m
Beam:	111.1 m
Height:	70.0 m
Mass:	647,900 tons tons
Officers:	9
Crew:	72
Cargo:	97,000 tons
Cruise speed:	w 3
Max. speed:	w 6.0
Endurance:	1.5 years
Weapons:	2 phaser VI emitters in single banks on dorsal primary hull bow port/stbd 1 phaser VI emitter on dorsal stern 1 phaser VI emitter on ventral primary hull
Shields:	1-layer conformal forcefield Navigational deflector on secondary hull bow
Transporters:	1 GP (6-pad), 1 emergency evacuation (22-pad), 2 cargo; Mk II
Auxiliaries:	2 medium shuttles, 4 work pods

Ships of historical interest:

USS Fabucci (NCC-S531)

SOURCES: (D Roger Sørensen)
(N Roger Sørensen)
(H Roger Sørensen, own)



While constructing support vessels optimized for its frontline needs, Starfleet kept searching for commercial alternatives for the less demanding roles. One of the pressing logistics issues was delivery of fuel to those outposts and Fleet formations that were distant from the major refineries. Standard containers were practical in moving large quantities of deuterium or tritium, but many of the frontline recipients could not truly handle such high volume shipments. For inexpensively

hauling around smaller neutronic fuel tanks, as well as antimatter pods, Logistics Command in 2250 ordered a limited number of commercial tugs and modified them to meet its needs.

The *Arcadia* cargo tugs were essentially half-scale versions of the *Ptolemy* fleet tugs, with less capable even if equally massive SEMT 'Pumori' warp drives. For Starfleet use, they were equipped with customized twin cargo grapples that would accept ten fuel pods each. This total load of some 97,000 tons did not unduly task the warp engines, so a practical top speed of warp 6.0 could be maintained. For increased range and endurance, the engines were fitted with Fleet standard Leeper-Fell ramscoops at the bows; plasma diffuser caps were added to the aft ends to help the vessels better evade raiders. In a more active measure, four M-63 phaser emitters were installed on the primary hull. The original navigational deflector and sensor array was also replaced by a more capable Dor Ayela unit.

These modifications added to the capabilities and unit price of the tugs, but did not detract from the existing strengths. While the fuel pod grapples and the accompanying fuel transfer boom (with attached offloading control cabin) prevented the hauling of more conventional types of outsize loads, the vessels retained their internal holds which could be accessed through bow and stern airlocks. Flanking the stern lock were two hangars for auxiliaries; the usual Starfleet contingent was two medium shuttles for efficiently moving spares, supplies and personnel, and four work pods for manipulating the fuel modules. Mk II pads were also available for transrep, and an emergency evacuation pad and two banks of 17 lifepods were added to comply with Starfleet regulations on troop shipments, another possible use for the internal holds.

The four dozen Starfleet *Arcadias* were delivered between 2252 and 2256. Their rapid delivery was facilitated by concurrent shrinking of commercial markets for the type, as the Klingon threat still hampered freight traffic in frontier space. While some Starfleet improvements on the *Arcadia* design were allowed to diffuse back to the mercantile world, making the tugs more self-sufficient, allowing civilian vessels to carry heavy defensive weaponry was out of the question. Thus, the only *Arcadias* that were cleared to operate on border sectors were those working for Logistics Command. The purchase of further vessels in basic armed transport configuration was considered in 2256, yet both Logistics and SMM favored heavier designs for the simple fact that they could perform any given job with fewer shipments and thus at lower risk. The *Arcadia* was doomed to remain a medium tanker, and in this role had to bow out in favor of the faster, smaller *Huntington* in the 2270s.

In the 2280s, there did emerge a direct successor to the *Arcadia*, chiefly for supporting Starfleet's increasing force of light frigates and heavy corvettes. The *Ural* class, as described in a later entry, was constructed wholly out of military components at a time when expenses mattered little. Her performance specifications thus differ rather radically from those of the *Arcadia*, yet the basic design solutions endure.

Tavares

Light transport
2254-2283

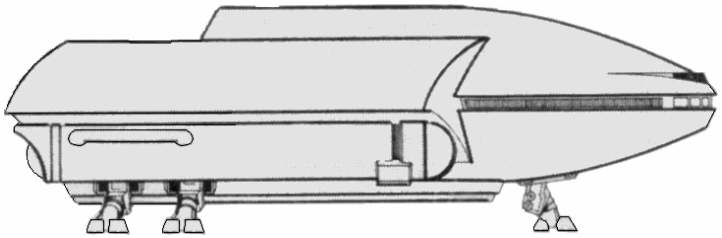
Completed:	54 total:
	44 light transports 10 corvette tenders
Length:	65.5 m

Beam:	36.1 m
Height:	18.0 m (landing gear retracted) 20.8 m (landing gear extended)
Mass:	45,000 tons
Officers:	4
Crew:	12
Cargo:	12,000 tons
Cruise speed:	w 5
Max. speed:	w 6.0
Endurance:	1.5 years
Weapons:	2 phaser VI emitters on dorsal bow
Shields:	1-layer conformal forcefield Navigational deflector on dorsal bow
Transporters:	1 GP (6-pad), 2 cargo; Mk II
Auxiliaries:	2 light or medium shuttles

Ships of historical interest:

USS Orlando (NCC-F1219), *USS Ganelon* (NCC-5003)

SOURCES: (D FASA)
(N FASA)
(H FASA, own)



Rounding out the logistics escalation program of the mid-23rd century was a light transport combining a solid-state warp drive system and an atmospheric hull capable of planetfall and takeoff. Emboldened by a decade of operating *Chameleon* and *Mission* light craft of these characteristics, Starfleet wanted to push the envelope and field a larger, more potent theater transport – in part to cover the shortfall of frontline orbit-to-surface logistics due to Project Tradewinds that had dispersed the modern light craft to civilian assignments. Naturally, there were still technological hurdles to be overcome, or then acknowledged and acquiesced to for the time being. By 2254, a workable configuration had nevertheless emerged, and the influence of its success can be compared to that of the fast *Aakenn* heavyweights. For the 2270s, the *Tavares* class would be virtually the standard light transport of Federation deep space commerce agencies.

The *Tavares* was propelled by two solid-state warp engines – PB-40 in the Starfleet model and DB-2250 in concurrently produced civilian versions, even if the difference was basically in name only. The engine type provided the same warp 5 cruise and 6 maximum speed performance here as in the other prominent application, the *Masterson* police corvette refit. The coils were nacelle-mounted yet semi-embedded on the flanks of the six-deck hull, straddling a cargo hold that formed the lowermost two decks and enjoyed direct access to surface from a pair of doors astern, plus indirect access via a pair of cargo transporters forward. Hydrogen fuel was held in the engine cowlings, and

intermix systems and antimatter tanks were kept out of the way of the cargo at the upper bow. This arrangement maximized stability and surface accessibility; penalties in radiation shielding and warp field gradient management were tolerable, leaving the *Tavares* class only slightly behind the heavier and more powerful *Independence* in performance.

A bow view of a Starfleet supply ship, USS Orlando *(NCC-F1219), shows to good effect the twin phaser turrets and the Fleet livery. While the bridge on Deck 4 is invisible to the surface here, other key areas lie close to the outer hull; the very modest shielding of the transport made her highly vulnerable to any opponent not frightened away by the guns and pennants. No less than nineteen* Tavares *units were lost in Starfleet supply duty, eleven of those to combat action.*

Above the ventral cargo hold, a second major volume accommodated two shuttlecraft for maximum flexibility in stevedoring the cargo. Starfleet insisted on full maintenance facilities, while most civilian operators of the vessels saw it better to dedicate some of the shuttle spaces to additional cargo. Civilian transports also typically made do with much smaller crews, donating some of the officer accommodation on Deck 2 or crew quarters on Deck 1 to passenger use, or converting the Deck 1 vaults for high value cargo to passenger cabins.

The civilian market was still wary of Klingon aggression, and slow to absorb the 200 units produced. Fifty hulls were earmarked for Starfleet theater logistics from the beginning, and four added when their civilian sales fell through. Their major distinction from their mercantile counterparts, a pair of Type VI phasers plus their fire control computer, still came to see frequent use in the lawless outer trade routes in the 2250s. A decade and a half later, Starfleet's anti-piracy crusade finally brought back the confidence of the commercial operators, and saw the explosion of *Tavares* operations across the inner sectors and the colonization zone alike.

A stern view reveals two of the three primary means of cargo entry to this Tavares *on starport tarmac: the vast doors of the lower hold, and the shuttlebay directly above. The starboard cargo transporter platform can also be glimpsed in the far corner of the hold, which is lit brightly and provided with integrated antigravs for ease of loading on austere ports like this.*

Being a pathfinder, the *Tavares* was quickly overrun by more refined competition when commercial interest peaked. Starfleet was slower to let go of its transports, operating a handful as corvette tenders till the early 2280s and only developing the replacement *Deneva* class after the Khitomer peace. Yet even Fleet analysts saw the attractiveness of the warp-nimble, aerodynamically agile transport, and modeled the successful *Sydney* mediumweight class on the same basic pattern, even

extending some of the design influences to the much heavier *Laweyas* and *Overfields*. The modern runabout also owes much to the *Tavares* layout, which has basically surpassed all earlier Starfleet configurations for orbit-to-surface transport vessels.

Federation

Dreadnought
2255-2295

Completed:	13 total: 12 *Federation* dreadnought 1 *Star Empire* advanced transwarp dreadnought
Length:	319.8 m
Beam:	140.0 m
Height:	87.1 m
Mass:	1,035,000 tons (*Federation*) 1,080,000 tons (*Star Empire*)
Cruise speed:	w 8
Max.speed:	w 10.0
Endurance:	6 years
Officers:	55
Crew:	445
Weapons:	*Federation*: 6 phaser VIII emitters in 3 twin banks on primary hull 2 phaser VIII emitters in twin bank on ventral secondary hull 2 phaser VIII emitters in twin bank on dorsal secondary hull (1 emitter in NCC-2109, 2112) 2 fwd medium torpedo tubes w/ 100 long-range photorps on primary hull *Star Empire*: 8 phaser VIII emitters in 4 twin banks on primary hull 4 phaser VIII emitters in 2 twin banks on ventral secondary hull 1 phaser VIII emitter on dorsal secondary hull 2 fwd medium torpedo tubes w/ 100 long-range photorps on primary hull
Shields:	3-layer forcefields Navigational deflector beams on fwd and aft secondary hulls Hull armor of quantobirilium alloy (NCC-2116)
Laboratories:	2 GP
Transporters:	5 GP (6-pad), 4 emergency evacuation (22-pad), 4 cargo; Mk III All ships brought to Mk IV standard after 2271
Auxiliaries:	6 medium shuttles and 4 work pods; various tactical craft carried

Ships of historical interest:

USS Affiliation (NCC-2108), *USS Alliance* (NCC-2105), *USS Association* (NCC-2118), *USS Compactat* (NCC-2103), *USS Confederation* (NCC-2114), *USS Dominion* (NCC-2115), *USS Entente* (NCC-2120), *USS Federation* (NCC-2100), *USS Star Empire* (NCC-2116), *USS Star League* (NCC-2101), *USS Star System* (NCC-2107), *USS Star Union* (NCC-2112), *USS Unificatum* (NCC-2102)

SOURCES:	(D FJ, *Star Empire*: Diane Carey 'Dreadnought!') (N FJ) (H FJ, SotSF, Diane Carey 'Dreadnought!')

Ever since the 2220s, when Chiokis won its first minor starship construction contracts from Geering, there had been plans to build large multi-nacelled starships heavily armed with warp-phased lasers or particle beams, and also carrying antimatter torpedoes. Called dreadnoughts, these ships would patrol the outer fringes of the Federation for years at a time and be capable of single-

handedly defeating any Klingon starship known to Starfleet. In lieu of the resources and the technology, the dreadnought project remained a dream for some thirty years. 'Silver bullet' acquisition politics went only so far: the Federation Council was not willing to divert any resources to a project so unlikely to succeed (the failure of the *Tritium* experiments still fresh in the minds). The ebb and flow of the Klingon conflict resulted in many warship programs being delayed or cancelled, others being promoted and hastened. At First Axanar, it appeared that the modern cruiser and destroyer fleet would be the final solution to the Klingon problem; by the time of Second Axanar, it was far from certain whether even Project Starship would suffice.

In 2250, it was felt the technology to build the ultimate warships finally existed. The newest Class One warp engines, the so-called PB-47 design, were yet to be introduced to cruisers but were already performing admirably on the frigate fleet. They were the first of the solid-state type to have field configurations malleable enough for multi-nacelle experimentation. With three sets of coils, they could create a six-lobe warp field of 2.5 kc; theoretically, such a field could move the projected massive vessel through warp maneuvers as if she were a light cruiser. All that was needed was an efficient powerplant, and a capable weapons system to go with it. And in late 2253, both were ready for delivery to the first *Federation* class dreadnoughts to be completed.

The mammoth primary hulls were built in the quiet wayside dockyards of Arcturus and Vega. Each bulged out into a 140 m saucer twice as voluminous as the standard cruiser or destroyer hull. The saucers housed three twin banks of heavy phaser VIII emitters, plus a Selenia 'Shark' torpedo system with two Mk 2 tubes and an octuple loader, and a total rate of fire almost doubly that of a standard six-tube cruiser battery. Inside, twelve decks featured spartan crew accommodation, advanced fire control facilities, heavy armoring and bracing, and shielded power conduits for the main weapons. Many sensor systems familiar from cruisers or destroyers were present, but little in the way of exploration gear was installed.

In the aft sector of the saucer, a m/am storage facility and primary engine room delivered power to the warp engines through two connecting pylons, one extending straight up from the saucer, one joining the saucer to the curved-cylinder secondary hull and allowing plasma conduits through to two further nacelles that were mounted on the secondary hull with short, sturdy horizontal pylons. A secondary m/am system was housed inside the aft secondary hull. Propellant and fusion fuel was carried in armored tanks distributed throughout the secondary hull, feeding six fusion reactors down there plus four more reactors in the saucer, as well as the powerful impulse unit at the aft rim of the saucer. The duplication and triplication of power subsystems made the ships fantastically resilient to battle damage. Even one of the nacelles could be lost and the ships would still retain a degree of warp capacity.

Two twin banks of phasers were mounted on the secondary hull, one aft of the saucer/engineering hull pylon and one below the forward end of the secondary hull. A spacious shuttlebay at the secondary hull bow could accommodate as many as 14 shuttles, and a second hangar was installed astern in two of the ships. Others housed a navigational array there, in addition to a bow unit – both of cruiser standard. The ability to project a subspace field astern was quite useful in solo deep space patrols where all-around FTL sensing was vital for survival. As a bonus, the unit enabled the ships to utilize full reverse warp for extended periods of time.

Some two years per keel were needed to complete the behemoths, but the first one, *USS Federation* (NCC-2100), sailed out of construction dock fully on schedule, in early 2255. Extensive trials included repeated one-engine-out simulations, some performed at warp 4, as well as overall

propulsion system tests up to the speed of warp 10.2. The only problems encountered before actual operational tests concerned the phaser system, which was not quite capable of handling the power surges of warp drive mode and thus was of reduced use in warp-speed battles. A remedy had to be found, though, since the ships were intended to specialize in long-distance, deep space fights which absolutely required phaser capacity at warp.

Twelve hulls out of the initially projected twenty were ordered, funded on one-by-one basis. Each individual hull was fiercely haggled over, so that *USS Entente* (NCC-2120) was constructed but for example the lower-registry *USS Organization* (NCC-2111) was not. The ships entered heightened operational readiness in 2266, in anticipation of Klingon hostilities, and practiced offensive as well as defensive maneuvers until mid-2267 and the abortive Klingon invasion. The *Affiliation* (NCC-2108) and the *Federation* were already in striking range of Gohrem and Kassat, the main garrison worlds before the industrialized core area of the Empire, when the call for truce came through from the tiny agrarian world of Organia. The *Affiliation* and her escort destroyers decided to press on and engage the Klingon defense fleet anyway, only to have their weapons controls become red-hot and their engines shut down in mid-warp. As it became evident that the Klingon fleet was in similar difficulties, Starfleet recalled all its ships and acceded to the terms of the Organian noncorporeal entities.

A standoff at Gohrem. The Klolode *cruisers posturing in front of* USS Affiliation *seem to place great faith on the ability of the Organians to keep the dreadnought from firing her heavy phasers. On the other hand, information traditionally travels slowly in the Imperial Fleet, so it is unlikely that the captains would even have been aware of the reasons behind the impasse yet. The suicidal formation could rather be taken as a sign of Klingon failure to develop effective tactics against dreadnought-type starships at that point, or to fully comprehend their destructive potential.*

The last dreadnought, *USS Unificatum* (NCC-2102) was finished and commissioned in 2267, entering border patrol service under the command of Commodore William Hastings. No funds were forthcoming for further units after the signing of the Organian peace treaty, and dreadnought construction yards were closed permanently.

Or so it seemed. In actual fact, one further unit was still under construction in Arcturan orbit as of early 2268. This dreadnought was not exactly following the guidelines given by the UFP Committee of Starfleet, and would have raised a few eyebrows and antennae in the Council had her existence been known. Under the supervision of Commander Paul Burch, the ship was being fitted with a new type of hull armor, a significantly enhanced phaser arsenal, a sensory countermeasures device of Vulcan design, as well as a new form of warp drive that would force the ship deeper into subspace than any ship had gone before. When completed, the vessel, *USS Star Empire* (NCC-2116), would be an offensive platform of irresistible power.

The *Star Empire* had had her saucer reworked to a structurally superstrong octagonal shape, heavily armored with quantobirilium alloy, braced and triply shielded. Her secondary hull was built roughly to *Federation* standards, but with newer models of the navigational deflectors and a selection of hidden surprises in the engineering compartments. And while the PB-49 engines were far superior to even the latest *Achernar* cruiser engines at normal warp speeds, the goal was set on utilizing them for 'transwarp' drive, making possible speeds of perhaps warp 30 or beyond through the immersion of the ship deeper into the subspace domain.

But the apparent theft of the *Star Empire* by a group of terrorists led by Cmdr Burch himself, in July 12th, 2269, resulted in the exposure of a major conspiracy in the ranks of Starfleet. Shockingly, Vice Admiral Rittenhouse and several starship captains had planned to utilize the dreadnoughts for deep strikes against Klingon military installations, crippling the Imperial Klingon Navy in preparation for a major invasion. The incredible power of the new battlewagons was evident from the plans: with only twenty ships, the Starfleet conspirators hoped to completely destroy more than fifty heavily defended Klingon naval bases within Empire space, including their impenetrably fortified stronghold at Ty'Gokor.

Swift action by starship *Enterprise* led to the release of the dreadnought *Star Empire* from her captors, who were freed of charges of terrorism and instead hailed for exposing the plans of the Rittenhouse faction. The ship was placed in mothballs at Venus, her main weaponry deactivated and her reactor core removed. Shocked reactions throughout the Council reflected a major concern: why hadn't the Organians intervened? However, provoked by the incident, Klingons soon tested Starfleet resolve with border raids and reportedly ran into Organian interference, reassuring the Council of the continuing power of the treaty. Persistent reports to the contrary, delivered by dozens of starship captains between 2269 and 2284, were quietly filed away by Starfleet.

The dreadnoughts lay dormant in starbases for most of the early 2270s, as Starfleet discussed possible ways of upgrading them to the demands of the day. Speed increases were a primary target of the upgrades: the V'Ger intrusion of 2271 had left the border patrol dreadnoughts standing still, as the closest ships, *USS Entente* (NCC-2120) and *USS Dominion* (NCC-2115), lay weeks away from Earth, and only a handful of frigates and the barely refitted heavy cruiser *Enterprise* were available for local defense. The upgrades took the form of installation of linear-coil engines on individual basis, and are described in detail in a later entry. Three vessels were left unrefitted and, one by one, placed in reserves until 2295. The *Compactat* (NCC-2103) served the longest, assuming a training role from 2281 to 2287. Like the *Dominion* (moved off active status in early 2286), she was equipped with modernized navigational deflectors similar to the *Achernar* cruiser units. The *Confederation* (NCC-2114) received no such attention prior to her 2281 deactivation. Nor was the black sheep *Star Empire* refitted in any way; although a very real part of the dreadnought deterrent, she remained officially decommissioned for the entire length of her career.

Khitomer treaty cutbacks spelled the end of story for all the dreadnoughts, regardless of activation status, service age or design. Their role as long range patrol combatants was merged with the exploration and power projection role of the emerging high endurance, long range *Excelsior* class. None of the *Federations* was retained in the Fleet Museum, and the *Star Empire* snuck out of her holding orbit carefully hidden from the eyes of the press. She was towed to her birthplace in Arcturus and used for target practice for some sixteen years, thanks to her incredibly strong hull.

Keith

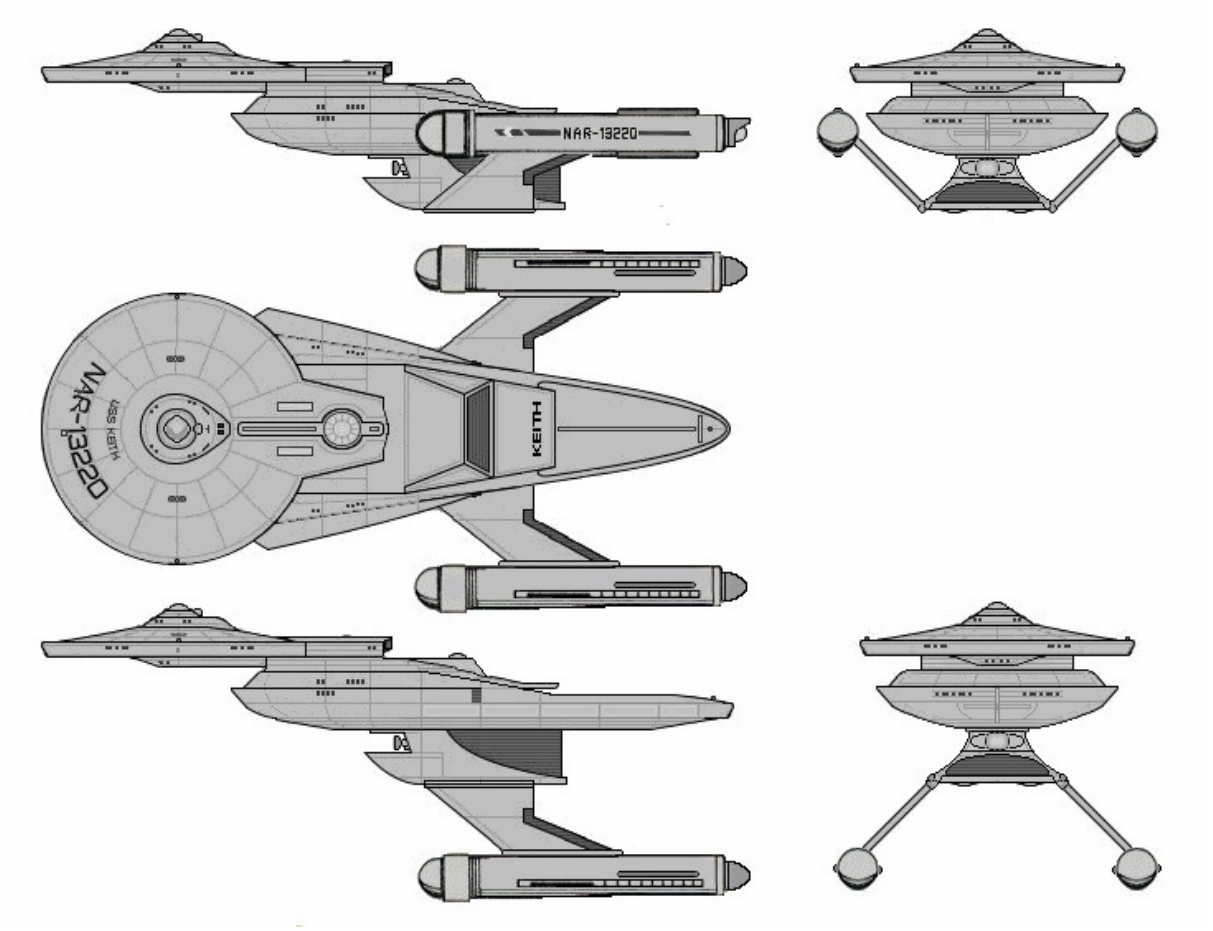
Surveyor / scout
2256-2296

Completed:	23 total: 17 Mk I surveyors built in 2256-2260 6 Mk III scouts built in 2268
Length:	180.0 m
Beam:	80.0 m
Height:	80.1 m (nacelles lowered) 47.5 m (nacelles raised)
Mass:	241,600 tons (Mk I) 213,600 tons (Mk III)
Cruise speed:	w 6
Max.speed:	w 8.0
Endurance:	5 years
Officers:	18
Crew:	78 + 20 research staff (Mk I) 82 + 20 research staff (Mk III)
Weapons:	4 phaser VI emitters in 2 twin banks on dorsal primary hull, port/stbd of bridge 1 fwd light torpedo tube w/ 40 probes or photorps in secondary hull bow (Mk III)
Shields:	1-layer forcefields Navigational deflector on ventral secondary hull extension
Laboratories:	4-8, with varying configurations
Transporters:	3 GP (6-pad), 1 emergency evacuation (22-pad), 2 large and 1 small cargo; Mk II (*Keith* Mk I) 3 GP (6-pad), 1 emergency evacuation (22-pad), 2 large and 1 small cargo; Mk IV (*Keith* Mk III)
Auxiliaries:	2 medium shuttles, 2 work pods

Ships of historical interest:

USS Keith (NAR-13220)

SOURCES:	(D FASA) (N FASA) (H FASA)



In parallel with the mainly Vulcan-driven *T'Pari* project, the 'post-Klingon' Starfleet enthusiastically sponsored the development of a complementary scientific scouting vessel of Earth design, with greater cruising and top speeds, range and endurange. The *Keith* class surveyor was drafted as a multipurpose vessel, an obvious euphemism to hide certain abilities that were absent from the *T'Pari*. With twice the engine power, directed into twin PB-35E nacelles, and with a primary hull based on escorts rather than corvettes, the *Keith* was an altogether more capable deep space surveyor, yet also an armed reconnaissance and logistics asset.

Flexibility was increased by the use of a separable saucer for escort-standard accommodation, control systems and sensors, with an attached eight-reactor impulse engine. Providing the ship with virtually everything she needed for basic navigation, this primary hull featured very little in the way of mission-specific gear. Two twin Type VI phasers of FH-4 model were installed for defense, covering the upper firing angles only, and a Type D shield generator embedded in a keel structure sufficed for passive protection. In addition, a six-pad general purpose transporter and a small cargo unit were paired with an evacuation transporter, and an airlock with a retractable docking tube was provided just aft of the bridge.

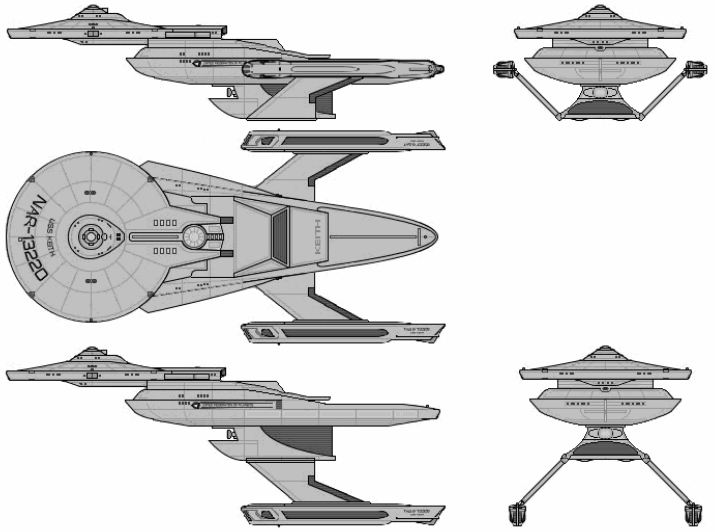
Mission-specific gear would be carried in a secondary hull that in essence was but a pressure vessel and supporting framework for the widest possible range of mission gear, and a pathfinder to similar pods on later *Oberth* class vessels. Up to 20,000 tons of instrumentation or supplies would fill the spacious lower holds of the pod, covered by rolling or duonetically transparent surfaces, while the upper decks featured mission specialist accommodation and spaces wired for workshop or laboratory use. A hangar for two full-sized exploration or utility shuttlecraft was inset amidships, with a rolling

door opening towards the fantail of the pod. Two cargo transporters and two general purpose units further facilitated the transfer of supplies or the deploying of survey parties.

The nature of the mission pod necessitated a separate engineering section to house the advanced but bulky antimatter powerplant. To properly englobe the mission pod in a warp field, the design placed the warp propulsion system underneath the pod, with the nacelles on upward-angled pylons so that they would straddle the pod. The RMR-200 reactor was cradled by curving structures not unlike the *Oberth* pylons, with similar quick-separation functionality. A powerful navigational deflector directly ahead of the reactor could swivel to both sides for various FTL scanning needs, utilizing side cutouts in the reactor pylons. In contrast, the sensors of the mission pod would be hard pressed to see past the warp engines – so these were mounted on hinged pylons, which could be dropped for sensing, and raised again for warp travel. There was no propulsive functionality to the variable geometry, unlike with some later designs.

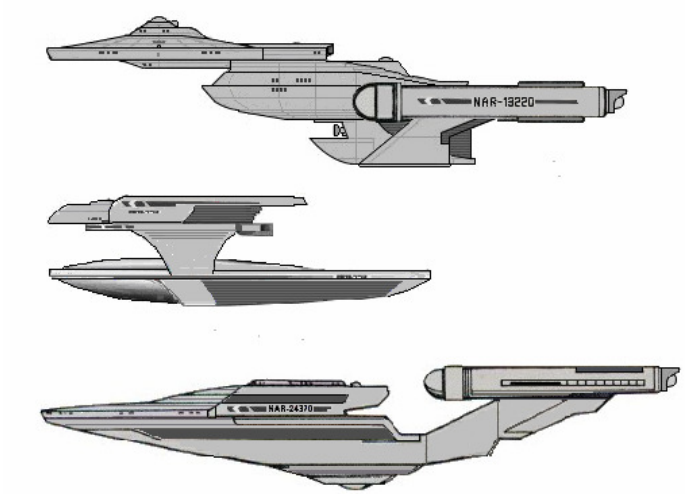
Even with warp engines of (very) light cruiser standard, the smallish ship type did not meet Starfleet's criteria for an actual exploratory cruiser. Nor did it quite cover general Fleet logistics needs in the 2260s, and a decision to procure just seventeen out of the originally planned total of 25 vessels was made with the understanding that all ships would be equipped to survey configuration. More exactly, they would serve as 'surveyor leaders' for the emerging armada of *Oberth* vessels. In a threat environment where even destroyers often had to go leaderless, there was no real chance of using light cruisers as shepherds for the *Oberth* flocks, so the *Keiths* found a secure niche in frontier mapping and assaying campaigns.

The Organian effect on *Keith* operations was a complicated one. In theory, treaties limiting the numbers of warships should have left the class untouched, while survey operations ought to have benefited from the truce, giving all the more work for 'deep space booster' assets like the surveyor leaders. Yet the *Keith* fell into the Activation Class VI for military logistics ships, and had to be erased from Starfleet records lest the ships themselves be scrapped. In 2268, various civilian research organizations thus received direct operational and financial responsibility for government-sponsored, state-of-the-art starships for the first time in Federation history. Being simpler and cheaper to operate than the simultaneously privatized *Hopi* cruisers, the *Keiths* immediately became popular and much-utilized.



Starfleet retained a keen interest in the design, though. Prior to the handover, the ships were given modern communications systems, for unspecified 'future needs', and the weapons berths were left unsealed even though the phasers themselves were removed. In addition, Starfleet exercised its option for six more ships, this time equipped with KR05 reactors. Held uncompleted while Organian treaty figures were being shuffled and reshuffled, these Mk II vessels actually ended up entering service as the Mk III, a thoroughly modernized scout with LN-61 warp engines, a FIB-3 impulse deck shared with the modern transport fleet, and twin FH-7 phasers. Even a light escort-type torpedo launcher was included. The main incentive for introducing this new class was its commonality with *Genser* escorts; the two classes were fielded side by side, the *Keiths* providing early warning and logistical support for the *Gensers* in convoy escort duty.

There was to be no further procurement of the scout type, however. The curious relationship between warp propulsion and sensing did not really cater for the sort of constant vigilance needed in escort duty. The engine swiveling mechanisms were deemed so much dead weight, and eventually the sensor payloads were moved over to the *Gensers* themselves and the pylons fixed in place. The Mk III scouts were retained till the end of the Klingon crisis, and retired alongside the escorts. Exploration Command hopes of reassigning the vessels to survey duty were dashed by the extent of wear and tear on the engine systems; similarly disappointed was Logistics Command that had hoped to utilize the LN-61 surplus for the fielding of further light deep space tugs.



The three principal survey designs of Starfleet in the 2250s and 2260s in a group portrait. In the end, the Oberth *represented the best balance between modularity and simplicity, continuing service more than a century after the introduction of the surveyor trio.*

Unity

Command ship
2257-2276

Completed:	7
Length:	287.3 m
Beam:	127.1 m
Height:	72.5 m (peacetime configuration) 87.0 m (crisis configuration)
Mass:	701,000 tons (peacetime configuration) 952,600 tons (crisis configuration)

Cruise speed:	w 6 (peacetime configuration) w 8 (crisis configuration)
Max.speed:	w 8.0 (peacetime configuration) w 10.0 (crisis configuration)
Endurance:	2 years
Officers:	31 ship operations 38 command operations
Crew:	405 (peacetime configuration) 565 (crisis configuration)
Weapons:	<u>Peacetime configuration:</u> 6 phaser V emitters in 3 twin banks on primary hull 2 phaser V emitters in twin bank on ventral secondary hull <u>Crisis configuration:</u> 6 phaser VIII emitters in 3 twin banks on primary hull 2 phaser VIII emitters in twin bank on ventral secondary hull 1 phaser VIII emitter on dorsal secondary hull
Shields:	2-layer forcefields Primary navigational deflector beam on fwd secondary hull Auxiliary navigational deflectors on fwd primary hull
Laboratories:	1 signals processing
Transporters:	5 GP (6-pad), 4 emergency evacuation (22-pad), 4 cargo; Mk III Select ships brought to Mk IV standard after 2271
Auxiliaries:	6 light shuttles, 3 command barges, 4 work pods

Ships of historical interest:

USS Unity (NCC-2106)

SOURCES: (D aridas sofia, own)
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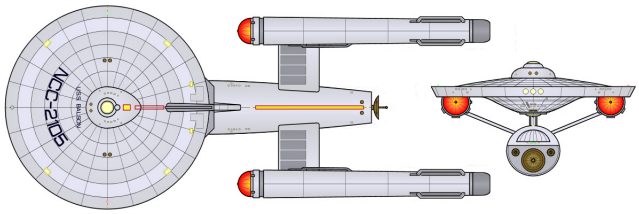
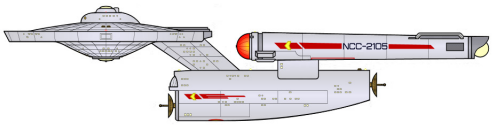




The introduction of the dreadnought-type starship opened up new strategic possibilities for Starfleet. Barring unforeseen expansion of the operational theater, the three-nacelled behemoths could respond to crises on any of the fronts while operating from centrally located bases, thus alleviating the need for local garrisons. Starfleet could now complete its withdrawal from planetary surfaces, a process begun as a result of the Axanari defection. However, being able to deploy the big guns to the border from afar was just part of the equation. Crucial issues of reconnaissance, communications, fuel and munitions logistics and maintenance also had to be solved without involving fixed planetside or orbital assets. The massive building programs for the required support vessels only began to meet the demand in the late 2250s. It was at this point that Starfleet could move on to programs of smaller production volume but equally crucial importance.

A certain type of patrol combatant had been neglected for half a century, due to the availability of fixed facilities for the task. When moving to a distant war zone, the expeditionary fleets of the 2250s would once again have to take their headquarters with them – and Starfleet by now understood that burdening the HQ role on a primary combatant was a dubious solution at best. Indeed, the *Federations* had deliberately been built without command facilities for operations beyond Task Force level, and this was also the largest formation the facilities of a heavy cruiser could hold together. While the *Hermes* coordination ships could handle basic fleet-level operations, they weren't intended as theaterwide HQ ships, and lacked the required size for adoption or adaptation as such. Thus, the dedicated command ship had to be reborn.

The torturous struggle for securing funding for individual dreadnoughts had the positive side effect that every heavy combatant turned down by the Council meant a hefty sum released for other uses. Starfleet quickly learned the trick of immediately channeling the funds onto another bid on a less openly offensive, cheaper and thus more appealing vessel. The first of these inherited the registry, powerplant and funding of the cancelled dreadnought *Corporation*. Borrowing was found to be an affordable and efficient construction method overall: *USS Unity* (NCC-2104) sported a Class 1B primary hull of *Achernar* design, its three phaser berths filled with twin Type V banks of *Loknar* surplus. Decks 2 and 3 were slightly expanded and equipped for communications functions rather than torpedo handling, and the impulse assembly was bifurcated to allow for a rather curious central primary plasma uptake. Laboratory spaces were replaced by command facilities, and crew and officer berthing adjusted to accommodate 405 of the former and 69 of the latter. Apart from these modifications, basic *Achernar* infrastructure was retained.

The secondary hull was a mission-specific, dreadnought-style design, longer and broader than the cruiser hulls and sporting e.g. a specialized 'Alphorn' communications system with numerous external antennas. The bow shuttlebay had an adjoining triage room; modular hospital facilities could be brought aboard for forward deployments. The two nacelles on horizontal, 'shoulder-mounted' pylons were of PB-47 type, and rated for warp 6 cruising and warp 8 dash speed. Similarly cruiserlike performance was offered by the shield generators at the hull bottom. However, a careful observer would have noted four empty generator cradles, and perhaps also paid attention to how both primary and secondary plasma systems were rather grossly overengineered – featuring for example a seemingly useless dorsal primary power coupling.

Starfleet's ulterior plans with the class would have been obvious to anybody aware of these facts. In case of a prolonged military conflict, it would be a matter of days to bolt a third PB-47 to the mountings atop the impulse deck, to add the missing field generators, and to plug Type VIII phasers in all weapons berths. A 'pocket dreadnought' would be ready for combat at speeds up to warp 10.0, albeit with reduced endurance. There was a degree of fantasy to the plans, as no spare PB-47s were actually set aside, nor were there enough Type VIII systems to outfit more than two of the command ships without depriving the *Federations* of vital spares. Still, seven *Unity* vessels were to be completed, all of these with the built-in upgrade potential.

In a crisis, each HQ ship would support a command staff of almost 200, linked to the combat forces and sensor nets by up to 8.6 million distinct communications channels, four separate levels of command and targeting data sharing networks and an improved array of personnel transporters and liaison craft. TBL-5 troop barges were configured as detachable surface command outposts, and included in the auxiliary mix of the vessels, typically three being carried along with the six liaison shuttles. Extensive medical facilities were also included; Starfleet felt it needed no dedicated large hospital ships for operations under the current doctrine, in which planetary combat would be kept to

a minimum, yet some centralized medical assets for space combat casualties were still useful, and efficiently combined with the HQ role.

A typical Unity *deployment in 2265 sees* USS Stability *(NCC-2109) blending in with* Constitution *and* Rochester *cruisers and a gaggle of destroyers. Entire fleets were seldom deployed; save for certain large scale exercises such as the annual Factor Two event depicted here, it was rare for even a third of the elements of a fleet to come together for concerted action.*

Since the other *Federations* were cancelled before any actual system construction had taken place, there was no way to match the affordability of *USS Unity* in later procurement. Later units had their powerplants built from scratch, and struggled for funding and dockyard slots in a manner unbecoming of a priority project. Nevertheless, the command cruisers were completed at a rapid pace, *USS Harmony* (NCC-2119) being the last off the slipways in January 2262. The registries and construction dates of the seven *Unities* were interspliced with those of the *Federations*, just like the vessels themselves were expected to tag along the dominant combatants – but only in times of open war. Like the class from which they had leeched their financial support and technological basis, they were as expensive to operate as to build, and were in effect immediately mothballed upon construction.

The command ships remained idled until late 2267, when they were scrambled to counter the rapidly escalating Klingon hostilities. Although no more than 25 % of the Fleet mobilized during the hectic two weeks of the crisis, all seven HQ vessels were promptly crewed, and five of them were deployed to the primary theaters (albeit without a chance to install the more powerful weapons). In a cruel twist of events, the most important command communiques in the crisis were issued independently of any Fleet command or communications assets, and indeed against the will of the admirals headquartered aboard the *Unity* vessels. Still, there was no opposing the omnipresent and plenipotent Organians, and forces on both sides had to be withdrawn.

With the Klingon threat thus seemingly negated, deployments of large formations decreased drastically. In theory, the *Unity* vessels would have been quite capable of independent operations as frontier explorers and combatants, especially if at least partially rearmed with the intended Type VIII emitters. But the treaty that had been wrung out of the military impasse reflected the fact that there had been no clear winner: in order to hold on to the fragile peace, both sides had agreed to a range of concessions. None were militarily crippling, but several were annoyances, and intended as such: keeping the *Unity* class in fighting strength would have meant reducing the numbers of other classes of cruiserlike combatants, most of which were more affordable to operate than the *Unity* almost-dreadnoughts. Since the option existed of listing the *Unities* as lightly armed support assets instead, it was embraced, and the class saw relatively little frontline use during the treaty years.

The basic concept of a HQ ship / combatant hybrid still held appeal beyond the ability to perform political lip service. When the *Unities* got long on the teeth, a successor design was created in the image of the class: *USS Balson* utilized technological solutions a quarter of a century more

advanced, but closely resembled *USS Unity* in silhouette, specifications and upgrading potential. This follow-on class is described later in a dedicated entry. Also described is an in-between command ship of lesser combat potential, the *Brenton* class cruiser.

The story of the original design would end in 2276, when *Brenton* procurement and *Balson* introduction freed the last of the vessels for sale to trusted rimward allies, for use as defense cruisers. The sale was far from a resounding success, since the buyers were fully aware of the inferiority of the stripped-down, torpedo-less *Unity* hulls. Only two units eventually changed hands; the Megarans agreed to the sale in 2282 when it was sweetened with four surplus destroyers.

Santee / Coronado

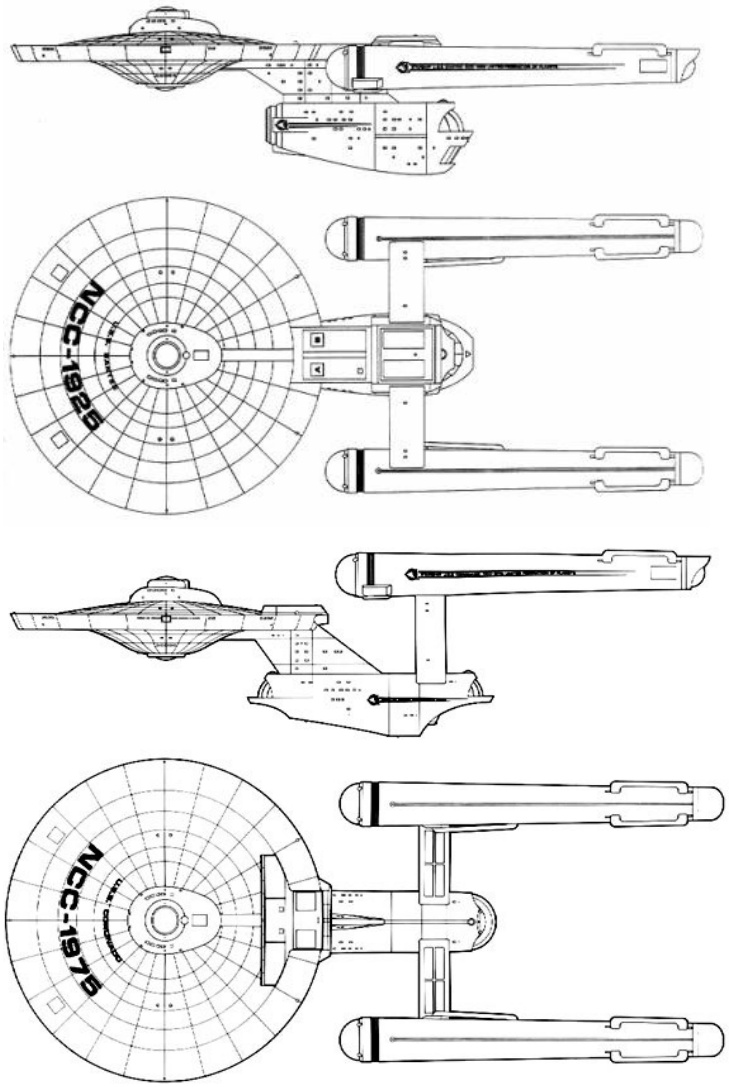
Through-deck cruiser
2255-2268 (*Santee*)
2257-2299 (*Coronado*)

Completed:	10 total: 4 *Santee* 6 *Coronado*
Length:	285.5 m (*Santee*) 285.1 m (*Coronado*)
Beam:	127.1 m
Height:	66.3 m (*Santee*) 72.1 m (*Coronado*)
Mass:	683,000 tons (NCC-1925-28, not including onboard auxiliaries and tactical craft) 679,000 tons (NCC-1975, not including onboard auxiliaries and tactical craft) 674,500 tons (NCC-1976, 1980, not including onboard auxiliaries and tactical craft) 676,000 tons (NCC-1977-79, not including onboard auxiliaries and tactical craft)
Officers:	36-39 (pilots not included; usual complement 30 Starfleet and Marine pilots)
Crew:	283 (*Santee*, typical) 269 (*Coronado*, typical) 276 (NCC-1977, with extra flight deck crew)
Cruise speed:	w 6
Max. speed:	w 9.0 (*Santee*) w 8.1(*Coronado*)
Endurance:	5 years
Weapons:	8 phaser VII emitters in 4 twin banks, port/stbd of bridge and port/stbd of ventral sensor array 1 phaser VI emitter on dorsal aft primary hull (*Santee*) 4 phaser VI emitters in 2 twin banks, on fwd and aft ventral secondary hull (*Coronado*) 2 fwd medium torpedo tubes w/ 90 (*Santee*) or 60 (*Coronado*) torps below bridge
Shields:	1-layer conformal forcefield Navigational deflector on primary hull bow
Laboratories:	2 GP (*Santee*) 1 GP(*Coronado*)
Transporters:	4 GP (6-pad), 2 cargo, 2 emergency evacuation (22-pad); Mk III All ships brought to Mk IV standard after 2270
Auxiliaries:	4 medium shuttles and 4 shuttlepods, 4 workbees (exploration operations, typical) 4 medium shuttles, 8 hoppers, 8 sublight fightercraft (planetary assault operations, typical) Various special environment, special operations and tactical craft sometimes carried

Ships of historical interest:

USS Chenango (NCC-1927), *USS Clemenceau* (NCC-1977), *USS Devonshire* (NCC-1979)

SOURCES: (D FSCC/Mark Wilson, SotSF)
(N FSCC/Mark Wilson, SotSF)
(H FSCC/Mark Wilson, SotSF)



The success of the *Constitution* program spawned several growth designs, the most ambitious of which was the three-nacelled *Federation* class dreadnought. Since the original cruisers proved so versatile by themselves, though, the growth programs were often cut in mid-production, or never even saw construction phase. One of the planned variants was still considered essential even in face of the vast capabilities of the *Constitutions* themselves: a dedicated small shuttlecarrier, of which up to thirty were desired for supporting operations ranging from planetary assault to disaster relief.

To many admirals, the concept of a shuttlecarrier was something of a relic in the era of advanced phaser fire control systems which had already rendered sublight fighters obsolete in most applications. But there was still plenty of use for small craft in orbit-to-surface operations of all sorts, and the three new designs were intended to provide these craft with an agile and fast mother vessel.

Propulsively and structurally the most ambitious was the *Santee* class (registry numbers NCC-1925 through 1934 allocated) which sported PB-47 mod 2 engines for warp 9 dash speed. The engines

were mounted on horizontal pylons extending from a large, blocky engineering section on the trailing edge of the primary hull. The secondary hull of the *Santees* featured a 'Kadek' deflector dish at bow, but dedicated the stern to a two-deck flight deck and hangar complex wherein small craft entered through the upper bay and were launched through a lower set of doors. Up to twenty fightercraft could be stowed on the flight decks and in the hangars forward of these. A heavy offensive and defensive armament was included in the form of full *Constitution*-type phaser VII banks and extra phaser VI units, although twin 'Awalt' Mk 3 torpedo launchers were chosen over the more potent but also bulkier and more complex *Constitution* 'Wolf' Mk 2 multi-tube torpedo armament.

The ship was to fight as a full-fledged cruiser in addition to protecting her small craft – an approach radically different from the lumbering shuttlecarriers of ages past. She would not embark major Marine units, nor be able to carry much in the way of ground vehicles and other combat gear. Rather, her forte would be the rapid deployment of precision strike teams and tactical support craft. As the selection of craft to be embarked was highly flexible, the ship could support interdiction operations, evacuations, surveys and search and rescue missions. The cruiserlike sensor and communications systems catered for a secondary role as a task force command ship as well, although other facilities for this mission were lacking.

In the *Coronado* class (NCC-1975-84), emphasis was put on auxiliary craft capacity. The bow deflector was dropped, and engineering arrangements in the primary hull were much more modest, as top speed was not to exceed warp 8. The secondary hull featured a fly-through flight deck rather than a two-level one, and had its hangars and workshops below the flight deck level, in many ways simplifying operations and increasing capacity. However, departures through the bow doors conflicted with the cones of fire of the primary hull ventral armament. Omission of the deflector dish also cut down FTL sensor range and speed. In comparison with the *Santee*, the *Coronado* thus was much more a carrier than a cruiser.

The *Princeton* class (NCC-1950-59) was intended to represent the middle ground in terms of registry numbers only. There would be no high performance powerplant, no long range deflector and sensor assembly, no torpedo armament, and no high throughput flight deck. Instead, the secondary hull would be optimized for the carrying of troops, riding to their meeting with the enemy in assault barges and hoppers deployed through four ventral drop bays. Ample command facilities would be installed in the primary hull, but for coordinating planetary assault operations, not fleet maneuvers.

USS Santee was completed in May 2255, right on schedule, and underwent the testing phase smoothly and uneventfully. *USS Coronado* followed in September 2257, slightly delayed and already under budgetary pressures that were certain to limit production numbers. By the time *USS Princeton* was cancelled in 2258, it had become clear that no more keels would follow the fourth *Santee* or the sixth *Coronado*. For all purposes, the two existing classes performed technically just as planned. Operational efficiency was the stumbling block, as the carrier-cruisers were having great difficulty proving their superiority over standard heavy cruisers. Those had reached their pinnacle with the introduction of the final *Victory* subclass of the *Constitution* family; Defense Command had no further roles for complex and overspecialized cruiser variants. For the following decade, resources would be concentrated on inexpensive bread-and-butter cruisers of the *Achernar* type on one hand – and the budget-busting *Defenders* on the other.

Naming practices for the oddball designs changed with time. Originally conceived as 'heavy cruisers, augmented', the ships were reclassified as shuttlecarriers during production. For the *Coronado* class, this designation was in 2270 changed to the historical but here surprisingly accurate euphemism 'through-deck cruiser'. The *Santee* class was no longer around to witness such a change; two ships had been retired due to damage from ramming attacks, and the remaining two had sailed to reserves in 2268 under an 'escort carrier' designation. The *Princeton* concept had been replaced entirely by dedicated assault transports of *Makin* class.

The primary mission for the *Coronados* turned out to be one of exploration support, with shuttle pilot training and special operations coming in as distant second and third. Planetary assault was still frequently trained for but, save for the abortive campaign that ended in the Organian peace treaty, never undertaken operationally.

A look into a peacetime through-deck cruiser. A Class 2CA aquashuttle only blocks one of the two hangar openings, allowing light and medium utility craft to operate via the aft doors. Numerous service and munitions lifts on the hangar floor and umbilical connectors on the walls tell of the improved maintenance and general tending capabilities of the cruiser over a typical Constitution *variant.*

The *Coronado* ships were retired one by one from active operations in the late 2280s and early 2290s due to their degrading warp performance and awkward engineering facilities that (as per a thorough feasibility study performed on the *Oriskany*) did not lend themselves to refitting. The loss was not particularly devastating: Starfleet was in the process of fielding a successor family consisting of the *Aleo* and *Jenshahn* classes, and had also come up with several alternate concepts for the missions performed by the through-deck cruisers. More regrettable from the economic and operational viewpoint was the Fleet's inability to downselect from these alternatives in time. The demand for low-key planetary warfare operations during the Klingon conflict was never great enough to warrant the use of one let alone three types of through-deck cruiser alongside two distinct types of strike frigate. High-key operations did not benefit significantly from the existence of the *Coronado* class, either.

Hopi

Large survey cruiser
2258-2282

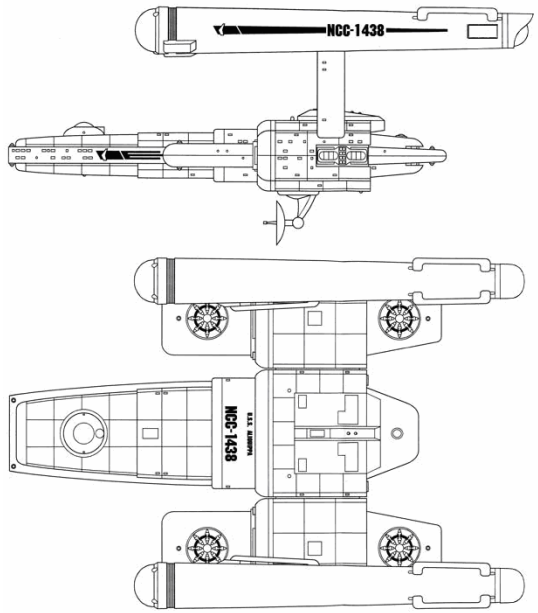
Completed:	10
Length:	203.8 m
Beam:	138.3 m

Height:	92.1 m
Mass:	651,000 tons (standard) 654,000 tons (w/ maximum instrument load)
Officers:	42
Crew:	283
Cruise speed:	w 6
Max. speed:	w 8.0
Endurance:	5 years
Weapons:	2 phaser V emitters in twin bank on dorsal stern 2 phaser V emitters in twin bank on ventral bow
Shields:	1-layer conformal forcefield Navigational deflector below primary hull
Laboratories:	2 GP, 2 planetary sciences, 1 astrophysics, 1 life sciences, 1 astrography (standard) Capacity for up to 28 additional laboratory modules
Transporters:	2 GP (6-pad), 2 cargo, 3 emergency evacuation (22-pad); Mk II
Auxiliaries:	1 light and 2 heavy shuttles, 4 work pods; special environment craft sometimes carried

Ships of historical interest:

USS Aliquippa (NCC-1458) *USS Guyasuta* (NCC-1453), *USS Kanesatake* (NCC-1455)

SOURCES: D TAS (Mark Wilson)
(N Mark Wilson)
(H Mark Wilson, own)



The first suggestions that the technological revolution of the Great Awakening might be old news came in 2255 when UFP Commission for Starfleet decreed that 'proven' technologies be used in the construction of the next long range survey type. By the definition of the day, these technologies included the PB-47 warp engine and the KR13 dilithium-regulated antimatter reactor, both frontline systems from the preceding decade.

Far from outdated, the engine and its matching powerplant were nevertheless surprisingly affordable because of ongoing production for numerous military applications. For the first time, Starfleet now

calculated that it could afford to field them for the less aggressive duty of long range survey. The counterintuitive rationale was the continuing military threat, and the desire to withhold armed long range units from survey duty if at all possible. The resulting engineering solution was a barebones spaceframe for the potent propulsion system, emphasizing modularity and low construction costs.

The swift completion of *USS Hopi* (NCC-1450) for an early 2258 launch and subsequent commissioning satisfied all parties involved, and resulted in confirmation of orders for a total production run of twenty, ten going to Starfleet Exploration Command and the rest to well-funded and trusted civilian organizations. Although both the naming scheme and certain external features suggested familial relationship between the preceding *Cahuya* survey cruisers and the *Hopi* design, the new vessel was conceptually quite dissimilar. Thorough modularity extended both to construction techniques and interior arrangement. The oblong primary hull, some 170 m long, was divided into four distinct compartments. The tapered bow housed crew accommodation as well as command and control spaces, such as a dorsal Class Two bridge module and a corresponding ventral tactical suite of paired Type V phaser emitters and their fire control facilities. A constant cross section midhull could be flexibly furnished with research gear, including a deployable telescope. A somewhat beamier aft hull in turn held propulsive and power generation functions and support systems, as well as holds for cargo and consumables. Podded above was an impulse assembly, also housing two more phaser V emitters. The fourth major compartment, a stubby stern hangar with broad sliding doors, could hold two large Class G reconnaissance shuttles and a number of smaller auxiliaries.

The engineers could have bolted a pair of PB-35 or -38 engines to this potent survey vessel and declared her an exploratory cruiser. Instead, they attached two lateral hull sections, essentially similar to the midhull systems area of the primary hull, and reserved these completely for mission-specific survey gear. Laboratory modules or bulky individual pieces of machinery could be secured in place within the girderwork, their placement constrained only by the exterior shells and by the athwartship primary plasma conduits within. Connecting corridors, turbolifts, dataways and power lines could then be constructed out of standardized elements.

Pylons for the PB-47 units were mounted outboard and immense sensor mounts forward and aft of each lateral hull. No less than eight annular subspace field generators for FTL sensing were provided, two in both the forward mounts, two in both the aft ones. Up to 96 standard sensor pallets could be plugged into the generator assemblies, turning the survey cruiser into the most powerful flying telescope so far fielded.

Despite the stunning standards of equip, the *Hopi* came in at 55% the cost of a *Constitution* series deep space cruiser. Operating costs were somewhat less advantageous, as some 325 crew were required in full survey configuration. Nevertheless, a three-year *Hopi* survey sortie would perfectly supplant a similar heavy cruiser effort; the heavy survey cruiser was a complete success both technologically and economically.

Operational testing established practical performance values at warp 6 cruising and warp 8 maximum speed, much as expected. Rimward missions were promptly launched, their schedule hindered more by the problems of training deep space –rated crew than by the pace of *Hopi* construction. All ten vessels were operational by 2263, thanks to shameless appropriation of heavy frigate dockyard facilities for the program.

After the initial round of highly successful charting missions, the vessels received a series of preplanned equipment upgrades. Older G1 recce shuttles were replaced by G3 craft, auxiliary computers were added to the systems hulls, and much of the stellar charting gear was swapped for star system and planetary survey equipment. The second wave of surveys would largely concentrate on finding exploitables at the distant reaches of the galaxy, far ahead of the commercial prospectors and local government surveys.

In the depths of rimward space, disaster struck. Three missions were lost within five years, plunging Exploration Command to doubt and self-crimination. *USS Kanesatake* was in 2265 pockmarked by Talarian lasers during a prospecting dispute and, unbeknownst to her crew, developed a warp imbalance that would tear the ship to pieces ten days later. *USS Guyasuta* was found adrift in the Kadena system in mid-2267; duly logged records showed the entire crew beaming down to the system's neutron star, for reasons that still remain obscure. Finally, *USS Aliquippa* disappeared into the Delta Triangle in 2269, only one of her outriding scoutcraft surviving to tell the story.

None of the losses could be attributed to shortcomings in vessel design or operating procedures. Nor was there any certainty that a full heavy cruiser, operating under the same overall doctrine, would have fared any better in similar incidents. Nevertheless, the losses gave an opening to the critics of 'exploratory adventurism', a lobby that in actuality supported active exploratory policy but disdained the construction and use of lightly armed vessels in that role. The *Hopi* program was but the first to fall, as the early 2270s saw the execution of President McLaren's drastic exploratory scaleback policy. Concurrently deactivated were the *Cahuya* and *Byrd* classes; pulling the *T'Pari* units in for a refit brought the number of active survey cruisers down from sixty to mere fifteen, discounting auxiliary and nearspace units. Other deactivation and refitting decisions followed, and within five years, Starfleet's exploratory commitment had fallen by some 75 % in all UESPA indices.

The surviving *Hopi* class vessels witnessed this development from the penalty box. The first two had been disarmed in 2272 already and sold forward to assorted domestic users. As construction of modern combat cruisers picked up pace, two more would be liquidated in this manner, and two placed in reserves; by 2282, the remaining three had been liberated of their engines to provide spares for the frigate fleet, the last barely having had time to receive modern pennant paint. A bright Starfleet future for a promising ship class had been cut short by the policy reversal.

However, many were ultimately of the opinion that this was for the best. The deep survey effort would soon again pick up pace, now with fully armed exploratory cruisers of *Tikopai* class. The imposing fleet of some three dozen would far outperform the combined pre-seventies survey cruiser force, at least until it in turn was called to arms against the Klingons and withdrawn from the deep frontier. The civilian *Hopis* would receive sensory, navigational and even propulsive upgrades and continue their careers well past the 2280s. And some good would come out of the *Hopis* in reserve, too: they would be utilized as floating *Faraday* observatories well into the 2330s.

Soyuz

Survey frigate
2259-2288

Completed: 3 total:

1 converted from *Coventry* heavy frigate in 2259
2 converted from *Miranda* heavy frigates in 2260

Length:	243.8 m (original) 247.1 m (refit)
Beam:	148.2 m
Height:	73.0 m
Mass:	700,000 tons (original, estimated) 800,000 tons (refit, estimated)
Cruise speed:	w 6 (original) w 7 (refit)
Max.speed:	w 8 (original; later limited to w 6) w 10 (refit, estimated)
Endurance:	8 years (estimated)
Officers:	35-45 (estimated)
Crew:	250 (estimated)
Weapons:	Original: 6 phaser VII emitters in 3 twin banks on primary hull Refit 2274: 12 phaser VII emitters in 6 twin banks on primary hull
Shields:	2-layer conformal forcefields Navigational deflectors on aft ventral hull (refit) Secondary navigational deflector on bow (original) Secondary navigational deflector on ventral hull (refit)
Laboratories:	2 GP, 2-8 signal processing (estimated)
Transporters:	2 GP (6-pad), 2 cargo, 4 emergency evacuation (22-pad); Mk III
Auxiliaries:	2 medium shuttles, special craft, 4 work pods (estimated)

Ships of historical interest:

USS Bozeman (NCC-1841), *USS Collins* (NCC-1839), *USS Soyuz* (NCC-1239)

SOURCES:	D TNG (TOS comic *Spock: Reflections pt 3*/David Messina) N TNG (H own, TNG, TOS comic *Spock: Reflections pt 3*/Scott&David Tipton)

The tragic loss of *USS Sverdlov* in 2258 shortly after the installation of the modern PB-51 high efficiency, low signature warp engines was a turning point in Starfleet efforts to develop a stealthier type of starship for deep penetration missions. Thanks to the incident, Fleet engineers from various specialist branches now had access to a well-working starship that officially no longer existed, and could perfect a technology that had officially utterly failed.

It was only in the mid-nineties that the full story of the *Sverdlov* loss could be disclosed, even though many elements of it were already common knowledge among conspiracy theorists, and many more had been deliberately added to the mythos by Starfleet Intelligence. The antimatter seal failure that had supposedly annihilated the vessel had been simulated by a controlled release of the substance, after which the ship had coasted to a distance and then engaged in a lithmus test of the low signature warp drive, successfully reaching distant docks at Finnea. Only a skeleton test crew had been embarked in the first place, and this team now formed the core of a force dedicated to operating Starfleet's first true stealth asset.

On short notice, armament was stripped from the *Sverdlov* as unnecessary and counterproductive to the mission. The torpedo system superstructure was replaced by a higher-volume installation for controlling a wide range of signals intelligence instrumentation. Side sponsons were bolted on for

housing bulky passive gravimeters and subspace receiver antennas; a boxy section was welded to the stern, for added coverage with dorsal and ventral sensor pods, and for further analysis facilities. Impulse drive was trunked past the stern add-on in two semi-cylindrar accelerator tubes that also featured advanced exhaust reduction systems.

Although a fairly extreme example of cloak and dagger thinking, this clandestine conversion was but one of many taking place as a response to the gradual petrification of the Klingon border. The ill-coordinated raids of the post-Axanar years had in fact been a welcome and mostly harmless source of information on Klingon military technology and tactics. Now that the Empire again practiced self-restraint, the information had to be pried out with signals intelligence flights to the vicinity of the border defense installations. A large number of civilian vessels received the appropriate gear, but these seldom braved the tactically interesting regions. Outdated *Detroyat* heavy destroyers were also converted in semi-secrecy, but these clumsy, high-emission vessels rarely caught Klingon border installations by surprise. The converted *Sverdlov* thus met a very concrete need when she sailed out again in 2260, in theory sporting the name *USS Soyuz* but in practice staying all but invisible to both Federation and Klingon observers. The success of the first missions against Klingon frontier garrisons guaranteed SFI the resources for the acquisition of a further two vessels, the *Collins* and the *Bozeman* – both *Miranda* conversions masquerading as 'cutbacks' rather than 'losses'.

USS Collins – *imagery from the rescue operations. The exact nature of the calamity that culminated in a warp core detonation was never established, at least not publicly. Application of PB-51 engines was unique to this class, depriving analysts of comparison material.*

Regardless, losses eventually were suffered. An apparent reactor failure forced the *Collins* in 2265 to abort her mission and accept assistance from *USS Enterprise*. Admiral Carlson refused to abandon ship until her total destruction could be counted on; all the evacuated crew members were placed under strict quarantine to prevent any kind of information about the ship or her mission from finding its way to the known and unknown Klingon agents within Starfleet. Whether such agents had been involved in the disaster that claimed the *Collins* was never established. Sister ships were placed under warp envelope restrictions when PB-51 could not be ruled out as the element at fault. Search for a replacement engine began at once.

Engine emission stealth ceased to be a concern in the late sixties, as Starfleet acquired its first practical cloaking devices. A 'routine' refit to LN-64 propulsion was therefore selected, and implemented on both the remaining vessels. The saucer rim was likewise reworked to modern heavy frigate standards, and some phaser weaponry restored. Impulse propulsion was modernized as well,

with Avidyne 2275 installed beneath the aft hull extension; just a single IMRF crystal was available, making the ships sluggish performers at sublight.

Propulsive performance was of little concern, however. It was the rapid development of weapons and sensor technology on the Klingon side that soon left these ships outdated for their role.By the time the Organian disappearance was openly reported, the spyships were far too lightly armed to brave the borders and too unlikely to go unnoticed. Also, Starfleet sensors no longer penetrated through the latest Klingon camouflages and cloak designs. This had been anticipated from the outset: the roomy interiors and external mounting points of the ships had been designed to facilitate extensive refits, and in 2275, the onboard sensor gear entered its fourth iteration.

USS Bozeman *on patrol. Sensors carried include gravimetric and passive optical instruments, as well as numerous active long range subspace scanner spires, suggesting an AC hunting mission. Klingon raids by cloaked privateer ships were a frequent nuisance in the 2270s, but the main role of the AC patrols was to monitor the movements of the official Klingon naval forces and to establish their fleet strength in potential trouble zones. Klingons have long experience in handling large-scale troop movements and logistics completely under cloak, to the degree that even their starliners often travel cloaked to hide their destination.*

However, the hull extensions also imposed great stresses on the spaceframes, drastically shortening their lifetime. Structural failure was thus a preferred explanation for the disappearance of *USS Bozeman* (NCC-1841) in 2278. The *Soyuz* was given just one further sensor refit, then retired in 2288 and scrapped due to fatigue. Her special sensors were at that time already becoming standard issue aboard exploration starships. In fact, some of the systems were moved to other ships and installations virtually intact, since only the spaceframe itself was really worn out.

The frontier sigint task at that point became largely the responsibility of the *Amerind* scoutships and *Ticonderoga* and *Constellation* reconnaissance cruisers. The frigate force ostensibly assumed an honest frontier patroller role. Yet the conversion of eight *Avengers* into the *Endurance* 'survey' configuration told of a stalwart Admiralty belief in the virtues of multipurpose combatants in the intelligence gathering role. It is also likely that at least a few externally innocuous-looking *Mirandas* were given modular internal sigint gear, similar to the packages that had turned five *Darans* into *Bragg* spyships, to help Starfleet ensure that the Klingon Empire kept to its Khitomer treaty commitments.

Through a freak time-shift anomaly in the Typhon Expanse, *USS Bozeman* later returned to our universe in 2368. Onboard the ship, no time had passed, and the vessel was for all purposes brand new. Thus, she was pressed back to Starfleet service despite her outdated equipment, to fill in gaps in 3rd Fleet strength left by the Wolf 359 disaster. The ship got rid of her now useless sensor mounts and received modern communications gear and a partial transporter upgrade, but retained virtually all other systems, including the logistically awkward binary fuel arrangement. She was finally lost in the second Borg offensive in 2373, near the area where she was found. Few such time

displacements have been credibly documented before, although it is widely suspected that some Klingon technology has in fact been obtained from advanced spacecraft displaced backwards in time.

Derf

Buoy tender / mine warfare ship
2260-2294

Completed:	104 total: 2 Mk I Starfleet buoy tenders 51 Mk III Starfleet buoy tenders 34 Mk III export variants 17 Mk IV Starfleet surveillance network maintenance variants
Length:	217.2 m
Beam:	128.0 m
Height:	70.3 m
Mass:	626,000 tons
Officers:	11
Crew:	61
Cruise speed:	w 6
Max. speed:	w 8.0
Endurance:	2 years
Weapons:	4 phaser IV emitters in 2 twin banks on dorsal hull 2 phaser IV emitters in twin bank on fwd ventral hull (Mk III only) Up to 1,800 gravitic mines (minelayer role only)
Shields:	1-layer conformal forcefield 2 navigational deflectors on fwd hull
Transporters:	2 GP (6-pad), 1 cargo; Mk III Some ships brought to Mk IV standard after 2275
Auxiliaries:	7 buoy recovery craft (Mk I, II) 5 buoy recovery craft (Mk III)

Ships of historical interest:

USS Acropolis (NCC-R1043)

SOURCES:	(D FASA) (N FASA) (H FASA)

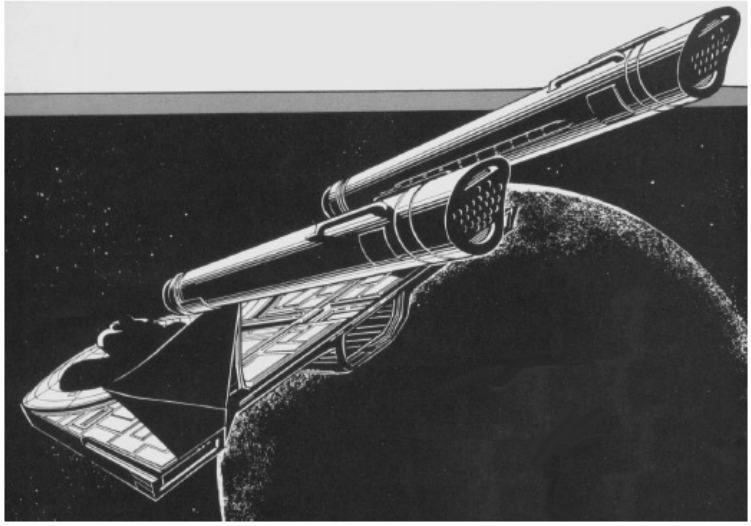
Among the oddest of Starfleet projects in the period of Klingon scare was the *Derf* class of buoy tenders. By designation a Class 5 support vessel, by design a Class 1 frontline combatant, this *Larson* derivative was an attempt to give a destroyer-category vessel a practical and plausible peacetime mission. Squeezing multimission capability into any spaceframe smaller than a light cruiser was folly – but *dual*-mission capability was quite within the realm of possible. It would be a simple matter to install a hull extension to a *Larson*, a *Saladin*, or even an older *Kovaris* vessel. Any of a number of secondary missions could be facilitated, although at the cost of added mass and reduced impulse performance: planetary exploration or small craft auxiliary tender duty via a proper shuttle hangar, a supply role via a cargo hold or towing clamps, a survey mission via extra sensors and computers. Operationally, however, few of these missions would match the classic destroyer attributes of high deployment speed but low on-theater endurance.

By early 2259, two practical dash-in-dash-out mission profiles had been identified. One was that of a rapid reaction signals intelligence vessel, not a civilian job per se, even though the nonmilitary misnomers 'survey cruiser' and 'exploratory cruiser' were also toyed with. For the time being, Starfleet abandoned this profile, as the sigint needs were being met by existing designs. Later, destroyer derivatives would indeed be pressed to this duty, although with modest results.

The second mission profile was that of buoy tender. A task that back on Earth's oceans had called for rugged, low speed vessels of limited seakeeping was in deep space a very different challenge. Buoys would be deployed not only in 'coastal waters' but also in interstellar space, along trade routes and borders. Constant maintenance, repair and replacement missions would have to be flown to the millions of buoys even when the lifetime of an individual buoy was measured in centuries. There would be no sense in returning the buoys to port for analysis and repair; onboard processing was the only reasonable solution. Obviously, a vessel of destroyer size and speed would offer significant advantages over the usual adapted civilian small freighter designs.

Throughout 2259, modifications were performed on a surplus *Larson* spaceframe. Decks 8-11 received an extension all the way to the stern of the ship. Special craft (operated as unmanned drones in most situations) equipped with tractor beams were housed in a ventral berth. After the mothership had arrived at a malfunctioning buoy, the drones would bring it aboard, eliminating the need for precision approach gear aboard the ship. Automated processing lines within Decks 8-11 could handle the repairing and re-energizing of up to eight deep space relay buoys at a time. Up to 80 standard communications or surveillance buoys could also be carried aboard for deployment via the recovery drones or twin ejector tubes astern. Transporter capacity was boosted by the addition of a second six-person platform and the replacing of the *Larson* evacuation unit by a dedicated cargo platform.

To accommodate the machinery, most lower hull functions were eliminated. Fire control computers and long range sensors had to go, and life support machinery was reduced in size and capability. The latter change was made possible by the low crew requirements of the ship (72 standard crew, plus ten intelligence specialists on the Mk IV special surveillance network maintenance variant). The former two in turn forced the abandoning of torpedo armament. The energy and cooling system reserves, space and computing power liberated by the elimination of the launcher were eagerly embraced by the engineers, who could now use it to retain full directed-energy weapons capability on the pared-down vessel. A battery of four phaser IVs provided punch similar to that of Mk II *Larsons*; the berths could take four more emitters if necessary, or even be upgraded to phaser VII standard in a time of crisis.



Buoy tender USS Puskás *reels in a Mk VI midrange relay for repairs. Both the processing bay doors and drone berth doors in the ventral hull extension are open, and buoy deployment hatches can be seen inboard of the impulse assemblies astern. It would be difficult to identify the* Puskás *as anything other than a destroyer otherwise.*

Almost as an afterthought, the engineers also changed the main propulsive system. Instead of the single PB-31C nacelle, the *Derfs* featured two PB-31D mod 2 (in the two prototypes, mod 1) engines lifted from the *Loknars*, and a single RMB-228 powerplant of commercial ancestry and good serviceability. Performance was basically identical to that of the destroyers, while the closely spaced twin nacelle configuration gave a degree of redundancy for solo deep space operations. Spherical plasma diffusors were not carried as standard, although a number of ships going to SF Intelligence were slated to receive these.

Production of the *Derfs* began in 2260 at the distant yet central Merak II. A hub of trade routes from the mining colonies on Kalandran, Dorvan, Capellan and Vardone sectors to UFP core, Merak was also known as a thriving industrial center for the production of colonization and mining equipment. Destroyer starships were a novelty to the local industries. Yet by the end of the year, two *Derfs* (mainly built of surplus *Loknar* prototyping and *Larson* components delivered from Proxima) had been launched, and local production of key components for further units was underway.

The early 2260s policy of lend-leasing or selling relatively advanced weaponry to allies in the fight against Klingons also influenced *Derf* production. The somewhat downgraded destroyers were an ideal phaser-armed lead ship for a smallish navy, easily adaptable to minelaying as well. Ambitious plans were made of producing up to 400 export vessels, to be operated by foreign navies in support of UFP buoy network maintenance operations. In the end, the same limitations that curtailed Starfleet's destroyer ambitions also cut down the *Derf* numbers to 51 Starfleet and 34 export versions (excluding the two prototypes), plus 17 special variants for SF Intelligence work. This still represented a considerable fighting force, a potent tool for buoy network maintenance – and a huge dent in the support unit procurement budget.

At no time was there a real chance of the *Derfs* taking over the majority of buoy tending work. They were tasked with the most remote and highest-risk areas only, and sometimes had to pay the price. *USS Acropolis* was lost to the Klingons in an intelligence gathering raid; *USS Walther Price* was the first to disappear without trace, an all too typical fate in the extreme reaches of the UFP communications infrastructure. Training Command retained the two prototypes as well as two

production vessels, while the bulk of the fleet was in 2267 transferred from Logistics Command to UFP Transit Authority to circumvent some Organian treaty limitations.

There was no major effort at refitting the *Derfs* with modern technology other than up-to-date maintenance tooling. Nor was there major demand for such an operation. When budgetary limitations began to be lifted in the 2280s, it took some convincing to get either Logistics Command or the UTA interested in an upgraded variant. In the end, the needs of SF Intelligence were the driving force behind the procurement of the *Niffen* class that would carry on the exotic tender-destroyer role to the 24th century – and, thankfully, the destroyer half of it would never see practical realization.

Mo'Kal

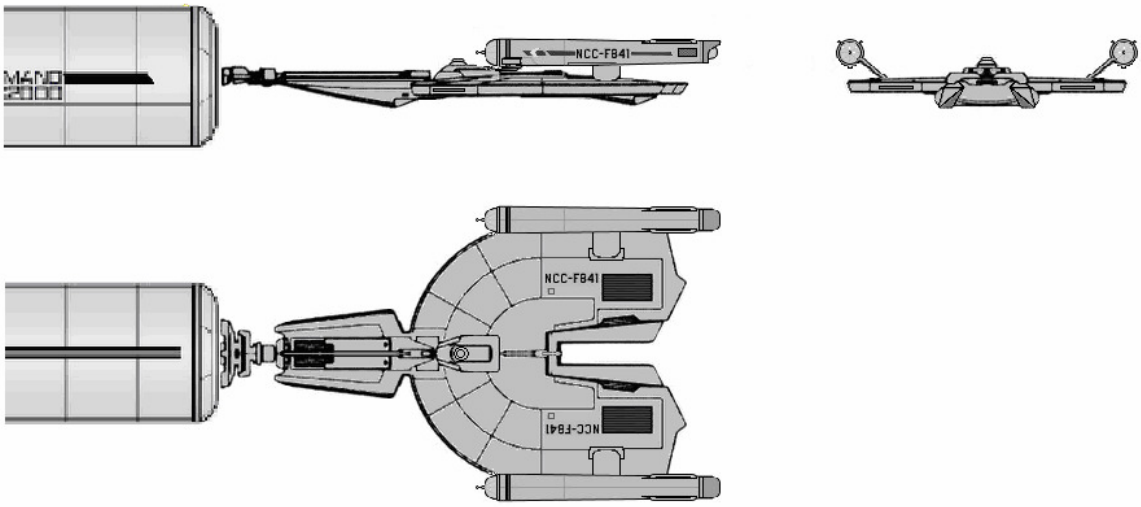
Light fleet tug
2260-2307

Completed:	136 total: 90 Mk I 46 Mk II built and 32 refitted from Mk I
Length:	140.0 m (Mk I, grapple folded) 155.0 m (Mk I, grapple extended) 155.0 m (Mk II, grapple folded) 175.0 m (Mk II, grapple extended)
Beam:	100.5 m (Mk I) 121.2 m (Mk II)
Height:	20.0 m (Mk I) 25.4 m (Mk II)
Mass:	235,200 tons (Mk I) 206,900 tons (Mk II)
Officers:	4
Crew:	24 (Mk I) 26 (Mk II)
Cargo:	2 x 121,600 tons (standard cargo pod arrangement, Mk I) 255,000 tons (maximum load other than pods, Mk I) 4 x 121,600 tons (standard cargo pod arrangement, Mk II) 550,000 tons (maximum load other than pods, Mk II)
Cruise speed:	w 6 (Mk I) w 8 (Mk II)
Tow speed:	w 5
Max. speed:	w 8.0 (Mk I) w 9.0 (Mk II)
Endurance:	2 years
Weapons:	None
Shields:	1-layer conformal forcefield Twin navigational deflectors port/stbd
Transporters:	1 GP (6-pad); Mk II (*Mo'Kal* Mk I) 1 GP (6-pad); Mk III (*Mo'Kal* Mk II)
Auxiliaries:	4 cargo maneuvering drones

Ships of historical interest:

USS Dacian (NCC-F841)

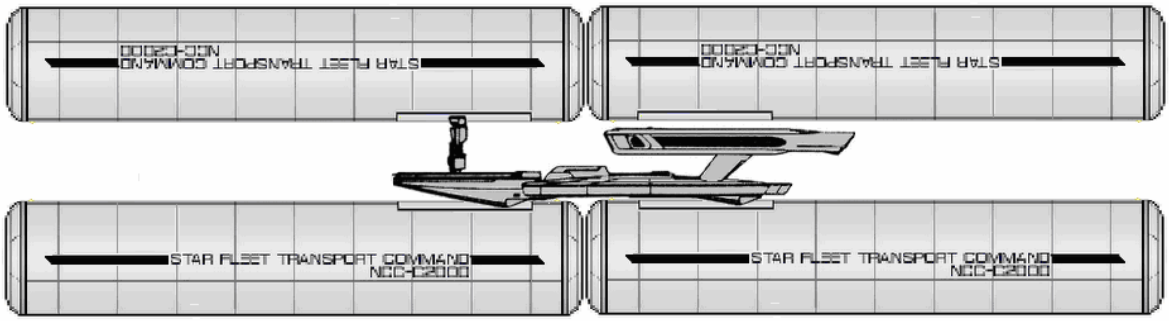
SOURCES: (D FASA, dimensions corrected for Mk II)
(N FASA)
(H FASA, own)



The early successes of the *Ohio* light tug program only whetted the appetite of Logistics Command. A few years of data gathering and number-crunching resulted in the case being made for a parallel program of two-engined tugs. Doubling of engine power would enable either doubling of load or a significant increase in acceleration while hauling a single container, even if the tow speed could not be improved beyond the warp five of the *Ohio* class. More significantly, a propulsion system featuring two PB-35E engines would allow the unloaded tugs to be deployed to their assignments much faster – a major advantage for a vessel type intended to compensate for the inflexibilities of heavier container tug operations by repositioning empty or lightly laden containers as needed.

Improving of cruise speed by a full warp factor was a real possibility, even if PB-35 had so far failed to exceed warp five in combat starship applications. The powerplant of a warp tug propulsion system, intended to cope with massively varying loads, inherently had excess output capacity of a sort that could never be affordably built into the reactor of a fighting vessel. By the same token, dash speed could also be greatly increased with application of brute power; the usual issues of bottleneck weaknesses in the power chain, wear and tear of systems, or concerns of warp signature were irrelevant to the scenario of brief maximum speed evasion from an attack.

While warp engineers began searching for the optimal way to install and tune the engine pair, work proceeded on the overall design. More onboard space was naturally needed than in the *Ohio*, not just for accommodating the larger power systems, but also for hosting a quartet of cargo handling drones now deemed vital for flexible operations. The saucer thus quickly grew to 85 m diameter and sprouted two trailing segments, each with a hangar for two drones, a fuel tank, an impulse engine assembly, plus mountings for a dorsal warp engine pylon. Between the segments lay a grappling system similar to the *Ohio* one for holding a standard container securely underneath the vessel. A second grappling cradle was mounted at the bow, and a heavy duty manipulator moved on rails along the bow cradle to grab and position one or two containers beneath the ship. The manipulator itself was strong enough to support a single container in flight as well, but it was uncommon to push loads ahead of the tug in this manner.



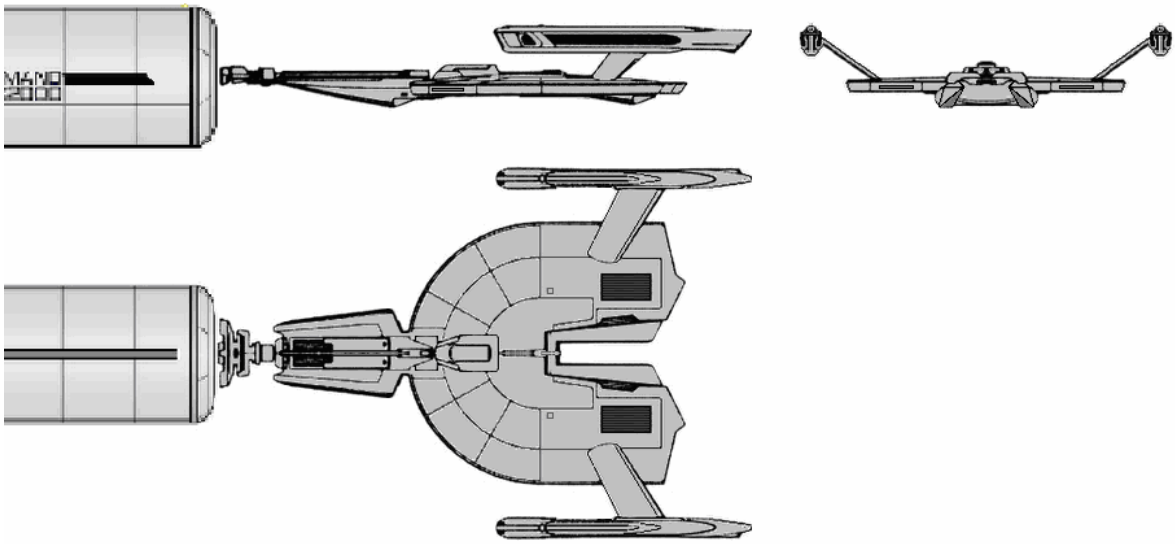
A somewhat frivolous example of the versatility of the Mo'Kal *Mk II. The optimal configuration for the warp field erected by the two LN-61 units remained a classic monospindle projected dead ahead of the vessel, but this broader symmetric arrangement for fully laden containers was also practicable, and demonstrates both the strength of the manipulator arm and the effectiveness of the modern warp field in reducing inertial stresses on the load. The image also provides a twofold answer to why Starfleet never opted to arm the tugs: an engine this capable would certainly make evasion the best combat tactic available, while a cargo configuration like this would severely limit the fields of fire for defensive weaponry.*

Those Sol and Morena yards not tied up with *Remora* and *Hellespont* construction could now start bolting PB-35E nacelles to the tug spaceframes. The warp envelope was gradually expanded during early operations, until warp six cruising, unloaded, could be offered to potential commercial buyers. For a rare once, notable civilian interest emerged, and between 2260 and 2270, hundreds of commercial tugs were completed with either the military superengines or a variety of off-the-shelf alternatives; unit costs for Starfleet dropped as the result. More significantly, PB-35 technology finally reached an affordability plateau of sorts: benefits of mass production began to balance costs of product improvement, maintenance and creeping obsolescence. Support types once produced piecemeal could now have been greatly multiplied in number, but Starfleet concentrated its funds on the most modern types – and the new *Mo'Kal* light tug was a prime candidate. A highly satisfactory fleet of 234 *Mo'Kal* type vessels was in operation by 2268, ninety of these in Starfleet registry.

The versatile little pusher was now Starfleet Merchant Marine's principal container asset. While Logistics Command only ran twenty-eight of the vessels, their double capacity and swift reaction time made them by far the Command's forerunning cargo tug. Their self-loading prowess also contributed to Starfleet shunning any further procurement of the smaller and more limited if also quite a bit more affordable *Ohio* type.

The seventies brought on a change that upset the balance of logistics strategy. Linear excitation warp engine technology was famed for the extra speed and cruise economy it gave to large combat starships, but it also greatly increased the flexibility of warp field generation overall, including the generation of cargo-encompassing fields so important to tugships. When LN-61 became available, Logistics Command immediately saw the immense potential for *Mo'Kal* upgrade. Not only could the tug be made faster in cruise, dash and towing alike, but her warp field could now encompass trains of containers, rather than just firmly grappled pairs. The procurement of a second batch of tugs, originally only intended to feature a stronger and lighter hull and some navigational gear refinements, now was rethought and came to feature a pair of linear warp nacelles, somewhat more widely separated than the original circumferential excitation pair. The two cargo cradles were retained, but rarely put to use. Instead, the powerful warp field created by the new engines could be extended far forward to encompass up to six cargo containers docked into a train – or, say, a hexagonal bundle of seven, not to mention assorted more exotic loads. The field could only compensate for the mass of up to four fully laden containers, though, and this became a standard outbound load for Starfleet's own *Mo'Kal* Mk II tugs. Inward legs usually involved pushing completely empty containers left over from previous

Mo'Kal runs or from priority shipments carried by the faster *Ptolemy* family vessels, demonstrating the principal weakness of the container logistics system.



The Mk II, too, gained civilian users, and production eventually reached 126 hulls. Logistics Command took charge of 78 units, of which 32 were newbuilds. Yet in parallel with this project, an all-new single-nacelle light tug was introduced: the *Kethkin*, a puller rather than pusher design, could match *Mo'Kal* Mk II almost blow by blow with half the warp engine acquisition costs or operating expenses. The newcomer was falling short only on total mass carried (325 rather than 550 kilotons) – and on cruise speed, which the two-nacelle configuration could ramp up to an impressive warp eight (versus the humdrum warp five of the *Kethkin*), guaranteeing *Mo'Kal* a central role in container logistics until the early 24th century. Nevertheless, by the 2290s, several of the twin-engine tugs had been scrapped for fatigue or damage accrued, six had been destroyed in action, and one relegated to training duty.

After Khitomer, Starfleet began liquidating its assets to a wanting civilian market. At that point, the *Mo'Kal* fleet was already reduced to operating in the inner regions of the UFP, a realm where the *Kethkin* was a fierce rival and ultimate winner in Logistics Command's game of favorites. In commercial sales, however, the swift twin-engined tug triumphed. Examples of both originally civilian and ex-Starfleet Mk II tugs survive today in active commercial operations, some with modern engines but many with the original LN-61 pairs.

Achernar

Heavy cruiser
2260-2295

Completed:	13 total:
	3 Starfleet heavy cruisers 10 export variants
Length:	289.0 m
Beam:	127.1 m
Height:	72.6 m
Mass:	690,000 tons

Officers:	43 (Starfleet; figures for foreign users vary)
Crew:	387 (Starfleet; figures for foreign users vary)
Cruise speed:	w 6
Max. speed:	w 8.3 (Starfleet) w 8.0 (export variants)
Endurance:	5 years
Weapons:	<u>Standard Starfleet weapons fit:</u> 6 phaser VII emitters in 3 twin banks, port/stbd of bridge and fwd of ventral sensor array 1 phaser VI emitter on ventral secondary hull (installed after 2292) 2 fwd heavy torpedo tubes w/ 80 torps on dorsal primary hull <u>Standard export weapons fit:</u> 6 phaser VII emitters in 3 twin banks, port/stbd of bridge and fwd of ventral sensor array 2 fwd heavy torpedo tubes w/ 160 torps on dorsal primary hull
Shields:	1-layer conformal forcefield Primary navigational deflector on fwd secondary hull Auxiliary navigational deflectors on fwd primary hull
Laboratories:	2 GP, 2 planetary sciences, 1 astrophysics, 1 life sciences (Starfleet) 3 GP (export variants)
Transporters:	4 GP (6-pad), 3 emergency evacuation (22-pad), 1 cargo; Mk II (export) or III (Starfleet) Starfleet-service *Achernars* brought to Mk IV standard after 2274
Auxiliaries:	4 medium and 2 heavy or special operations shuttles and 2 shuttlepods, 4 work pods; various tactical craft

Ships of historical interest:

USS Achernar / *John Muir* (NCC-1732)

SOURCES:	D TMP, ST3, Franz Joseph (N FJ, ST6) (H own)

In the 2260s, as tensions with the Klingon Empire were reaching a breaking point, Starfleet once again considered equipping its allies with relatively modern ships and weaponry. To ease the strain on the primary frontiers of the cold war, capital ships of decisive strength would have to begin patrols on the flanks of disputed space, in areas where Starfleet bases were few and where local players like the Andesians or the Elasi had a strong foothold. While several such allies had proven unreliable during the last round of weapons exports, a brief round of negotiations and inspection tours by Federation Council Special Committees was enough to guarantee the delivery of warships to six non-member political entities.

Several destroyers and some frigates could easily be lend-leased to the allies, but no large cruisers in the proper performance niche were available: the old *Baton Rouge* variants were too decrepit for this use, the *Constitution* variants too advanced and too employed, and the remaining *Horizon*-era vessels of course little more than gutted hulls. A customized design was clearly needed, and Starfleet teetered between three principal choices: reopening the *Amchitka* production lines (and presumably also somehow upgunning the obsolete design), devising a downgraded *Surya* variant (even though the suitable dockyards were still tied up with Starfleet's own acquisition and maintenance programs), or using the *Constitution* structure as the starting point for a significantly simplified and exportable starship. The latter came to be the preferred export model, when Starfleet realized that it already possessed the know-how and detailed plans of building a low performance, *Constitution*-configuration starship out of existing hull components – not to mention several leftover *Horizon* secondary hulls and an idled production line for destroyer saucers. Ships resembling the initial *Constitution* prototypes could now be easily manufactured: the old problems of warp performance fine-tuning could be ignored and a brute force approach taken instead.

What transformed these cut-and-paste starships into practical fighting machines was the PB-47 warp engine. Although originally intended for frigates, the modern engine had a malleable field and an inherent robustness for greater power levels, and thus gave adequate performance on the export cruisers as well. The PB-47 mod 3 units, in concert with the slightly underpowered *Saladin*-type SBE impulse engines and a battery of six RIN-6 phaser VII emitters and two Racal 'Awalt' Mk 3 torpedo tubes, allowed the ships to fight effectively from warp as well as from sublight speeds. Increased magazine capacity and modern loaders brought the torpedo firepower of these vessels to a respectable cruiser level, despite the low number of tubes. Amidship phasers were also eventually applied on all Starfleet *Achernars*. In turn, laboratories were virtually omitted from the design, and the space was used for enlarged ship's stores, versatile auxiliary command facilities and a secondary sickbay. Auxiliary craft capacity was also significantly greater than in other *Constitution* derivatives, as the engineering arrangements left additional useable volume in the secondary hull. In essence, the ships could double as auxiliary carriers for local defense or assault needs.

In peacetime, the specialized facilities of the ships were put to different use. The *Achernars* were efficient machines for colonial support duties, thanks to their enlarged cargo holds. They could also carry and deploy large numbers of standard and special-environment craft for planetary exploration purposes, compensating for their shortcomings in other exploration modes like independent sensory analysis. The modern PB-47 warp engines proved an economical choice for colonial supply runs or local patrol circuits. Optimized for intense maneuvering, their acceleration curves were commendable, even though they offered endurance and top speed somewhat inferior to the PB-32 system when mounted on heavy cruisers.

Original plans were scaled for a remarkable maximum of 68 vessels, but such a great number of buyers never materialized. Noncommittal astronomical names were initially selected for the 13 ships completed out of remaining *Horizon* and *Archon* spaceframes, even though the buyers usually renamed the vessels at delivery. *USS Achernar* spearheaded the early production batch intended for export customers, ranging from the trusted Andesian Guardianship of the 'southeast passage' (2 units) to the distant Xindi Control in deep Alpha (4 units). As a deal for selling three ships to the Ktarians fell through, causing feelings of embitterment on both sides, *USS Astrad*, *USS Alfr* and *USS Xanthii* were adopted for use in Starfleet proper and given improved transporter and computer systems. Serving in the TacFleet special military response force alongside the advanced *Victory* subclass, the three ships proved elemental in defending against the Xindi incursion from a long-neglected section of the lower coreward Federation border in the early 2270s.

Several other export ships were also gradually reabsorbed into the fleet, in some cases receiving new and more nationalistic names in the process. This practice was begun in 2269, when the formerly Xindi-operated XXS *Naxu Thain*, XXS *Tezanha* and XXS *Sathiyaxa* were reacquired and renamed *USS John F. Kennedy*, *USS Tao Feng* and *USS Surak*, respectively. *USS Achernar* herself became *USS John Muir* after her return from the Rigel front. Somewhat ironically, *USS Sol* never wavered, despite being reassigned from γ Hydra to Lya to eventual (and fitting) Quadrant Zero defense in the colors of the 3rd Fleet.

USS Sol *watching over traffic at the Luna Defense Perimeter in the aftermath of the Probe visit. En route from Vega when the Probe arrived, the* Sol *was saved from neutralizing and reached Earth in time to re-establish order amidst the swarming refugee and aid vessels. For the first two days of the restoration operation, Starfleet was unable to deploy any other space assets apart from small craft, and the capabilities of the* Sol *were stretched to their limits. The versatile cruiser proved her mettle many times over, wiping out any doubts Starfleet might have had about a limited-application vessel of heavy cruiser size.*

While the export customers were largely satisfied with the type, UFP Council soon realized that proliferation of such technology to nations not abiding to the Prime Directive could have disastrous effects. Under the leadership of the newly elected President of the UFP Kenneth Wescott, the Council took on a highly cautious approach towards all military aid. As the Klingon threat receded somewhat after Organia, a gradual campaign of buying back the ships was begun. By 2271, Starfleet once again was in possession of eleven of the thirteen ships, and plans were made for upgrading them into something more useful. While this project, described later under the *Constitution* refit entry, proved something of a failure and was aborted after only four converted hulls, the *Achernars* did perform sterling service in a purely defensive role until the Khitomer cutbacks. None were lost in battle, and the remaining two export ships were recovered intact as well. All ships were removed from service in an orderly manned at the very end of their projected lifetimes; by 2295, the secondary hull of *USS Coromandel* (NCC-1744, ex-*Ekkhaia*, ex-*Sirius*), formerly of the *Southern Cross* (NCC-1376), had enjoyed some ninety years of colorful service.

Okinawa

Light frigate
2260-2299

Completed:	44
Length:	164.2 m (original) 183.0 m (refit)
Beam:	90.0 m
Height:	20.4 m
Mass:	230,000 tons (original) 411,000 tons (refit)
Officers:	12
Crew:	78
Cruise speed:	w 5
Max. speed:	w 7.0 (original) w 8.0 (refit)
Endurance:	2 years
Weapons:	Original: 3 phaser V emitters in single banks fwd, port/stbd of bridge 1 phaser V emitter on ventral secondary hull Refit 2271:

3 phaser V emitters in single banks fwd, port/stbd of bridge
1 phaser V emitter on ventral secondary hull
4 phaser IV emitters in double banks on dorsal secondary hull flanks (select ships)
2 fwd medium torpedo tubes w/ 10-20 photorps on ventral secondary hull

Shields: 1-layer graviton/subspace globular forcefield
Navigational deflector dish on fwd secondary hull
2 auxiliary navigational deflector emitters on bow (original)
Auxiliary avigational deflector emitter on ventral primary hull (refit)

Laboratories: None (standard)
1 astrophysics or astrographics (NCC-1257, 1269, 1285, 1292 after 2289)

Transporters: 1 GP (3-pad), 1 emergency evacuation (22-pad); Mk III (original)
1 GP (6-pad), 1 emergency evacuation (22-pad); Mk IV (refit)

Auxiliaries: 2 work pods

Ships of historical interest:

USS Great Lakes / *USS R.L.Stevenson* (NCC-1281)

SOURCES: (D SFC II, Klingon Academy)
(N SFC II, Klingon Academy)
(H SFC II, Diane Carey, Diane Duane, own)

While the *Achernar* project sought to directly expand Starfleet's reach through export sales, the New Light Frigate initiative of 2260 made use of commercial processes in a less direct manner. The great success of the compact *Procyon*/*Centaurus* corvettes had attracted the attention of several

foreign operators, and many of these had approached Starfleet in order to secure contact with the government team of designers and shipbuilders behind the *Procyon*. It was in Starfleet's interest to moderate the foreign access to such technologies, not to block it altogether. In the early 2250s, downgraded export models were created, with Starfleet having a say in every design aspect and choosing to limit performance and growth potential. Towards the end of the decade, the design was allowed to grow in size, speed and power instead: Starfleet now hoped to turn it into a light frigate for its own use.

Basic *Procyon* elements were retained in the enlarged design, including a potent, centrally mounted antimatter powerplant; a flat layout of a saucer primary hull, aft-extending engineering section and laterally rigged nacelles; and an armament of multiple heavy beam cannon. The combination of a 90 m primary hull, twin SAE impulse engines and two PB-38 nacelles was extremely agile at sublight and swift at warp. There was power to burn from the RMR-8 dilithium-regulated reactor, and two tactical applications to do the burning: one ventral and three single dorsal banks of Type V phasers, and a single Hycor forcefield generator. Essentially, the *Okinawa* (as the inaugural New Light Frigate was named at the October 2260 launch) approached the 'half a frigate' doctrine of the perimeter ships from the opposite direction, being 'twice a corvette' instead and sacrificing a little bit of firepower for superior endurance and versatility.

Starfleet soon found that adding at least one torpedo launcher would be tactically desirable. Versatility in turn suffered from the lack of shuttle support facilities, but adding these would have negated the advantages of the program just as surely as installing a shuttlebay on a *Kiaga* PA ship would have watered down that escalation measure. With the originally chosen standard of equip, and with the perimeter ship program out of the way, the *Okinawa* could be constructed in significant numbers, 44 units being completed by 2265. Four of these were dedicated to training, and featured added crew berthing but commeasurately reduced sensors and analysis spaces. Others saw action in star system defense duty, more or less becoming 'rich man's *Procyon*' at priority theaters.

A trio of Okinawa *frigates – all from the early production run, named after islands of conflict – pulls the formation tight on approach to Task Force D. Few combat units could have afforded outriders of this caliber at the height of the Klingon crisis. During the 2260s, such escorts were a regular sight. Klingon analysts at the time actually emphasized the tactical significance of light frigates over their heavier sisters, due to the latter seldom having time to participate in fleet practice maneuvers.*

Throughout the decade, the *Okinawas* still struggled to become more than system defenders. The levels of Klingon aggression and pirate activity varied unpredictably, and so did the need for defenses – but there was a more or less constant need for fleet outriders and deep space escorts. Such assignments called for dedicated hardware: search for a suitable torpedo launcher went on in parallel with a quest for new engines. Instead of the dash prowess of PB-38, Defense Command now wanted deep space endurance; instead of the affordable reliability of the Mk 13 launchers of the gradually shaping escort fleet, it wanted decisive hitting power. As starships in this category were still being designed for export, Starfleet could once again insert its requests for trying out

various types of hardware. A series of foreign sales scandals seriously hampered this mode of search for optimal hardware, though.

Perhaps this delay was for the better, as in the 2270s Starfleet gained access to all-new propulsion technologies of great performance. Half the *Okinawa* force was recalled for the fitting of LN-23 linear excitation engines that would give them warp 8 dash speed and double their warp endurance. Simultaneously installed would be Mk 14 light torpedo armament, comprising two fast-firing launchers at secondary hull bottom.

The refits were less of a success than Starfleet had expected. Unlike Cochrane Warp Dynamics' LN-61, the competing Pleshun engine was robustly overengineered for high power, high speed applications, none of which would in fact emerge for it. There was too much coil mass, too little emphasis on economy, and subsequently most of the endurance gains failed to materialize. Increased dash speed was achieved at the cost of reduced sublight agility, despite the installation of a heavy duty IMRF system.

Thus not quite capable of independent deep space operations, yet too potent to remain tied down with system defense duty, vessels of this type became integral elements of defense fleets along the antispinward and rimward borders. Essentially serving as agile destroyers, they would accompany cruiser forces on deployments, but rely greatly on starbase and tender support. In return, they would partake in some traffic control and spacelane protection; half the refitted force would in fact be flagged for the FCS. These varied operations put a wide spectrum of strain on the spaceframes and engines. As was the lot of small starships of all designs, the *Okinawa* class was soon facing another round of vitally important overhauls and refits.

Technological development was not to be the salvation for the class, though, but its demise. During its decade of pedestrian performance on the substandard LN-23, modern perimeter ship and corvette designs had rushed past on both sides, and the definition of light frigate had crept up to the level of *Daran* class, leaving the *Okinawa* in definite Defense Command disfavor. The former first-rate fleet outriders mostly found themselves stuck with scouting and survey missions. On such duty, the installation of onboard laboratories on select vessels at least provided an edge over surveillance-tasked corvettes, allowing four of the light frigates to serve on past the 2287 détente cutbacks.

This three-ship of Okinawa *frigates – the* Lake Pontchartrain *(NCC-1280) and* Uvs Nuur *(NCC-1286) from the lake-themed latter half of the production run, plus the* Shikotan *(NCC-1252) – provides interesting contrast to the previous image. The LN-23 nacelles are mounted at a slight anhedral on broad pylons, in a structurally more demanding, warp-dynamically advantageous layout. An external IMRF crystal has been added to restore impulse agility after the warp engine upgrade; less in evidence are the greatly improved sensing and shielding capabilities. Tactically, the vessels still perform much the same mission as their older sisters, in this 2276 fleet engagement deep inside Romulan space.*

Retirement for the veteran *USS Avalon* (NCC-1270) came in 2299; she had not been the last to leave dockyards at Daran V, but could thank an ultimately uneventful career for her longevity. Seven *Okinawas* had been lost during the 2270s adventurism, one in the preceding decade of defensive operations. In broad terms, Starfleet had gotten exactly the sort of gapfiller it had hoped for when initiating production in 2260, and the continuing *Okinawa* operations in the last two decades of the century were an unexpected bonus. With similarly shaped but more optimally configured perimeter ships and corvettes now in abundance, the post-Khitomer Starfleet was happy to donate the surviving light frigate stock to use by UFP research organizations. Individual examples continue to serve in esoteric roles even as of this writing, thanks in part to the excessive robustness of the warp engine that cost them their original career.

Samson

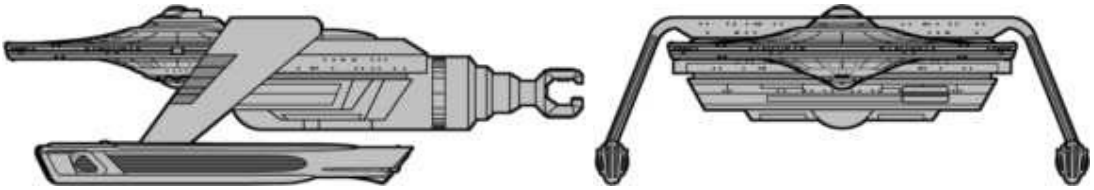
Fleet tug/tender
2261-2298

Completed:	6
Length:	233.5 m (towing rig retracted) 304.2 m (towing rig extended)
Beam:	198.9 m
Height:	72.1 m
Mass:	660,000 tons (original) 752,000 tons (refit)
Officers:	4
Crew:	48 (towing missions) 92 (tender/repair missions)
Cruise speed:	w 6
Tow speed:	w 3-5
Max. speed:	w 8.0
Endurance:	5 years
Weapons:	None
Shields:	1-layer conformal forcefield Primary navigational deflector on portside ventral primary hull Auxiliary navigational deflectors on ventral primary hull
Laboratories:	None
Transporters:	1 GP (6-pad), 2 emergency evacuation (22-pad), 2 cargo; Mk III All ships brought to Mk IV standard after 2274
Auxiliaries:	2 heavy shuttles and 8 work pods

Ships of historical interest:

USS Samson (NCC-3730)

SOURCES: (D FASA)
(N FASA)
(H FASA)



Although immediately following the mediumweight *Master* class tugs of the 2220s-30s in the registry scheme, the *Samson* tugs of the 2260s were among the heaviest in Fleet arsenal. These massive vessels were intended for the tasks too daunting for *Ptolemy* or *Keppler* units to handle: recovery of stranded dreadnoughts and possible future battleships, delivery of heavy orbital outposts and other installations, trajectory correction of asteroids for industrial or military purposes…

In light of the special and specific mission of the ship, it is perhaps surprising that the design was in fact a joint venture between Starfleet-sponsored Chiokis and the wholly commercial Rantura Shipping Lines. A civilian demand did exist for hauling equipment such as ore refineries to the newly opened frontier in as large and preintegrated units as possible. The more complete a factory could be delivered to the distant target, the more quickly the commercial operator could begin making profit. In the untamed depths of the Treaty Exploration Zone, size also translated to security: large factories would be more likely to come under Starfleet protection than small ones.

Between Rantura and Starfleet, a dozen hulls were procured. The forward half of each was a conventional saucer, while the aft extensions enclosed the impulse engine assemblies and main power systems. Beneath the hull at ship centerline was the massive cylindrar pod of the telescoping towing arm, flanked by cargo holds and shuttlecraft facilities to starboard and workshops plus a navigational deflector assembly to port. Empty mass reached a cruiserlike 160,000 tons without the twin PB-31 engines outrigged on arching pylons. Yet the bulk of the vessel could be made to move with just 48 crew and four officers; an additional 44 repair crew were usually carried on tender missions, although more than a hundred skilled specialists could be accommodated if need be.

Perhaps unremarkable in technological terms save for her power and size, the Samson *nevertheless filled an important operational niche as the top-end heavy tug of the 2260s-90s. Numerous research and defense outposts like this R series station were towed in place by the type, and the theoretical capacity also existed for recovering the heaviest Fleet combat units in case of open war breaking out. Thankfully, no* Samson *ever saw combat of any sort.*

The six units registered for Starfleet use were delivered between 2261 and 2264. All underwent an extensive overhaul and warp propulsion upgrade in the mid-2270s, eventually coming to mount LN-64F engines on new, lightweight pylons, and KR16-A customized powerplants in a slightly reshaped aft hull. No armament was ever installed, however, nor were there sensors or computing systems beyond basic navigation gear. The civilian units were delivered in essentially the same original configuration as the Starfleet ones, even though their engine refits took different paths and resulted in a

longer service life. Starfleet was satisfied to operate the *Samsons* till 2298, replacing them with *Doppler* class heavy tugs in a somewhat delayed but highly welcome move at the turn of the century.

Pompey

Destroyer
2262-2292

Completed:	3 converted from *Siva (II)*
Length:	237.7 m
Beam:	160.1 m
Height:	53.4 m
Mass:	603,200 tons
Officers:	44
Crew:	132
Cruise speed:	w 6
Max. speed:	w 8.2
Endurance:	3 years
Weapons:	6 phaser VII emitters in twin banks on dorsal hull 2 phaser VII emitters in twin bank on ventral hull 2 fwd medium torpedo tubes w/ 30 photon torpedoes
Shields:	1-layer conformal forcefield Navigational deflector on structural support 5 secondary navigational deflectors on fwd hull
Transporters:	1 GP (6-pad), 1 cargo, 2 emergency evacuation (22-pad); Mk III All ships brought to Mk IV standard after 2272
Auxiliaries:	1 light shuttle, 2 work pods

Ships of historical interest:

USS Pompey (NCC-506)

SOURCES:	(D FSRC/aridas sofia) (N FSRC/aridas sofia) (H own)

For the first three decades of *Saladin* destroyer operations, there was little need to introduce major modifications to the basic design. Although suffering from maneuvering problems inherent in the single-engine configuration, the class had been built not only to exceed all the performance requirements of the 2220s, but to easily accommodate future upgrades. From the first keel on, space had been set aside for installing a dilithium-regulated total conversion reactor. Extensive weapon and sensor upgrades were also facilitated by a modular construction approach. There was room to spare for unpredicted innovations as well – the Class 1 primary hull had been built to about 170% its initially needed size for this exact reason. A *Siva (II)* vessel from the late 2250s would thus be externally almost identical to a *Saladin* from the early 2220s, yet match the modern *Larson* class in all aspects of performance.

As the 2260s approached, though, time was about to catch up with the veteran design. With destroyers in general disfavor due to de-emphasis on offensive operations, Starfleet was denied the construction of further vessels of *Saladin* design. This served the existing destroyer fleet well, as funds were freed for experimentation that would hopefully restore the *Saladins* to the forefront of

the combat force. Even the most advanced models of the class were separated from that position by shortcomings in warp maneuverability, propulsive reliability and redundancy, directed energy armament and sensor technology. The obvious solution for most of the issues was application of multiple engine nacelles. A move that would have made no sense back when the destroyers served as offensive attrition units was now considered reasonable; in the post-Axanar lull, even the *Saladins* were to be utilized as high-tier 'multipurpose' vessels.

Reassigning *USS Pompey* (NCC-506) from the Klingon border to propulsive research was a simple matter in 2260. Obtaining two PB-32 engine sets presented no problems, either; these were quietly taken from the *Nelson* scoutship spares cache. The deep space engines offered an excellent speed range, endurance and economy, but were slightly less flexible in terms of field shapes than the new PB-47. A conservative configuration was therefore chosen, and the nacelles were attached to a horizontal pylon in approximate *Detroyat* or *Surya* style. Multilinear containment systems were installed largely within the broad midsection of the single-piece pylon box, while vertical power trunks connected the pylon to the engineering control area in the primary hull, ahead of the impulse engines. Between the vertical sections, there was enough room for a hangarette that could accommodate a single light warp shuttle, as well as offer full maintenance facilities and precision tractor beam approach control for the craft.

More significant additions to mission gear were the two phaser VII emitters of FH-11 type installed ahead of the bridge, to bring the total to four twin banks. Auxiliary navigational deflectors were bolstered by two extra emitter dishes, and shielding was upgraded to Hycor CS-60 standard. Such off-the-shelf upgrades held promise of an affordable rejuvenation for the entire destroyer fleet. Two other *Sivas* were taken in for similar modification as the *Pompey* in January 2262 began her propulsive trials.

A convoy of three Ptolemy *tugs… Or two tugs and a destroyer? A curiosity of the* Pompey *class, made possible by the increased power and flexibility of the twin warp drive, was the ability to haul cargo pods. The container grapple had originally been intended to be interchangeable with a torpedo pod or a subspace scanning array, but neither of these ever entered service. These bold if foundering steps in 'multimissionalizing' the destroyers were prelude to a general overhaul of Starfleet capabilities; what the* Pompeys *failed to achieve was made possible in later starship generations mainly through vastly increased average vessel size.*

Largely satisfactory test results nevertheless failed to gain the appreciation of the financiers. In comparison with the similarly configured heavy frigates, the *Pompey* remained a modestly performing starship. Flexible mission profiles still could not be shouldered on the type: laboratories were missing, shuttle facilities minimal, sensor and computing suites limited to combat essentials.

While it was obvious that the type would excel in deep space escort duties – once again a significant part of Starfleet frontier operations – there was no obvious replacement for the original single-nacellers in the offensive-defensive role. Rather than weaken the latter aspect to strengthen the former, Starfleet chose to place its bets on heavy frigate upgrades. The option for further *Pompey* conversions was deferred to indeterminate future.

Increasing Klingon tensions in the latter half of the decade brought Starfleet close to ordering the conversion of ten more vessels. However, the unexpected outcome of the Organian confrontation put such plans on limbo again. The involuntarily adopted 'garrison strategy' on the Klingon border lessened the need for independent medium range combat assets, and major shifts in funding left the entire destroyer fleet high and dry. The three *Pompey* vessels were sent on escort duty, but the great pirate hunt was already winding down; general convoy was discontinued, and the destroyers found themselves riding shotgun to individual Starfleet transports on high-risk routes. In this role, they enjoyed an intriguing advantage: as the only escort vessels in Starfleet service to utilize the PB-32 engine, they could masquerade as *Ptolemy* transports from a distance. Many a raider was lured to his doom by the distinct warp signature, combined with transport-like mass figures – and in some cases even a suitably altered silhouette. The *Pompeys* could accept a ventral cargo grapple, this in turn mounting a single standard cargo container. Rarely utilized for actual cargo runs, the destroyers instead carried lightweight mock containers or armed 'Q-pods', necessary force multipliers when facing the sort of pirates that still dared operate in the late sixties and early seventies.

The *Pompey* and the *Suleiman* (NCC-508) were retired in 2277, the *Sargon* (NCC-504) in 2292. The decommissioning dates were directly tied to PB-32 lifetime. The engine was all but gone from the cruiser and tug/tender fleets already, and casting of new coils had long since been discontinued. Priority to PB-32 spares and maintenance was given to the once-wronged *Nelson* class. There never were any direct replacements for the *Pompeys*; the refitted *Larsons* and new *Cochises* filled the original limited-endurance destroyer niche instead, and the later *Polaris* destroyers emerged from a completely independent project. From the technological viewpoint, there was little to be learned from the circumferential-engined *Pompey* when the linear-engined *Polaris* class was conceived. Operational experiences emphasized the aspects neglected or unachievable in the *Pompeys*, and marked a shift towards true multimission starships.

A rare four-bank phaser salvo focuses on an asteroid in the Duperre belt, as USS Suleiman *hunts down a suspected Romulan penetrator probe. Somewhat underequipped for independent border patrols, the* Pompeys *still were significantly more useful than baseline* Saladins *or* Larsons *in solo picket duty. Many intercepts were scored during the years of Romulan-Klingon mutual conflict, which often swelled across the respective borders to UFP space.*

Deneb / Defender

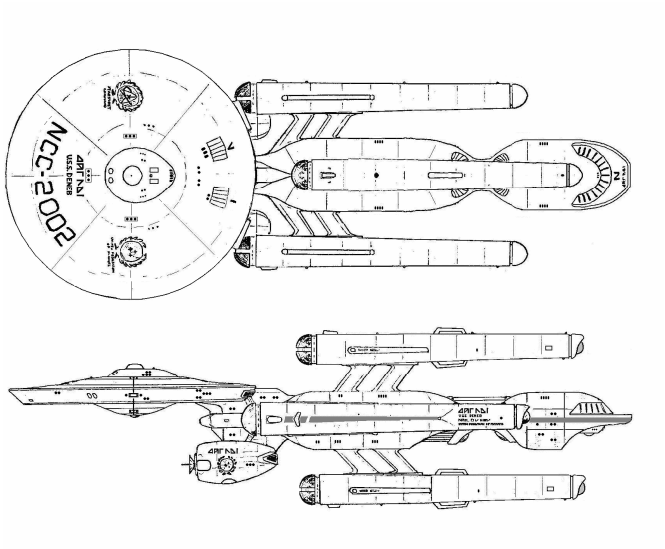
Defender / battleship
2263-2315

Completed:	14 total: 2 *Deneb* defenders 12 *Defender* battleships
Length:	534.2 m
Beam:	215.0 m
Height:	153.9 m
Mass:	4,230,000 tons (*Deneb*) 4,232,000 tons (*Inaieu*) 4,223,000 tons (*Defender*)
Cruise speed:	w 8
Max.speed:	w 11.8
Endurance:	25 years
Officers:	95 (*Deneb* and *Inaieu*) 221 (*Defender*)
Crew:	645 (*Deneb* and *Inaieu*) 1046 (*Defender*)
Weapons:	9 phaser VIII emitters in 3 triple banks on dorsal primary hull 6 phaser VIII emitters in 2 triple banks on ventral primary hull 4 phaser VIII emitters in 2 twin banks on aft secondary hull 4 phaser VIII emitters in 2 twin banks on ventral tertiary hull 4 fwd heavy tubes w/ 180 long-range photorps on connecting hull 2 aft heavy tubes w/ 70 long-range photorps and 8,000 mines on secondary hull
Shields:	3-layer forcefields 2 navigational deflectors on fwd tertiary hulls 8 auxiliary deflectors on fwd dorsal and lateral primary hull
Laboratories:	6 GP
Transporters:	6 GP (12-pad), 6 emergency evacuation (42-pad), 4 large and 8 small cargo; Mk III
Auxiliaries:	8 medium and 3 heavy shuttles and 18-22 work pods; various tactical craft often carried

Ships of historical interest:

USS Defender (NCC-7000), *USS Deneb* (NCC-2002), *USS Inaieu* (NCC-2003)

SOURCES:	(D Diane Duane 'My Enemy, My Ally', 'The Wounded Sky') (N Diane Duane 'My Enemy, My Ally', 'The Wounded Sky') (H Diane Duane 'My Enemy, My Ally', 'The Wounded Sky', own)



The last of the growth designs based on the success of the *Constitution* heavy cruisers owed its existence to the hard facts of astrography. A top speed of warp 8, often pushed to warp 9 in practice, allowed the heavy frigate and heavy cruiser forces to cross a deep space sector in little less than two weeks. The dreadnoughts could traverse the distance in a week. Yet the two extremities of Federation space, Deneb and Orion, lay more than a hundred such sectors away from the core worlds. While Starfleet had a strong presence of nearly a dozen starbases in the Rigel direction and more under construction, the Deneb region was an isolated cluster of eager and dedicated yet militarily weak UFP members and allies. A relief fleet would take nearly five years to arrive, were the defenses there to fail.

Two of the dreadnoughts, *USS Star Union* and *USS Star League*, were initially deployed in the 8th Fleet protecting Deneb and exploring surrounding space. The *Star League* had to be recalled in late 2261 to pacify the Klingon-Orion front in the aftermath of the Ghioghe incident, however, leaving a vast area of space to be patrolled by a single dreadnought and at most five cruisers of the *Constitution* family. Denebians are not known for their tendency to complain: instead, they are famous for acting. And act they did, so that in early 2263, two dreadnoughts of indigenous construct and design were nearing completion at Deneb A V. The ships had been locally funded, and would be locally operated to defend not only the Deneb A system but the entire region as well – a major *tour de force* for a society that had been classified as G- in the Richter scale only half a century earlier.

The Denebians could not afford to think small. Their physique alone called for ships with spacious interiors. While adhering to traditional design solutions proven by Starfleet experience (in lack of native expertise), the engineers multiplied all power and durability figures by a factor of 1.5 at the very least. An immense saucer 215 m in diameter was constructed for each vessel; below and behind the saucer, a secondary hull to match provided space for a radially configured six-core warp powerplant that would feed the four PB-33 nacelles with enough energy to push the ship to warp 11 for several weeks at a time. Two tertiary hulls were mounted side by side below and ahead of the engineering section, and housed the main navigational deflectors and sensor systems. The nacelles branched out of the secondary hull in a staggered cruciform arrangement, the horizontal pair leading on the vertical. Two gigantic impulse engines of local design were mounted at the saucer aft rim, and two only slightly smaller ones at the aft ends of the tertiary hulls.

When not speeding the four million tons of ship through space, the power system would channel energy to eighteen phaser VIII emitters, six on the dorsal and four on the ventral surface of the saucer plus four on the secondary hull and two plus two on the tertiary hulls. Standard *Federation* class targeting hardware and software was used. Also, standard torpedo launchers of that class were carried, in a configuration of two twin forward tubes flanking the connector hull just ahead of the secondary and above the tertiary hull, and two aft tubes firing from the secondary hull stern and also providing for minelaying needs. Total firepower was deemed equal to that of any three starships of other designs, a trio of *Federation* dreadnoughts possibly excluded. Navigational deflectors on the tertiary hulls had to be customized for the huge vessels; auxiliary deflector roundels spotted the primary hull rim and dorsal superstructure. Combat shielding, while relying on a *Federation* layout, received strengthened waveguides so that shield power could momentarily be tripled over that of the *Federations*.

Hanging against a backdrop of the Dumbbell nebula, USS Deneb *superbly performs her primary mission of projecting Starfleet power into deep space. A fleet of just two such vessels might at first not seem like an efficient deterrent, but the high speed at which these vessels spanned the interstellar distances meant that even with very little advance warning, they could stand between an invasion and its target. And like the* Federations*, the* Denebs *were quite adept at fighting at warp speeds, a skill seldom matched by the enemy.*

Given the space requirements of all the weaponry, not to mention that of the mostly Denebian crew, the ships had surprisingly little room for exploration gear. Two shuttlebays in the primary hull usually carried some eight interplanetary shuttles customized for the Denebian physique, while the third (at the aft part of the secondary hull, perhaps best considered a quaternary hull unto itself) held a contingent of fightercraft and service auxiliaries. Six general purpose laboratories were provided, as was standard sensing gear. Six main transporters, each capable of moving twelve Denebians simultaneously, were used for planetary forays or for boarding actions. Seven tractor beam emitters could be fired up to tow disabled ships at impulse or low warp in the depths of frontier space, or to tear apart smaller vessels.

In mid-2263, two commissioning ceremonies were held. *USS Hood* transported admirals Fitzpatrick and Sha'av to the occasion, establishing trans-Federation speed records for several years. In simple, austere ceremonies, the two vessels received Starfleet names and registries, becoming *USS Deneb* (NCC-2002) and *USS Inaieu* (NCC-2003), respectively. Their official designation was one of 'defender', insisted on by the Denebians who found the 'dreadnought' reference obscure and confusing. In fleet operations of large scale, the defenders would yield to Starfleet command. In normal patrol duty, Denebian local defense forces would be in full charge of the vessels.

The 'normal' patrol duty would prove to be anything but. During thirty years of operations, the two ships intercepted a combined total of 1589 spacecraft intruding Federation space, made tentative first contact with sixteen cultures, fought and won 169 solo and 24 fleet battles, and crossed the

length of the Federation four times each, to participate in crisis control in the Klingon or Romulan border and then to return to their assigned patrol areas. Put short, the *Deneb* and the *Inaieu* each saw more action than the rest of the dreadnought fleet combined.

Soon enough, Starfleet was convinced of the worth of the vessels, and was hoping to acquire more. However, the means of doing so did not exist, since the dockyards that had delivered the numbers of cruisers, destroyers and heavy frigates vital for defense could never be adapted for defender production. On this the admirals were in agreement: Starfleet of the 23rd century was a cruiser fleet, not a battleship fleet. The effort of producing the cruiser, destroyer and frigate arsenal had drained Starfleet of resources for a good while, yet even without these vital acquisitions the chances of procuring vessels of defender scale would have been slim. For Starfleet to obtain actual battleships, something big would have to give.

And in 2267, something did, in the small pastoral world of Organia. Due to the intervention of a superior species, the conflict between UFP and the Klingon Empire was put on hold for almost two decades. An antimatter-powered, phaser-armed modern Starfleet had been constructed at great expense, but now the great fleet was virtually idled. Vast resources were freed for use from operating budgets. But for what sort of use, now that Organian influence precluded any application of force in UFP-Klingon politics?

Deep space patrols were one field of military operations not touched by Organian interference. By conservative estimates, some 400 to 600 unidentified space vessels, ranging from mundane smugglers to advanced alien voyagers way out of Starfleet's league, were trespassing Federation space at any given time during the mid-23rd century*. Many considered it fantasy and folly that the Starfleet of 2260s could claim to patrol the deep range, but equally many were convinced that this was the perfect way to utilize the forced truce – ships built as deep space patrol combatants could serve as flying fortresses if and when hostilities with the Empire began anew.

How many battleships could Starfleet afford? None, said the adamant few. Ten, said the most optimistic of the supporters. Finally, construction of eight of the immense vessels was initiated, again at distant fleet yards and not in the cruiser- and frigate- geared core world docks. Rigel bore the brunt of the program, completing three battleships, the *Arizona*, the *Rodger Young* and the *Yamato*, between 2268 and 2269. Vulcans sponsored the construction of two, the *M'Hasien* and the *S'Harien*, at Aldebaran. The *Dataphda* and the *Divine Wind* were completed at Tiburon and Izar, respectively. Yet it was the eighth ship, *USS Defender*, that first received a Starfleet commission at her birthplace, the Denebian yards. This time, the production was completely sponsored by Starfleet, and the original 'defender' type description was transformed into a proper class name.

The vessels were constructed in record time considering their bulk and complexity. They were the only major construction project to come to fruition during the early years of the Organian ceasefire. Most such projects remained theoretical, biding their time while waiting for the political climate to change. The battleships left political concerns behind as they headed for deep space, assuming patrol beyond Rigel, Deneb, Mira and Canopus and also moving as far corewards as they dared through the mists of the Great Barrier. No Klingon ships braved such depths of space, and the combat engagements these ships had were with races the Federation had seldom even heard of before. Success in the mission allowed Starfleet to procure four more of the vessels – the *Missouri*, the *Warsaw*, the *Shushima* and the *Kursk* – by bleeding off funds mainly from destroyer maintenance programs. After that, the impromptu yards that had enabled the production were struck down everywhere except at Deneb, where a maintenance center was established. Amusingly, this

center was never to process a single *Defender*, since the ships were far too durable and self-sufficient to require dockside maintenance attention.

The Yamato *in action. The third starship to hold not just the name but also the registry number 1305 was lost in 2289, in circumstances seemingly devoid of mystery or glory. The ignominous collision with a fueling lighter was later given closer scrutiny, however, and evidence of hostile tampering of flight control software was uncovered. Whether this really contributed to the loss of the vessel remains a matter of considerable dispute.*

Although the later *Defenders* differed from the *Deneb* and the *Inaieu* in details of internal configuration only (accommodating humanoids of average physique), the systematic designation '*Deneb* class' was never applied on them. Some did insist on calling them defenders, for they were no closer to the historical description of battleship than the Starfleet dreadnoughts were. Anybody who has ever witnessed an old Orion battleship in action could testify on the order-of-magnitude difference between these ogres and the largest ships built by the Federation to date. Some believe that the crew of the *S'Harien* did – the vessel went missing on trans-Rigel patrol in 2275, and soon components claimed to originate from her were available on Orion market. However, many believe that this was pure Orion propaganda, and that forces greater than mere piracy sealed the fate of the great ship.

The unfortunate fact was that it was not all that difficult to destroy a *Defender*. The ships possessed superior endurance and speed and an admirable concentration of firepower, but once the enemy managed to engage them at sublight, the weaknesses of the design became apparent. The *Defenders* featured no advanced technology, just tried and true solutions applied on a larger scale. This was the most evident in shielding technology: the shield-tripling mode could not be sustained for more than a few minutes at most, and it would have been suicidal for a *Defender* to stay and fight amidst an enemy fleet for a longer time period, with the enemy undoubtedly concentrating its fire on this largest target imaginable. The *Defenders* simply were no better than battle cruisers or dreadnoughts in fleet battles at close quarters.

There was never any talk about upgrading the *Defenders* with linear warp engines or modern phasers when these technologies became available. The ships were so overengineered from their very birth that no modification could have notably increased their capabilities, even if the Federation could have afforded such an attempt. The mediumweight *Proxima* class did undergo a refit that gave it cruise performance on par with the *Defenders*, and an edge in dash speed; an improved array of main phasers brought firepower to battleship standard. This gave Starfleet the required boost at the Klingon front and further ensured that the vessels of the deep frontier would remain unaffected by modern developments.

When the Khitomer peace was signed, the *Defenders* still possessed the highest firepower, weapons range and endurance of any Starfleet vessel in operation, easily surpassing even the modern *Excelsior* variants. They could also operate virtually independent of any support organization, their primary endurance-limiting factor being the lifespan of their crew. What they lagged behind in was

shielding, speed and sensor capabilities, all of which were significantly better in the *Excelsiors* that now took over the patrolling of the deep range.

Despite their political palatability, the *Defenders* were all retired by 2315 to comply with the chapters of Khitomer treaty limitations that pitted them against the *Excelsior* and later *Ambassador* classes. As the Denebians had designed and built their ships to last, they were in full working order at the time of their decommissioning. Both still survive in deactivated state, but reactivation would be impossibly complicated and expensive. Parts of the *Inaieu* have been turned into a museum exhibit, mostly visited by Starfleet personnel who now frequent the area. Starfleet presence has grown in strength with the acquisition of piers on Xindi starbases in 2352 and the construction of a proper Fleet starbase facility in the Deneb F system in 2343, even though plans on acquiring a further base on Deneb G IV fell through in 2364. The locals rarely visit the exhibit, which they in their matter-of-fact mentality consider a derelict, unsuitable for recycling and only mildly interesting as a monument of Denebian ingenuity and persistence.

* As of 2375, the figure is estimated at 8,500 unidentified visitors, reflecting both increased Federation volume and surface area, growth of local traffic, and improved detection capabilities – the true figure for the 23rd century, taking into account those visitors not detectable by the technology of the era, would probably have been closer to 1,200-1,400 trespassers. About 8 % of the visitors fall into the category of 'uninterceptables', representing vessels or beings capable of greatly superior speed, evasion or aggression. This figure is expected to drop somewhat within the next twenty years, though, as Starfleet hopes to gain transwarp pursuit capability.

Cle Dan

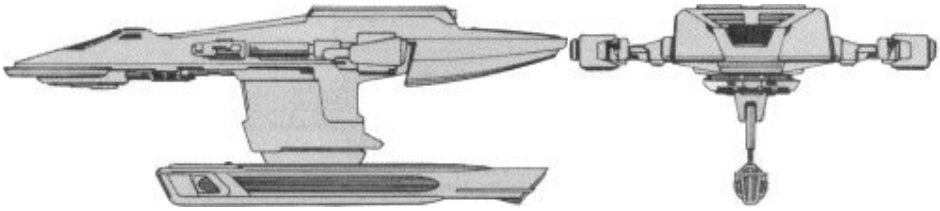
Tender
2263-2297

Completed:	44
Length:	120.3 m (original) 121.9 m (refit)
Beam:	79.9 m
Height:	42.6 m (original) 42.1 m (refit)
Mass:	163,800 tons (original) 148,600 tons (refit)
Officers:	2
Crew:	22
Cruise speed:	w 5
Tow speed:	w 3
Max. speed:	w 7.0 (original) w 9.0 (refit)
Endurance:	1.5 years
Weapons:	None
Shields:	1-layer conformal forcefield Navigational deflector on ventral hull bow
Laboratories:	None
Transporters:	1 GP (6-pad); Mk III (original) 1 GP (6-pad); Mk III (refit)
Auxiliaries:	4 work pods

Ships of historical interest:

USS Cle Dan (NCC-R1200), *USS Lakani* (NCC-R1229)

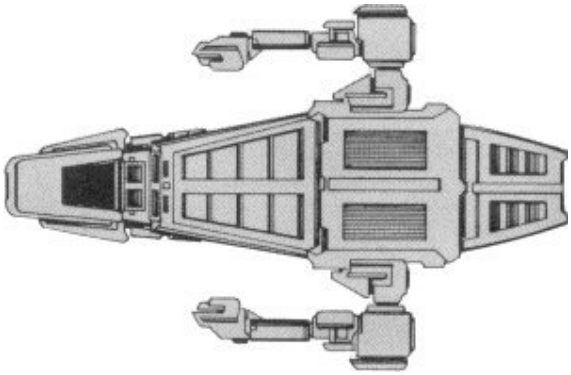
SOURCES: (D FASA)
(N FASA)
(H FASA)



A somewhat belated response to the challenges of field repairs was given in 2263 when the first *Cle Dan* fast repair tenders were fielded. Capable of reaching the operating areas of even the latest deep-ranging exploration vessels and combatants, these nimble little vessels combined the propulsion machinery of an *Ohio* tug with a versatile hull equipped with a complete forward salvage and repair suite of tools and facilities.

At a cruise speed of warp five, the *Cle Dan* could travel with tactical formations and supply convoys alike. A potent impulse system allowed the towing of massive pieces of hardware, including entire starship nacelles, across short distances. Two heavy cranes were fitted laterally amidships, and could reach into twin dorsal bays for spare parts, grab battlefield jetsam or burned-out components from port and starboard alike, or clamp onto an item to be towed above the hull. The bays also provided stowage for an assortment of finer tools, mountable on the four work pods carried. Forward of the bay area were workshops and holds for the most essential types of field repair. At the very bow, habitation was provided for the two dozen crew, along with a combined navigation and repair operations command center whose vast overhead viewports gave direct visual access to the starships in need of assistance.

The *Cle Dan* tenders frequently operated farther forward than other Fleet repair assets, but lacked the endurance and range of large tugs of *Ptolemy* descent, or the volume and complexity of workshops and spares holds on *Abbott* repair ships. They were at their best when able to operate alongside these more potent vessels, which were lamentably few in number. It would be typical for a 2260s or 2270s Task Force to be assigned at least one *Cle Dan* operationally, but other tender assets would usually only deploy when needed.



The view from the control cabin of the portside crane of USS Habat *is nothing short of spectacular, even if the subject is as grim as the aftermath of the Battle of Kannagar. Visible on lower right is the docking bay of the* Habat*, with personnel and workbees ready to secure the impulse reactor nudged in by the crane. Victorious in battle, Starfleet was able to retrieve major pieces of salvageable hardware before scuttling the remaining hulks.*

As soon as LN-61 engines became available, Starfleet started allocating them to the *Cle Dan* force, eventually converting half of the original 44 units to this faster and more maneuverable standard. Additional sensors were also installed at the bow, resulting in a slight increase in total length along with a more than tripled capacity for sorting out a complex debris field, a typical scene of operations for a frontline tender. Other mission gear naturally underwent constant upgrading as well, yet the vessels themselves retained their original systems and utilities until the 2298 retirement and replacement with more capable *Grin'ki* units.

There are few historical entries or footnotes on the exploits of this as such far-ranging and adventurous type of support vessel. Best remembered is perhaps *USS Lakani*, captured intact by the Romulans while supporting Operation Grey Ghost in Rihannsu space.

Bader

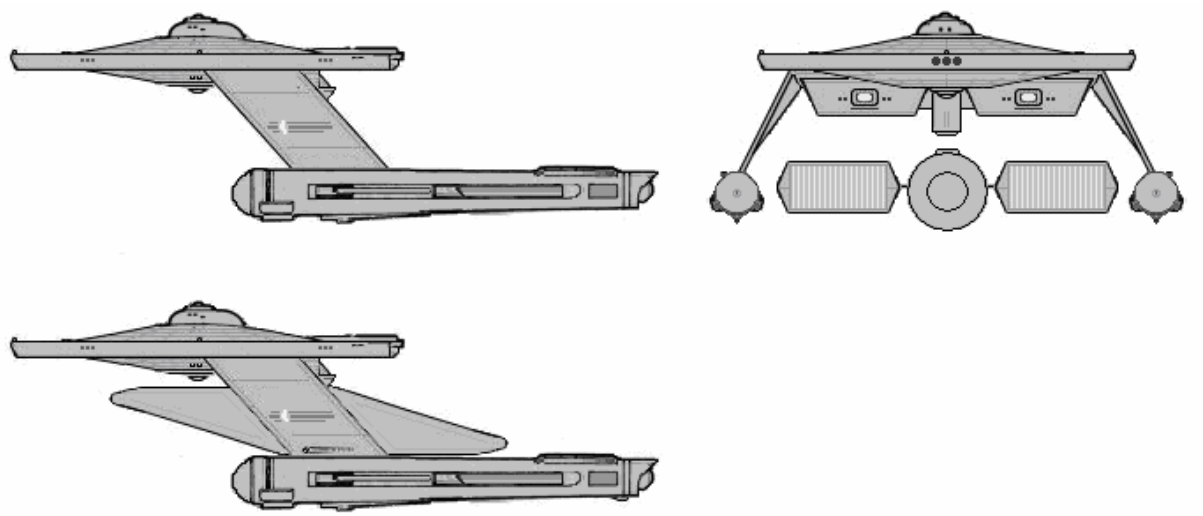
Exploratory cruiser
2264-2274

Completed:	8
Length:	240.0 m (Mk I) 242.6 m (Mk II)
Beam:	150.2 m (Mk I) 152.0 m (Mk II)
Height:	72.3 m (Mk I) 76.5 m (Mk II)
Mass:	609,950 tons (Mk I) 710,100 tons (Mk II)
Cruise speed:	w 6 (Mk I) w 7 (Mk II)
Max.speed:	w 8.0 (Mk I) w 9.0 (Mk II)
Endurance:	5 years
Officers:	36
Crew:	124 (Mk I) + up to 30 research staff 132 (Mk II) + up to 30 research staff
Weapons:	4 phaser VI emitters in 2 twin banks on dorsal primary hull
Shields:	2-layer forcefields Navigational deflectors on hull extension bows 3 secondary navigational deflectors on fwd primary hull (Mk I)
Laboratories:	8, in varying configurations
Transporters:	3 GP (6-pad), 2 emergency evacuation (22-pad), 1 large cargo, 2 small cargo; Mk III
Auxiliaries:	4 medium shuttles

Ships of historical interest:

USS Clifton (NCC-1495), *USS Tombaugh* (NCC-1492)

SOURCES:	(D FASA, dimensions corrected) (N FASA) (H FASA)



Throughout the Klingon conflict, Starfleet officially remained committed to the deep space exploration mission. At the earliest sign of the threat receding, Exploration Command assured, resources would again be diverted for long exploratory forays. While the signs in the early 2260s remained as ominous as ever, the surge of low-cost *Achernar* heavy cruisers alleviated the problems at the restless borders. A parallel program was thus put forth for creating similarly affordable vessels capable of deep space survey sorties. For the fiscal period of 2262-66, resources were allocated for completing eight cruiser-sized vessels solely for exploratory purposes.

The exploratory cruisers would be lightly armed and protected, but would still outperform the long-serving *Whorfin* and *Cahuya* vessels in this and other respects. Dubbed the *Bader* class, they were to be based on the proven *Ptolemy* deep space tug design, recently integrated with the PB-32 engine. The *Baders* would receive additional ventral spaces housing exploratory shuttlecraft and survey gear as well as an advanced sensor suite and new conformal TaT MSAT navigational deflectors. The ability to carry a cargo pod would be retained, although the expected primary load would be outsize instrumentation. Issues of affordability soon dictated a transition to the newer PB-47 common with *Achernar* and modern frigates, however; the advantages of the integration work already done on the *Ptolemy* were lost. When the first *Bader* in early 2264 left construction dock, doomsayers predicted performance inferior to both the other PB-47 recipients and the original tug design.

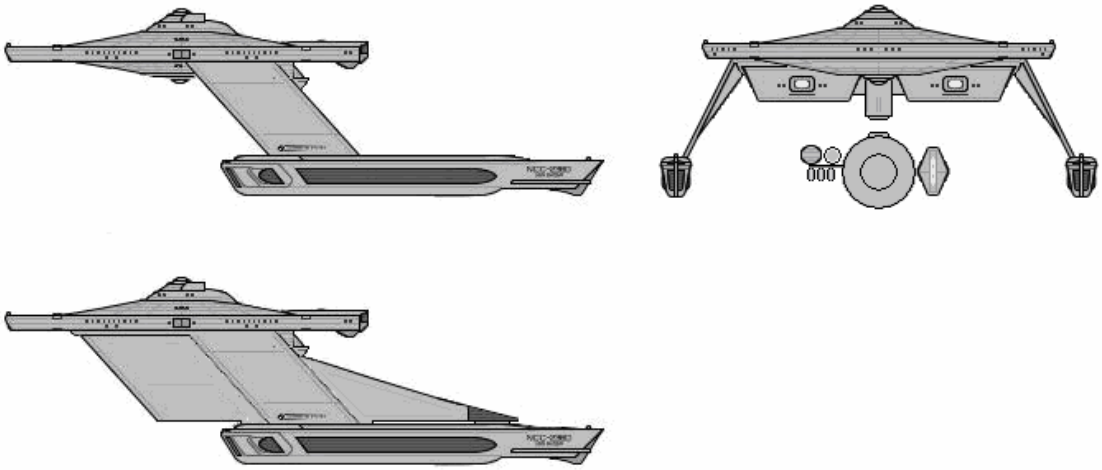
Against odds, the propulsion system of the *Bader* proved a relative success. As the powerplant was optimized for deep space economy rather than peak output, the superb acceleration figures of the new engine could not be exploited, but cruise and dash speeds were established at steady warp 6 and 8, respectively. Mission gear installation proceeded swiftly, and by August, the first vessel sported two pairs of FH-4 phasers, a full set of eight laboratories, and a complement of four medium shuttlecraft. A second hull was nearing completion, and all the remaining keels had been laid.

Yet during the following two years of production, Starfleet's commitment to the exploratory mission began to wane. Despite the growing numbers of combat starships, it was decided that a defensive role had to be imposed on the *Baders* as well. Technologically this meant that FH-4 was supplanted by FH-7 and a new fire control system installed, despite overtasking the secondary power loop and the outdated M-2 mainframe. Operationally, the *Baders* were expected to become part of the scouting force, a role where the lack of acceleration, maneuverability and impulse power proved debilitating. Defense Command's unfavorable experiences with the type put an end to the plan to procure a further eight *Baders*. This proved an unfortunate decision indeed, as the Organian

truce soon reduced the pressures on Starfleet and allowed the *Bader* force to resume its original role of exploration.

In missions to uncontested deep space, nearly every vessel of the class attained fame and recognition. The *Bader*, *Clifton* and *Tombaugh* hosted a series of Sagan Award recipients between 2268 and 2274, while the *Akela* and *Crescent* retraced old survey routes in what amounted to popular media events. After obstruction problems with systems mounted in the centerline cargo grapple, the *Wavell* and *Rover* received vast and ungainly subspace aerials grafted onto their engine pylons for long baseline interferometry work. In effect, all the vessels steered clear of interstellar trouble or the vagaries of truly unexplored space. Thus, while the scientific community at large was elated at the new tool at their disposal, Exploration Command started to lose interest.

Meanwhile, efforts continued to improve on the military potential of the vessels. The *Jones* was caught in the frenzy of linear engine refitting, and received LN-64 units for warp 7 cruising and warp 9 dash. The primary hull was also reworked to modern standards, and at a long last a suitably potent FIE-2 impulse engine was installed. The conversion process was an uneconomical one, however, and there was little practical gain from the improved warp performance. Plans to install torpedo tubes were dropped, and refitting of the remaining seven vessels was first postponed and then abandoned. By 2274, all the vessels had been relegated to transport use, and their crews transferred to more proper scouting vessels such as *Wilkersons* or more practical research units such as *Oberths*.



For the next decade and a half, Starfleet would be well stocked in exploratory cruisers, as its force of *Tikopai* vessels was augmented by the efforts of various multipurpose cruisers and frigates. Yet the ebbs and flows of the Klingon threat kept forcing Exploration Command's course: by the late 2280s, new cruisers dedicated solely to scientific duties once again had to be fielded, to compensate for the dispatching of multipurpose units to the front lines. This time, affordability was sought not by recycling older Fleet designs, but by introducing commercial solutions and keeping ambitions at bay. The results were perhaps more satisfactory than the *Bader* experiment in terms of operability and affordability, but their mark in Starfleet history is a lesser one. The distinct silhouette of a fully rigged *Bader* still epitomizes the era when Starfleet's exploration role last was made subjugate to its defensive one.

Oberth

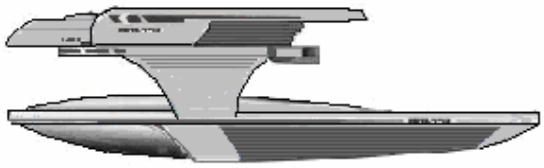
Surveyor / supply ship / tender / medical ship / various others
2266-

Completed:	226 total: 14 *Oberth* science scouts (later surveyors) 3 *Gagarin* tactical scouts (later surveyors) converted from *Oberth* and 1 from *Darwin* 1 *Glenn* supply ship converted from *Oberth* and 28 built 18 *Angueira* medical ships 17 *Pakokku* supply ships 10 *Komarov* tactical scouts (later surveyors) 6 *Gunum* medical ships 15 *Sagan* science scouts (later surveyors) 19 *Eyre* supply ships 46 *Fermi* surveyors 27 *Oahu* tenders 25 *Sakharov* surveyors
Length:	120.0 m
Beam:	60.1 m
Height:	31.9 m
Mass:	110,000 tons (supply ships and tenders, horizontal reactor, typical) 116,000 tons (supply ships and tenders, vertical reactor, typical) 118,000 tons (surveyors, horizontal reactor, typical) 124,000 tons (surveyors, vertical reactor, typical) 121,000 tons (medical ships, typical)
Cruise speed:	w 6 (original) W 6 (adopted after 2319)
Max.speed:	w 7.0 (original) W 8.0 (*Sagan* and later) W 7.6 (adopted after 2319)
Endurance:	2-4 years
Officers:	6 (typical early science ship) 2 (typical late supply ship)
Crew:	57 (typical early science ship) 12 (typical late supply ship)
Weapons:	<u>Standard:</u> 1 phaser V emitter (later in some cases replaced by modern phaser VI) <u>Various other fits, including:</u> 2 phaser VI emitters (*Gagarin*, most *Fermi*, *Oahu*, *Sakharov*) 2 phaser VII emitters (some *Oahu*, *Sakharov*) 1 phaser X emitter (test rigs for cruiser and explorer weapon systems) 1 fwd torpedo tube w/ 10-15 photorps or probes on secondary hull (*Gagarin*, some *Oberth*, *Komarov*) 1 fwd torpedo tube w/ 20-25 photorps or probes on secondary hull (some *Fermi, Sakharov*)
Shields:	1-layer forcefields Navigational deflector on dorsal fwd secondary hull Auxiliary navigational deflector on fwd primary hull
Laboratories:	0-8, with varying configurations; typical ones include 2 GP, 2 planetary survey, 2 life sciences, 1 geology (*Oberth* planetary surveyor configuration) 1 general physics, 2 astrophysics, 1 cartography (*Oberth* stellar surveyor configuration) 1-2 biomedical (*Angueira*, *Gunum* medical versions) None (*Pakokku* supply versions, *Oahu* tender)
Transporters:	1 GP (6-pad), 1 emergency evacuation (18-pad); Mk III (original) 1 GP (6-pad), 1 emergency evacuation (18-pad), 1 cargo; Mk III (*Pakokku*) 1 GP (6-pad), 1 emergency evacuation (18-pad), 2 cargo; Mk III (*Eyre*) All ships brought to Mk IV standard after 2275 Most ships built or brought to Mk V standard after 2284 Most ships later built or brought to Mk VI or Mk VII standard
Auxiliaries:	1 work pod usually carried in equipment/cargo pod

Ships of historical interest:

USS Banting (NCC-838), *USS Grissom* (NCC-638), *USS Lagrange* (NCC-617), *USS Lake* (NCC-618), *USS Pegasus* (NCC-53847), *USS Shepard* (NCC-631)

SOURCES: D ST3
N TNG (SotSF, FASA, LUG)
(H own, SotSF, FASA)



The ingenious *Oberth* small starship was an effort to create a common affordable platform for missions including light supply, mapping, various scientific observations and communications relay laying. Remarkably for such an ambitious project, the *Oberth* actually was an unqualified success.

The simple basic philosophy of the design, often suggested but seldom made practical, was to build a minimum starcraft and attach to her a pod configurable for all the missions. While the concept was ages-old, the history of this particular design began with a study from 2257, performed largely by Centauri starship designers instead of the usual Starfleet R&D bureaux. Thus, the results were not chained by Starfleet's plans for future starship families, and many rather individualistic components were developed for the class. Predictably, Starfleet initially wasn't too happy with the design, supporting its own program of converting *Saladin* destroyers to *Nelson* scoutships and promoting an upgrade to the smaller *Hale* and *Bode* scouts. But after the industrialists of New Athens had pitched the design with endless virtual and subscale models for the better part of a decade, 'leftover' NCCs in the 600 range were finally appointed for an initial prototype batch of four vessels.

Diverting of resources to the high-volume destroyer projects and to the *Nelson* follow-on science scouts still delayed production of the tiny surveyors until late 2265. Built to various engine and equipment configurations, *USS Oberth* (NCC-602), *USS Lagrange* (NCC-617), *USS Lake* (NCC-618) and *USS Copernicus* (NCC-623) began yet another line of science vessels named after space exploration personalities of Earth history. The *Lagrange* had an austere supply configuration, the *Copernicus* was built as a relay layer, and the *Lake* initially demonstrated an angular passenger/cargo module before being converted to the generic surveyor configuration and remaned *Hawking*. The *Oberth* in turn was fitted as a general purpose science vessel by the end of her test runs, and the decision was made to proceed with this configuration for the first production batch in 2266, beginning with *USS Gagarin* (NCC-630).

The core common to all variants was easily recognizable as the modern counterpart of the *Hale* design. A 38 m, two-deck saucer, with an inset bridge module in the middle, unsurprisingly accommodated primary command, control and habitability functions. The half-sunken bridge was surrounded by a ring of escape pods covered with sliding panels, and farther out by bunking for up to 25 crew, plus officers' quarters and galley. The lower saucer deck (designated Deck 3 in deference to the traditional status of the bridge module as Deck 1) could be flexibly configured for up to 60 assorted research personnel or supercargo, full scientific facilities of no less than five general purpose laboratories, sixteen berths for modular-assembly scanning instruments, or hangar arrangements for research and liaison craft and drones.

Deck 4 was a wide, engineering-dedicated level that housed main and auxiliary power systems, power distributors, life support and other vital ship's systems. Several options existed for the horizontal warp core at centerline, including a SEMP 'Robuste' fusion reactor (never used), a RMR-400 or -500 series dilithium system, and the ultimately virtually standard KR05-P. Two midget WD-3 warp nacelles (versions A through G in the various subclasses and upgrades, massing mere 40,000 tons apiece) were attached to the port and starboard flanks of the third deck. Their intercoolers were on the dorsal surface of the deck just inboard of the nacelles. An IP-5 impulse deck hung below the deck aft centerline, next to its twin fusion generator/cooler assembly.

Useable hull volume was maximized by locating the fuel tanks outside, within the oblong ventral equipment pod that could freely be scaled according to mission needs. Fuel was transferred via lines within two curved triangular structural supports holding the pod underneath the saucer. For 2265, the configuration appears needlessly complicated. Yet in 2257, when dilithium power was still a novelty in the small-ship community, the locating of antimatter bunkerage in a jettisonable pod was an understandable engineering solution – especially in a vessel that did not need the compact profile of a warship, and had greater protection priorities for crew and mission hardware than for propulsive systems. Still, these volatile components were the only part of the propulsive system housed outside the main hull, thus leaving most of the pod free for cargo, relay buoys or mission modules. The forward section, covered by instrumentation-transparent material, catered for a wide variety of sensors and scanners in addition to housing the main navigational deflector. Sliding doors protected the three aft compartments and made them accessible from outside by work pods or cranes; usually one workbee was also carried in the aftmost compartment for various cargo handling and repair duties, unless alternate berthing for it was provided in the saucer.

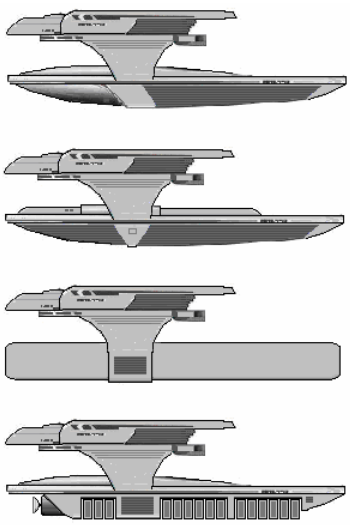
In emergencies, a complex jettison procedure would rid the saucer hull of the ventral pod, its support pylons, and the warp nacelles. Impulse power would then be available for planetary landings, even though the impulse reactor units could also be ejected if needed. Only one *Oberth* is reported to have used the jettison option, however: *USS Giotto* (NCC-19847, *Fermi* subclass) performed a planetary landing after suffering extensive damage in the Cellari Ambush of the Cardassian conflict in 2355, and sat marooned on Cellari III for two months. Incredibly, the ship is credited with the kills of two *Malaki* patrol boats and one *Gondori* tanker and disabling of one heavily damaged and nearly derelict *Galor* Type II cruiser in three separate combat engagements during her four-month flight from behind Cardassian lines. The luring of a *Velgan* class frigate into a minefield near Maynard's Meadow led to yet another, although uncredited combat victory for the ship – some of the alleged exploits of the ship still remain contested by historians. Thirteen of the original 84 crew survived, and Lt. Sannah C. Delacroix, the acting captain, was decorated with the Starfleet Citation for Conspicuous Gallantry and the Kragite Order for Heroism.

The potential for military victories certainly wasn't built into the vessels. A minimal if ultramodern defensive armament of one phaser V emitter on the primary hull and a one-layer forcefield was originally chosen. Defensive measures beyond this were dependent on improvisation. Although never officially stressed, the relay-laying configuration could quite as well be used for laying gravitic mines. In addition, tractor beam machinery was usually mounted inside the forward pod compartment and/or the instrument berth between the impulse nozzles. The original designers had never even dreamed of including a torpedo launcher in the arsenal, yet the Mk 16 introduced in 2275 was compact enough for installation even aboard the small science ships. Three *Oberths* from across the original production run (*USS Gagarin*, *USS Banting* and *USS Cooper*) were fitted with a single bow tube and a magazine for 10-15 shots, and dual-mode software was added to short range sensors. The measure failed to save the *Gagarin* from Klingon boarding in 2279, though. The resulting prisoner-of-war conflict was finally

resolved during the 2287 détente, yet the vulnerability of science vessels to hostile boarding was not; raiding of such vessels remained a prime intelligence source for Klingon forces.

The following *Komarov* subclass received the launcher as a permanent feature, and also carried proper targeting sensors. The experimental *Darwin* conversion, *USS Thagard*, embraced these tactical improvements and added more, mostly as a demonstration of systems integration and miniaturization. She became something of a flagship for the survey fleet, equipped with a large auditorium, shipping an honorary Marine guard and even featuring a botanical garden in the ventral pod.

In lieu of a proper hangar, the ships could be fitted with up to three large rolling-door airlocks on the saucer rim. These featured docking fixtures, and also gave the crew space access in the supply and tender roles, but were mainly used for housing instrumentation in survey vessels. Normal ingress/egress was in all ships except the four prototypes augmented by a six-pad transporter that could be directly connected to dataways on starbases or large starships, facilitating effortless intership transport. This capability was especially useful in the tender and supply roles. No bulk cargo transporters were normally installed in the surveyor models, or even the tenders. However, the *Pakokku* series of supply ships utilized a medium cargo unit for outpost and surface transrep missions, where hardwired transports could not be performed; the improved *Eyre* class featured two units. As the class matured, the transporter systems were dutifully upgraded, ultimately up to Mk VII level.



From top to bottom, USS Oberth*,* USS Lagrange*,* USS Lake*,* USS Copernicus*. Note ventral pod configurations.*

In 2273-76, the ships already completed received new WD-3B nacelles and modern powerplants, and computer systems were thoroughly upgraded. A new paint scheme was also applied. Some missions of the retiring *Monoceros* and *Nelson* scouts were directly given over to *Oberth* vessels, and the need to maintain old destroyers for scout duty was diminished. Most of the *Oberths* were designated science scouts (SS), although the mission class identifier was later also expanded as 'superscout'. The *Komarovs* and torpedo-toting original *Oberth* units in turn were considered tactical scouts (ST) for the duration of the Klingon crisis.

Furthermore, a completely new role was given to the design, also related to the Klingon conflict: a medical support variant of the basic supply model was created with the addition of quick-conversion medical facilities to the new batch of some thirty supply ships (of *Glenn* subclass). Based on

experiences from these 'combi' ships, a subclass of 18 ships was built with a dedicated hospital module in place of the ventral pod, augmented by permanent biomedical laboratory and surgery facilities in the primary hull (*Angueira* subclass). The antimatter bunker in the pod was less of an obstruction than originally feared; its delta and gamma flux was even harnessed to medical purposes in some ships.

The *Sagan* subclass of science scouts broke new ground by taking onboard a Varanasi warp core twice the size of earlier units and housing it vertically inside the ventral pod. The installation required some reworking of the support pylons, exchanging fuel lines for plasma conduits, but proved a great success and a promising solution to the surveyors' deep space performance limitations. A wide range of special variants quickly followed, and ships were converted from one variant to another at a speed that made Starfleet accounting departments give up subclass designations in despair and disgust. The subclass breakdown in the datasheet of this entry should thus be taken as a rough indicator of original status only.

In 2351, after the fourth and supposedly last major lot of surveyors (NCC-19000 onwards, and formally *Fermi* subclass, although seldom thus designated) had been delivered to Starfleet and the number of hulls brought to 195, older hulls were released for private operations, sometimes gaining a new class name (including *Vigilant* surveyors and *Sierra* small craft tenders operated by the FSC). Some were pulled back to Fleet use during the Cardassian war when all Federation supply ship types suffered heavy losses due to the favored Cardassian tactic of cutting all enemy support lines before decisive battles. New tenders (*Oahu* subclass, NCC-31595 onwards) and surveyors (*Sakharov* subclass, NCC-53834 onwards) with the option for slightly heavier modular armament were also introduced in 2348, over a century after the conception of the type and at a time when the border wars were already reshaping Starfleet's conceptual views of surveyors and survey operations.

Externally, differences between late-model *Oberths* are minor, although equipment and powerplant standards vary within broad limits. Some ships have been used as testbeds for modern starship equipment, such as the infamous illegal phase-cloak tests performed by *USS Pegasus* (NCC-53847, *Sakharov* subclass) in 2359. The tests that ultimately led to the destruction of the vessel through mutiny were finally exposed in 2370 and led to the prosecution of Rear Admiral E. Pressman and several Starfleet Intelligence, Security and R&D officials on charges of violating the Treaty of Algeron.

At the moment, Starfleet is slowly replacing the numerous *Oberths* with *Nova* class surveyors and also relegating some of their science duties to larger starships. Still, it is likely that by 2380, more than fifty *Oberths* (mainly *Eyre* supply ships, *Sakharov* surveyors and *Oahu* tenders of NCC-31000 or higher) will still be in frontline service.

Chandley

Strike frigate
2266-2283

Completed:	14 total:
	8 strike frigates Mk I 2 refitted to strike frigates Mk II 6 strike frigates Mk III
Length:	314.9 m
Beam:	262.0 m

Height:	90.1 m
Mass:	673,300 tons (Mk I) 673,600 tons (Mk II) 676,700 tons (Mk III)
Cruise speed:	w 6
Max.speed:	w 8.1
Endurance:	5 years
Officers:	31
Crew:	332 (Mk I) 339 (Mk II)
Troops:	250
Weapons:	6 phaser VII emitters in 3 twin banks on primary hull 2 fwd medium torpedo tubes w/ 40 photorps in ventral primary hull 2 aft medium torpedo tubes w/ 40 photorps in ventral primary hull
Shields:	3-layer forcefields Navigational deflectors on hull extensions 3 secondary navigational deflectors on fwd primary hull
Laboratories:	None
Transporters:	8 GP (6-pad), 8 emergency evacuation/assault (20-pad), 4 cargo; Mk III
Auxiliaries:	Up to 10 assault shuttles, 2 work pods

Ships of historical interest:

USS Hanson (NCC-2309), *USS Monson* (NCC-2302)

SOURCES:	(D FASA) (N FASA, Kevin Dilmore & Dayton Ward 'Foundations') (H FASA, Kevin Dilmore & Dayton Ward 'Foundations', own)

The art of planetary assault has never been close to the hearts of Starfleet strategists. Prior to the Klingon advances in the 2220s, there had been very little incentive for the Fleet to fight its way from orbit to planetary surfaces. Major invasions in the Romulan, Tarn and Khsatriyan campaigns had been preceded by orbital bombardment and establishing of space superiority, and the troops landed only when opposition had ceased. No such thing as a 'minor invasion' had been attempted, not after the disaster at Verillia IV. The way of the Klingon warrior was different: combat was seen as one integral whole, extending from planetary surfaces to deepest space. There was no battle too large or too small for the use of class M terrain to tactical advantage. Starfleet had no flexible response to such a threat; to call in assault transports and shuttlecarriers when the crew of a battle cruiser pillaged a settlement would be inexcusable waste of resources, and far from a timely response.

The *Coventry* frigates were the closest thing to a rapid reaction assault force Starfleet had. Yet they embarked just two platoons of troops during normal operations, while a Klingon cruiser was assumed to carry ten or more, using cryosleep techniques to accommodate the force for extended periods of time. When the Klingons again appeared to be close to pulling their act together in the 2260s, Starfleet acutely needed ships with greater troop capacity. Speed was of essence in more ways than one. The faster the ships were produced, the greater their deterrence value in the political situation. The faster they reached their battlefields, the less chance the Klingon invaders had of digging in or escaping with loot. And the faster they deployed their troops while in orbit, the more likely they would be to rout the surprisingly conservatively, even sluggishly moving Klingon ground forces. On the latter point, the technology of the day provided a new approach: with dilithium energizing and duotronic control, whole companies plus their light vehicles could be deployed by transporter. In 2262, a request for

proposals was sent out for a Transporter Strike Frigate capable of rapidly disembarking eight platoons of troops via transporter, maintaining a cruise speed of warp six, and carrying phaser and torpedo armament superior to that of the *Coventry* class.

The early sixties were a far cry from the desperate times of the 2220s. The major shipbuilding and refitting programs of the forties and fifties had either been completed or funded to completion, and both the budgets and the dockyards thus had slots for 'silver bullet' acquisition programs. By 2264, funds had been secured, plans finalized, and the first four keels laid for the hypermodern Transporter Strike Frigates. Chandley Works Ltd was granted the use of Star Fleet Division's yards at Mars and Titan for this special project, which involved spaceframes far bigger than anything Chandley had produced in the preceding two centuries of operations. What the company excelled in was precision duonetic field engineering, and this was needed for making the troop transporters work seamlessly with shields and warp fields in combat conditions.

Chandley nevertheless chose to play it safe. Pylons of unprecedented length were used in order to efficiently separate the warp coils from the transporter emitters, giving the vessel a height of 90 meters and a beam of 262 meters. The spaceframe proper was by no means small, either. To accommodate the two light companies' worth of troops and equipment, two boxy structures four decks high were added to the stern quarters of a *Loknar* -type Class 1 saucer, flush with the saucertop and thus comprising Decks 6-9. Each held separate accommodation, mess areas and training facilities for each of the four platoons; holds for the units' vehicles and equipment; four troop transporters, each with 20 pads, plus two six-pad GP transporters; and an aft-facing shuttlebay, with a combined standard complement of eight assault shuttles for the deployment of four of the platoons (without their vehicles) in conditions prohibiting transporter operations.

Astern between the shuttlebays was an expanded SBK impulse deck almost three times as powerful as the *Loknar* unit, and necessarily stronger than the *Coventry* or *Surya* engines as well – total idle mass was already 20,000 tons past the *Coventry* mark. Vast arch-like structures over the lateral extensions provided mounting for the transporter emitters, one per each assault transporter for maximum efficiency. Below was a transverse keel housing the main powerplant, primary plasma leads, and a decisive armament of two Mk 3 torpedo launchers per side, one facing forward, one aft. The armament was completed by three twin phaser VII banks on the main hull. Control was by a Fasfax III unit, yet without the FSTR/TAC fire control package of contemporary cruisers. Instead, the TDC-M expert program managed the concerted use of the assault transporters and shields, a task well beyond human response times.

Warp propulsion was ultimately rather conservative and featured many off-the-shelf solutions. The *Loknar Mk II* plasma loop, *Achernar*-standard powerplant and PB-47 engines were all well within their performance envelopes. Cruising at warp 6 and a dash speed of warp 8 kept stress levels in the spindly pylons (and at the Chief Engineer's workstation) within acceptable limits, and allowed joint operations with all modern fleet combatants.

The four inaugural vessels were launched in 2266, and *USS Chandley* (registered NCC-2300, and officially named after the 21st century naval hero, not the company!) commissioned in early December of that year. Four more vessels were completed to the standard within the next two years by Vickers at Mars, another four by Star Fleet Division at Titan. Yet these vessels were launched to a world much changed: the Organian truce had terminated Starfleet Marine operations against the former arch-enemy, seemingly leaving little for strike frigates to do. However, a daring counter-raid by *USS Hanson* (NCC-2309) against raiders from two ostensibly renegade Gorn cruisers in 2269 proved the

worth of the frigates in ship-to-ship combat. Encouraged by the success, Starfleet ordered six more *Chandleys*, now optimized for engaging enemy vessels in space. The Mk III standard was not considered a separate subclass, yet carried the more potent Keindoffer-Klaatsen Mk 4 long range torpedo system, the advanced FSTR/TAC interface, and uprated impulse engines. Production was expanded to involve Andorian yards in addition to the Sol production facilities.

A strike frigate of Mk III standard in a rare multi-ship operation alongside a through-deck cruiser and two heavy frigates during the Xindi Incursion. Typical of the poor coverage of the conflict, the image fails to reveal the exact identities of the vessels in question. The Chandley *displays prominent hull art, an extreme rarity elsewhere in the Fleet, yet the alligator motif (symbolizing the two-realm nature of the vessels) was popular in the strike frigate community and applied on at least three* Chandleys *in the early 2270s.*

A more modest Mk II upgrade to two of the existing eight ships merely increased the size of Marine equipment storage bays at the expense of hangar spaces, and was clearly aimed at a direction opposite from that taken by the Mk III modifications. Boarding warfare nevertheless became the main role for the *Chandleys* for the next decade. They saw little action in the brief Xindi conflict, yet regularly engaged in anti-piracy operations. Towards the end of the seventies, they also began participating in intelligence operations against Klingon forces, raiding lone vessels in disputed space. The grisly fate of the boarding party from *USS Monson* (NCC-2302) in 2269 still fresh in mind, Starfleet initially took no risks, performing extensive scans to reveal booby traps and scuttling mechanisms and to allow them to be disabled. Confidence grew with mounting experience, however. By the early eighties, the *Chandleys* were raiding Klingon ships with deadly speed and efficiency.

As the noninterference of the Organians became more and more obvious, Starfleet again began pondering the use of the successful *Chandleys* in planetary assault. An engine, shield and torpedo system refit was deemed necessary for anti-ship and assault duty alike. The project is described later in a separate entry. Meanwhile, several of the vessels were moved to inactive reserves, to preserve their delicate spaceframes for what certain circles in Starfleet Command already ominously referred to as 'real action'.

All the *Chandley* types suffered casualties evenly: one unit of each was lost between 2269 and 2276 – *USS Baudin* in the campaign of Kastela, *USS Tromp* to the Tholians during the ill-fated 'fact-finding' expedition of 2271, and *USS Williams* at the evacuation of Niri. The class ship survived without a scratch through arduous years of patrol first on the Romulan Neutral Zone, then on the Organian treaty borders. She was in 2275 assigned as an engineering testbed for evaluating Kelvan warp propulsion and structural integrity techniques. Due to the extensive modifications she received in the role, the *Chandley* was a prime candidate for spearheading the refitting program initiated in 2277.

The last unmodified Mk I units were stricken in 2288, and the final Mk II and III ones in 2294. None had seen active service after 2283, however. The concept of transporter assault had been largely outdated by increased shield action in the battlefields, and opposed boardings had become the province of corvette-category starships. The peculiar spaceframes had no applications outside the original mission parameters, and would have required extensive overhauls in any case. While the strike frigates were significant contributors in the major achievements of the late 23rd century, namely the eradication of piracy and the pacifying of the Klingon front, they must be viewed as a passing fad in comparison with the other designs and technologies introduced during those legendary years.

Garneau

Light surveyor / light supply / light tug / salvage tug
2267-

Completed:	292 total: 33 *Garneau* light science scouts (later light surveyors) 18 *Lena* light supply ships 23 *Darwin* light science scouts (later light surveyors) 21 *Fjon* light supply ships 93 *Fisher* light tugs 23 *Clarke* light supply ships 50 *Todega* deep space salvage tugs 40 *Schmidt* deep space salvage tugs
Length:	80.0 m (*Garneau*, *Lena*, *Darwin*, *Fisher, Clarke*) 101.3 m (*Todega*) 104.2 m (*Fjon*)
Beam:	88.9 m
Height:	12.6 m (*Garneau*, *Lena*, *Darwin*, *Fjon*) 21.4 m (*Fisher*) 35.6 m (*Todega*) 44.6 m (*Schmidt*)
Mass:	102,000 tons (*Garneau*, *Lena*, *Darwin* typical) 109,500 tons (*Fisher*) 211,000 tons (*Clarke*) 120,300 tons (*Fjon*) 210,000 tons (*Todega*) 214,300 tons (*Schmidt*)
Cruise speed:	w 4 (original) W 4 (adopted after 2319) W 5 (*Clarke*)
Max.speed:	w 7.0 (original) W7.1 (adopted after 2319) W7.9 (*Clarke*)
Endurance:	6 months
Officers:	3 (typical surveyor)
Crew:	19 (typical surveyor)
Weapons:	None (*Garneau*, *Lena*, *Fisher*, *Clarke*, *Todega*) 1 or 2 phaser V emitters on bow (*Fjon*, *Darwin*)
Shields:	1-layer forcefields Navigational deflector beam on bow
Laboratories:	2 planetary survey, 2 geology (*Garneau*) 1 planetary survey, 1 astrophysics, 1 cartography, 1 geology (*Darwin*) None (*Lena*, *Fjon*, *Fisher*, *Clarke*, *Todega*, *Schmidt*)
Transporters:	1 GP (6-pad); Mk III (*Garneau)*

1 GP (6-pad), 1 cargo; Mk III (*Lena*)
All ships brought to Mk IV standard after 2279
Most ships built (*Darwin*, *Asmodeus*, *Fisher*, *Clarke*, *Todega*, *Schmidt*, *Fjon*) or brought to Mk V standard after 2287
Most ships brought to Mk VI standard after 2320

Auxiliaries: None

Ships of historical interest:

USS Darwin / *USS Thagard* (NCC-652), *USS Garneau* (NCC-641)

SOURCES: (D SFP, FSRC)
(N FASA, SFP, FSRC, own)
(H FSRC, own)

From the very beginning of the *Oberth* design project, there was an intention to produce a lightweight passenger/utility version with fuel tanks mounted directly inside the primary hull – essentially an *Oberth* sans the ventral pod. Civilian organizations were ready to accept the inevitable diminishing of range and endurance resulting from this reconfiguration; Starfleet in turn hoped to compensate by adopting a more economic operating speed. A ship with a comfortable cruising speed of warp four would still perform better than the majority of comparable civilian designs of the era. Commonality with existing Starfleet equipment would be a major plus for Exploration Command: sensor pallets and research modules could be shared with the *Oberths* for missions of planetary and stellar survey.

By 2267, this study had turned into a family of low-cost Class Two vessels, the first of which was a light surveyor dubbed *Garneau* class. The moving of the antimatter pods and deuterium tankage into the main hull took up some 56% of the primary hull internal volume formerly available for accommodation and research facilities. Yet, space was left for somewhat uncomfortably housing a crew of 15-40, as well as for four standard laboratory modules and sixteen sensor berths – contrasting with the eight modules and 32 berths of a typical podded *Oberth*. Weaponry and associated systems were omitted, and the impulse system slightly downscaled. Otherwise, changes were minimal: essentially, all it took to change an *Oberth* into a *Garneau* was to remove the ventral pod and its attachment points and cut a 120 m^3 opening into the saucer to install the fuel tanks, and to replace the bow airlock/hangar with a navigational deflector array.

Translating the simple design into an operational success was equally effortless. Some 34 *Garneaus* were rapidly constructed, mainly at Centauran shipyards, and sent to dilithium-hunting and mapping missions within Federation-controlled but poorly explored space. Many ships sailed out with only one or two laboratories installed, carrying minimal crews, although the full complement would have been two general planetary sciences labs, two geology and mineralogy labs, and some 25 crew and scientists. Most were operated by civilian research and industrial organizations, even if in pursuit of Starfleet goals, and carried NAR registries. Towards the end of the 2270s, the dozen originally under Starfleet registry (NCC-641-651) were also sold to commercial concerns; the eye of storm between decreasing piracy and increasing Klingon tensions lured resource hunters back into the business, and the *Garneau* was the ideal platform for serious prospecting.

The Starfleet surveyor replacement program was economical and efficient rather than fast and ambitious. *Darwin* (NCC-652) light surveyors were improved *Garneaus* with light weaponry and more advanced computer systems and warp engines. Some two dozen were built between 2277 and 2286, but it was soon found out that survey missions in nearby space were no longer of crucial interest. Longer-range surveys in turn required full-sized *Oberth* ships, of which several new batches were built. The by then rather decrepit *Garneaus* were retired and replaced by the *Darwins*, which were then sent to map the resources of UFP core regions to high resolution. The mapping program was so efficient that to this day, no further mineral survey in the area has been needed.

In addition to the surveyors, 18 ships were originally completed without the wiring needed for the laboratories and many of the sensors. Instead, they were configured for simple supply duties and maintenance of subspace communication relays. A medium cargo transporter was installed for ease of supply operations. The *Lena* (NCC-5028) subclass of 2267 was an economic success as well, although the extreme fatigue placed on the small ships forced almost all of them to be scrapped in the 2290s. None were operated by civilians, and the hopes of selling the supply variant to civilian enterprises were squashed by the introduction of a highly economical Klingon-originated design commercially known as the *TongDuj* class. While somewhat larger than the *Lena*, its acquisition cost was one fifth of that of the Federation design, and operating costs only 1.2 times those of the *Lena* subclass. Several variants were quickly fielded, saturating the market despite UFP attempts at placing import restrictions. Between the *Antares* and *TongDuj* variants, little in the way of civilian market was found for Starfleet-designed light or medium transports in the late 23rd century – and sales have been sluggish in the 24th century as well. Starfleet's tendency to overengineer its ships for every possible contingency seems to generally overprice them out of civilian markets altogether.

A more involving modification reintroduced the support pylons of the *Oberths*, this time lacking the plasma conduitry and instead reinforced to carry high structural loads. Extra fuel tanks were installed semi-internally, and the resulting *Fisher* (NCC-F900) light tugs were sent to replace the aging *Ohio* light tugs in Starfleet service. The ships would haul single cargo pods, or sometimes trains of empty or near-empty pods. The subclass of 93 was the most successful of all the *Oberth* spinoffs, and eased the workload on heavier tug designs significantly. The vessels were not decommissioned until the 2330s, by which time the standard cylindrar cargo pod had more or less been retired from all but Starfleet use anyway. No direct successor design was thus needed for the *Fishers*.

The next step was a demonstration of the so far theoretical procedure of conversion between podded and unpodded hull configurations. The *Darwin* was in 2293 equipped with a standard survey pod, her antimatter bunker relocated and her interiors reworked to what amounted to showpiece standard. The resulting vessel was renamed to thematically match the *Oberth* subclass, becoming *USS Thagard*. The conversion process, performed largely on manufacturer expense, was a technological success and resulted in a celebrated starship, but saw no further operational applications.

Also in the early 2290s, two further variants under the general *Garneau* umbrella were introduced. First, the *Fisher* design was in 2292 hastily modified for military use in anticipation of a Klingon offensive, departing rather radically from the original *Garneau* aims. Some 62 *Fisher* hulls were finished to the *Asmodeus* light corvette configuration; the variant is described in Section II of this work.

In 2293-2298, another 21 ships of *Darwin* descent were pressed to light supply duty. The *Fjon* (NCC-5063) subclass was to replace the fatigued *Lena* vessels, joining the heavier *Pakokku* (NCC-5046) and *Krasnoyarsk* (NCC-2350) supply ships in the effort of supporting Starfleet across its suddenly increased regions of responsibility. To keep up with the growth, the *Fjons* were given a stretch: their cargo holds were enlarged significantly by extending Deck 4 aft by almost 40 meters, then up so that it faired smoothly with the saucer hull. The resulting two and a half decks of cargo space were given a large, single-piece dorsal loading door. The new spaces to both sides of engineering systems on Decks 2 and 3 were fitted as workshops, and the rim of Deck 3 on the saucer was modified as well, eliminating the side docking ports and introducing a bow phaser bank. With the ability to carry almost four times the original cargo load, significant supercargo for crew rotation, and tooling for basic *in situ* repairs, the *Fjons* gained practical frontline tender capabilities.

USS Anholt *of* Fjon *class shows off her expanded lines, corresponding to an empty mass increase of some 20,000 tons.*

The official maximum speed of warp 7 was regularly exceeded to meet the demanding schedules, and the manufacturer limit was reset at the significantly faster warp 7.1 on the new scale in 2319, after the multiphasic breakthrough. None of the *Fjons* ever received multiphasic retuning, however; their engines kept pushing what internal diagnostics programs still defined as 'warp 10+'. The last *Fjons* were retired in 2329, and again replaced by higher-endurance *Oberth* derivatives, of *Eyre* subclass.

Some sources postulate a third 2290s subclass, the so-called 'corsair' special operations vessel. Certain discrepancies between observed *Fjon* production numbers and Starfleet documentation suggest that up to eight such vessels might have been completed, with either *Lena* or *Fjon* spaceframes but undisclosed special capabilities. Subclass name *Greer*, mentioned in several documents, may in fact be unrelated to this project, yet is believed to apply at least to a vessel of similar mission profile and general capabilities. While Starfleet has confirmed the existence of other types of corsairs, such as the 2250s-70s *Leonardo* and *Carbonare* classes, major gaps still exist in records pertaining to 2280s-90s Starfleet special operations.

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The following century brought about a major change in the *Garneau* configuration, even if the basic subclass design was retained: double nacelles were installed on both sides for more malleable warp fields. Three subclasses utilized this configuration.

The *Clarke* supply ship was the simplest of the four-nacellers. Basically, she carried *Lena* internal gear, but with expanded fuel tanks, passenger quarters, a communications room and a maximum security stowage facility built into the cargo holds. 'Doubled-up' WD-3F engines on both sides increased cruise speed to modern warp 5 and allowed for dashes up to warp 7.9 in the courier missions that the ships were sometimes called to perform.

The so-called *Todega* deep space tug became the most popular light salvage vessel of the next five decades. Her impulse engines were doubled in power and in the number of nozzles, and a tractor beam and IMRF enveloping generator was suspended on the ventral pylons. The class possessed the capacity to tractor-tow ships up to *Excelsior* size at low warp speeds, yet Starfleet only ordered the design in modest numbers. Its ambitions were set at greater speeds, ranges and survivability offered by the *Mediterranean* class medium tugs. Two Fleet-operated *Todegas* were lost in deep space assignments during the border wars, one to a containment failure in the starship she was trying to recover, one to

high speed debris in a post-battle wreckage field. There was some talk about arming the ships for the war zone, but the level of protection offered would have been minimal. No phasers were ever fitted, nor would there have been hardpoints, targeting systems or even sufficient spare power for them.

The final four-nacelled variant was the *Schmidt* class salvage tug, adding even greater impulse muscle in the form of a dorsally carried propulsion pod. The ventral tractoring system featured more compact field-enveloping generators, and a dedicated autopilot/datalink facilitated use of multiple tugs in the towing of the large modern starships, much in the fashion of the civilian 'superconvoy' operations.

Currently, none of the lightweight two-nacelled *Oberth* variants remain in Starfleet service. A handful of *Todega* and *Schmidt* salvage vessels is kept in active service, and larger numbers in reserve. Many civilian organizations still operate *Fisher* tugs, mainly for insystem cargo ops. Overall, the ships have been replaced in all Fleet roles by heavy *Oberth* derivatives, and they in turn by more modern, custom-built designs like the *Nova* class. Some consider the time ripe for the introduction of a new standardized lightweight starship family similar to the *Garneau* one, however, and major starship design agencies regularly pitch ideas to Starfleet. At the moment, there is no definite Starfleet requirement for such a family, but a major review of operational requirements is due after the analysis work on the Dominion conflict is completed. New economic realities stemming from adoption of replication technology may make it unnecessary or unwise to rely on a family of common-component ships.

Brenton

Cruiser / command ship
2268-2311

Completed:	12 total: 3 Mk I cruisers built in 2268-69 3 Mk II command ships built in 2269-70 3 Mk III cruisers built and 3 refitted from Mk I in 2271-74 3 Mk IV command ships built and 3 refitted from Mk II in 2271-74 3 Mk V cruisers refitted from Mk IV and 1 from Mk II in 2284-2294
Length:	260.4 m (Mk I, II) 267.7 m (Mk III, IV, V)
Beam:	253.7 m (Mk I, II) 242.2 m (Mk III, IV, V)
Height:	55.0 m (Mk I, II) 52.8 m (Mk III, IV, V)
Mass:	662,200 tons (Mk I) 663,500 tons (Mk II) 773,100 tons (Mk III) 766,600 tons (Mk IV) 778,800 tons (Mk V)
Cruise speed:	w 6
Max.speed:	w 8.0 (Mk I, II) w 9.0 (Mk III, IV)
Endurance:	4 years
Officers:	29 ship operations 21 command operations (Mk I, III) 31 command operations (Mk II, IV)
Crew:	Mk I: 349 ship operations 39 command operations

Mk II:
353 ship operations
129 command operations
Mk III:
357 ship operations
39 command operations
Mk IV:
361 ship operations
139 command operations
Mk V:
366 ship operations

Weapons: 4 phaser VII emitters in 2 twin banks port/stbd of bridge on dorsal primary hull
2 phaser VII emitters in 2 single banks flanking dorsal central divide
2 phaser VII emitters in twin bank in dorsal central divide (Mk V)
6 phaser VII emitters in 3 twin banks on ventral primary hull
2 fwd medium tubes w/40 photorps (Mk I, III, V)
1 aft medium tube w/40 photorps (Mk I, III, V)

Shields: 2-layer forcefields
Primary navigational deflector beam on fwd hull
Auxiliary navigational deflectors on ventral hull

Laboratories: 3 signals processing (Mk II, IV)
2 signals processing (Mk I, III)

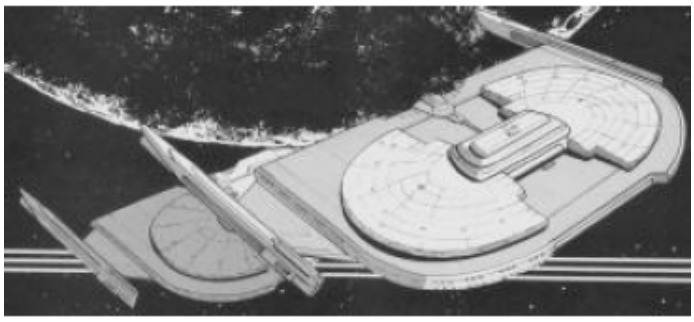
Transporters: 4 GP (6-pad), 3 emergency evacuation (22-pad), 2 cargo; Mk III (Mk I, III)
5 GP (6-pad), 4 emergency evacuation (22-pad), 1 cargo; Mk III (Mk II, IV)
All ships built or brought to Mk IV standard after 2271

Auxiliaries: 4 light shuttles and 4 work pods (Mk I, III)
8 light shuttles and 4 work pods (Mk II)
10 light shuttles and 4 work pods (Mk IV)

Ships of historical interest:

USS Brenton (NCC-1766), *USS Ford* (NCC-2121)

SOURCES: (D FASA, Mk II, IV, V Lee Wood)
(N FASA)
(H FASA, SotSF, Lee Wood)



In this unusual formation of up-engined Brentons*, the top vessel represents the command standard of equip, with the more spacious shuttlebay and without the torpedo launchers.*

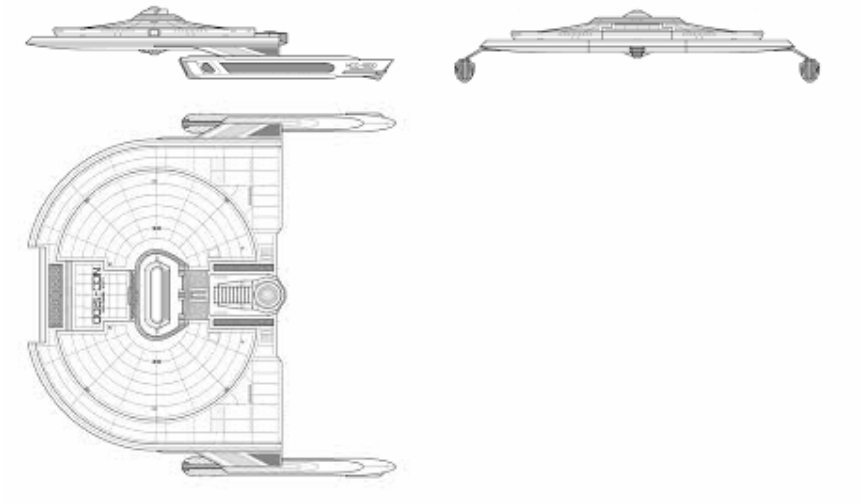
The strategic downscaling of Starfleet military operations after Organia turned the organization both inward and outward in unprecedented ways. Recalling and idling of warfleets freed funds, ships and other resources for expanded exploration operations. At the same time, the new administration reined in the deep space programs, maintaining a noninterventionist, nonaggressive public face while channeling funds for advanced military R&D and looking for ways to make the existing fleets count for more. There was no intention to retire the dreadnoughts, which represented an excellent way to concentrate reserve firepower. Indeed, Starfleet kept asking for more of these 'peace ships', even after receiving full funding for the *Defender* program. The destroyer forces gracefully yielded

to idling as well, despite not having been designed for this mode of 'operations'. But seriously hit were the support forces that no longer had a plausible role in a quayside Starfleet.

Between 2267 and 2270, Starfleet made minimal effort to sustain and none at all to upgrade its support fleet, trusting that commercial designs could be purchased or manufactured if and when the need again arose. It wasn't particularly expensive to keep a tanker idled, either, except perhaps from the commercial viewpoint of lost revenue. Command ships were a completely different matter in both respects: the white elephants of *Unity* class had no commercially available peers, and cost only mariginally less to keep on standby than to operate. Starfleet's foresight in ordering these ships built with general combat capabilities paid off handsomely now.

Yet sending the *Unity* ships to exploration and patrol missions was in contradiction to their doctrine and design. The vessels were intended to double as dreadnoughts, not as cruisers: they were built with fast transit and hectic action in mind, and had endurance and affordability shortcomings as a consequence. They also lacked in some key facilities (such as research laboratories) while having others (such as field hospitals and tactical craft repair shops) as extraneous ballast on a typical cruiser sortie.

Anticipating this problem as well, Starfleet had already decided to provide its next generation of dual capacity command ships with a cruiser rather than a dreadnought alter ego. When the Organian situation emerged, the plans were put to action. A cheaper, significantly less armored single-hull spaceframe was chosen, and research, patrol and colony support duties were emphasized. A generic light cruiser or frigate silhouette was extended in beam to accommodate the main C^3 systems side by side with science labs. A three-level superstructure spanning this 'centerline plug' housed additional command facilities plus flag accommodation; a shuttlebay neatly inserted underneath was ideally capable of serving the liaison needs of a command ship, but could just as well accommodate four exploration shuttles for cruiser duty.



Even a cruiser-configured Brenton *could coordinate a task force up to 30 starships in strength. Ships of this type excelled in general patrol and command duty, however. Combined with scientific survey capabilities, this made them practical guardians of the frontier. In June 2288,* USS Hatton *(NCC-1782) intervened in a starship duel that had apparently spanned centuries – a temporal anomaly spat out two vessels that had opened fire at each other during the Romulan War. The* Hatton *was able to extract the Earth combatant from the fight.*

The broad-beamed design was amply propelled by twin FID impulse engines, giving performance superior to that of the older, SBE-engined *Coventry* vessels of similar mass and design. Warp propulsion was on par with that design, relying on the same PB-47 that propelled the older frigates, cruisers and command ships alike. Yet better things were on the horizon; only three of the dual-purpose ships would be finished initially, while three more hulls would wait for the availability of a modern linear excitation warp drive system of either PB-52 or LN-64 type.

This no longer remained the plan in late December of 2268, when the first hull was launched. Instead of exploiting the command ship option of the Organian Peace Treaty, *USS Brenton* was entered to registry as a regular cruiser (NCC-1766) to meet the requirements of the 'use it or lose it' clauses of the treaty. Unwelcome vacancies in the total number of cruisers were emerging now that the oldest *Baton Rouge* vessels were being withdrawn; their decrepit condition would not have allowed them to be kept in fighting strength even as a contractual ruse. By entering the first three *Brentons* as cruisers, Starfleet could tread water and keep slots open for the new generation of linear-engined fighting vessels that was agonizingly just around the corner.

The first hull to gain command ship status and an accordingly chosen registry was *USS Ford*, NCC-2121. She and her two sisters were considered *Brenton* Mk II cruisers in official records, however, to further bolster the numbers; contrary to the plan, they, too, were launched with PB-47 engines. All the vessels were equipped with Type VII phasers from onset, and enjoyed full operational status. The 'true' Mk I cruisers also received torpedo launchers at hull centerline, with two tubes forward, one aft. This ate into the C^3, transporter and shuttlecraft facilities and made retrofitting of full command gear cumbersome if not impossible, but Starfleet welcomed the variety in standards of equip. The Mk I performed splendidly as a patrol cruiser, while Mk II excelled in support duties. One simulator hull, informally known as *USS Talos* after an at the time topical incident, was also constructed on Earth orbit for training the command crews, lacking propulsion and armament but featuring most of the C^3 systems plus authentic analysis gear for the simulated sensor feed.

When LN-64 became available in 2271, not only did the original six *Brentons* get a swap, but six newbuilds were also ordered. Again, a division to torpedo-armed cruisers and phaser-only cruiser/command hybrids was maintained, resulting in the Mk III and Mk IV standards. Starfleet's goal of six command ships to supplement and eventually supplant the seven *Unities* was thus met, with a bonus flotilla of combat cruisers on the side.

The *Unities* eventually had their command gear transferred, and most were quickly paid off at the conclusion of the *Brenton* program – just in time to miss the Xindi Incursion. In this conflict, forward command outposts were so sorely needed that half-completed cruisers were ushered to the duty. Part of this need arose from a desire for secrecy, however; Starfleet had no legitimate reason to mobilize the purpose-built command ships in advance, even though it was later revealed that SFI had possessed authentic knowledge and forewarning of feline Xindi intentions. Due to the field shape requirements of the broad-beam design, the LN-64 installation on the *Brentons* had not given as great a propulsive boost as had been hoped for. Without prior preparation, the *Brentons* stood no chance of reaching the theater hot spots apace with the erratic slashes of Xindi strikes or the lightning speed of Fleet counterstrikes.

In operations that withstood open scrutiny, Starfleet could manage with the existing resources. There was always room for improvement, though. In the 2273 defense review, the strategic need for command ships was established at ten units, or one per each operational Fleet. Maintaining the balance between cruiser/command and dreadnought/command hybrids, Starfleet ordered the missing

four vessels to roughly the same specifications as the older *Unities*. The types and standards of easily borrowed components had changed in the meantime, so the resulting *Balson* ships were quite different in details. In basic concept, they still followed the *Unity* lead, including the option for drastic upgunning to dreadnought rather than cruiser standard.

The *Brenton* and *Balson* classes continued command ship operations side by side until the 2280s. The primary reason for *Brenton* retirement at that time was not simple overcapacity, political maneuvering or technological obsolescence. Rather, the very mission profile of command ships had shifted with the introduction of starship types capable of networked operations without external central management. Command ships were still essential in complex planetary assault or blockading operations, but compact, mission-customized designs such as the *Etna* class would meet those needs from the early 2290s on. Fleets operating vessels of older stock retained *Balsons* as their command nodes.

The *Brentons* freed from their command obligations were in the process of gradually being turned to full cruiser combatants, with the removal of all command spaces, addition of torpedo tubes, and installation of extra bow phasers, when Khitomer peace put an end to the so-called Mk V upgrade program. All Mk IV newbuilds plus the *Gance* of former Mk II standard had been reworked at that point, and continued service along with the Mk III cruisers. The remaining command variants were withdrawn from service right after Khitomer, but the combat cruisers served with distinction until the *Tomed* incident.

Baker

Light exploratory cruiser / destroyer
2268-2274 (light exploratory cruiser)
2273-2328 (destroyer)

Completed:	40 total: 10 light exploratory cruisers Mk I built in 2268-2269 1 destroyer Mk III converted from Mk I in 2273 8 destroyers Mk IV converted from Mk I and 17 built in 2273-86 13 destroyers Mk IV built in 2291-97
Length:	171.9 m (Mk I) 212.6 m (Mk III, IV)
Beam:	96.0 m
Height:	48.7 m (Mk I) 56.8 m (Mk III, IV)
Mass:	413,000 tons (Mk I) 622,900 tons (Mk III) 624,600 tons (Mk IV)
Cruise speed:	w 6 (Mk I) w 7 (Mk III, IV)
Max.speed:	w 8.0 w 9.0 (Mk III, IV)
Endurance:	3 years (Mk I) 2 years (Mk III, IV)
Officers:	36
Crew:	199 + up to 30 research staff (Mk I) 237 (Mk III, IV)
Weapons:	<u>Light exploratory cruiser:</u>

4 phaser VI emitters in 2 twin banks on primary hull dorsal/ventral bow

Destroyer Mk III:
4 phaser VI emitters in 2 twin banks on primary hull dorsal fwd quarters
2 phaser VI emitters in twin bank on ventral primary hull
2 fwd light torpedo tubes on primary hull ventral bow

Destroyer Mk IV:
4 phaser VI emitters in 2 twin banks on primary hull dorsal fwd quarters
2 phaser VI emitters in twin bank on ventral primary hull
2 fwd medium torpedo tubes on primary hull ventral bow

Shields: 2-layer forcefields
Navigational deflector on secondary hull bow (Mk I)
Twin auxiliary navigational deflectors on dorsal superstructure

Laboratories: 4, in varying configurations (Mk I)
None (Mk III, IV)

Transporters: 4 GP (6-pad), 2 emergency evacuation (22-pad), 1 cargo; Mk III

Auxiliaries: 1 medium or 2 light shuttles or 1 special environment craft (Mk I)
2 light shuttles (Mk III, IV)

Ships of historical interest:

USS Bakker (NCC-1296)

SOURCES: (D FASA, Brad R. Torgersen, TOS comic 'Action of the Tiger')
(N FASA)
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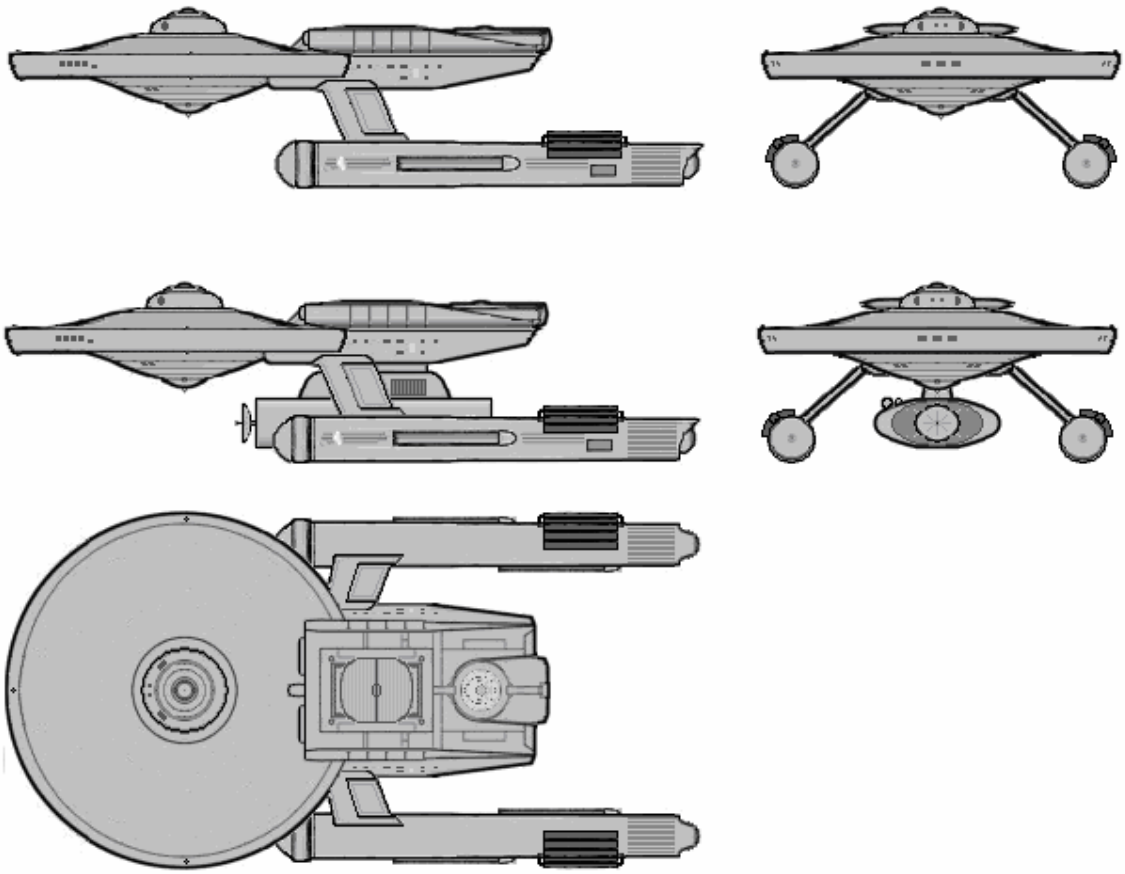


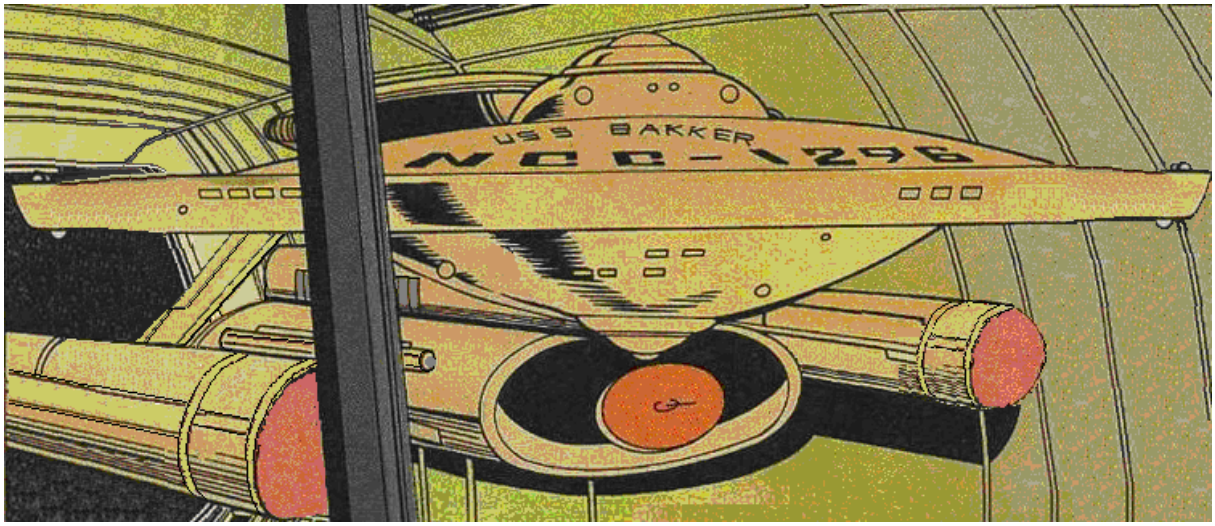
When the *Bader* exploratory cruiser construction program was aborted for lack of military scouting potential in the late 2260s, Starfleet lost an economical way of boosting its sagging exploration

capabilities. Restarting of the program during the Organian peace would not have restored the economy of the concept, as the costs in reproducing the tooling alone would have outweighed the advantages of reusing the existing design. Rather, Starfleet had to seek savings in classic cutbacks, this quite literally meaning a reduction in the dimensions of the exploratory cruiser to be constructed in *Bader*'s stead.

Starfleet's first purpose-built exploratory light cruiser (or light exploratory cruiser, as the designation soon would be formalized) was to utilize relatively few preexisting elements. The command superstructure on the saucer hull was more or less standard stock, save for two navigational deflector dishes taking the place of bow quarters on Decks 2 and 3. However, the saucer itself was constructed to only 96 m diameter, featuring just basic accommodation and support functions, plus two twin banks of bow phasers with excellent fields of fire.

A boxy hull extension astern served a dual role. The lower decks were dedicated to engineering, housing the main powerplant and antimatter stores. The upper half was home to four laboratories, lateral sensor berths, and a relatively capacious shuttle hangar with hinged dorsal doors. The number of transporter units was increased as well, with two six-pad systems in the saucer and two more plus a cargo unit in the aft extension.

For a rare once, a separate IMFR assembly was carried, paired with the nozzle systems of the FID-2 impulse engine. Two PB-45 warp engines, despite showing their age, gave cruiser performance in all respects. The lion's share of mission gear was to be carried between them, on a ventral grapple in *Bader* style, and normally consisted of a flattened cylinder with sensor arrays at both ends and equipment bays in the middle. If need be, the lithe explorer could instead carry a hangar pod for a fuller arsenal of survey craft, or heavy single-sensor modules of varying types, thus undertaking special missions the comparable if propulsively inferior *Keith* and *T'Pari* units were unsuited for.

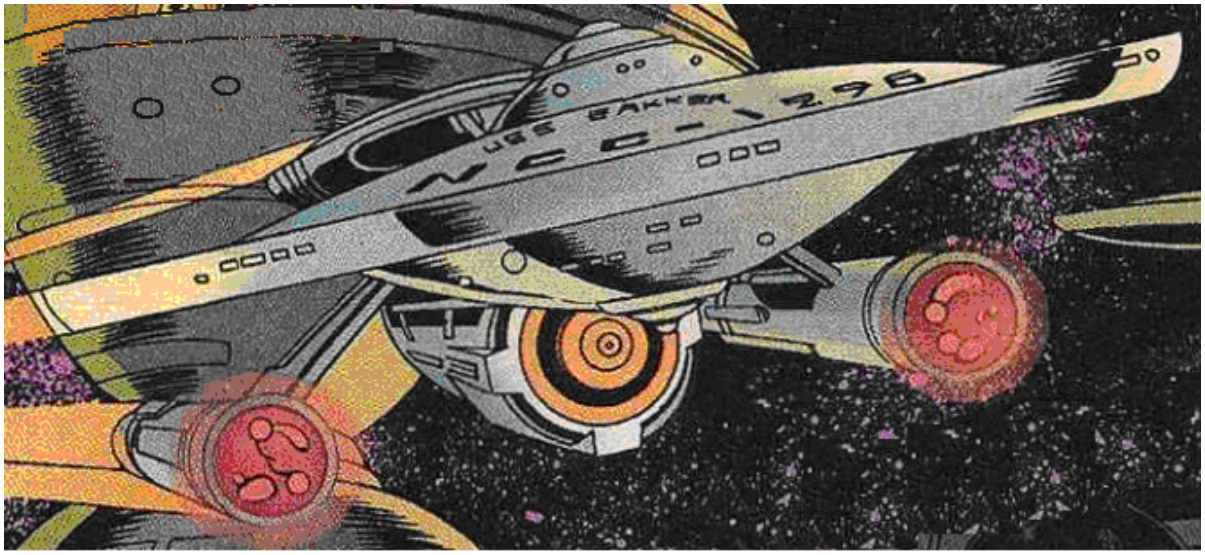


USS Bakker *resting between sorties at Starbase 6. The mission module is about to be floated away; its forward sensor dish is well in evidence, yet the bracings of the starbase observation window obscure the lateral clusters of instrumentation, roll-out subspace antenna surfaces, and the doors to the survey equipment hangar at the spine of the module.*

The 2268 launch of the inaugural vessel appeared to justify all the doctrinal and engineering shortcuts applied on this stopgap type. Delivery was on schedule, on budget, and met the

technological specifications of the time. Nine further units soon followed *USS Baker*, NCC-1290, to mapping missions in border regions now theoretically safe from Klingon harassment.

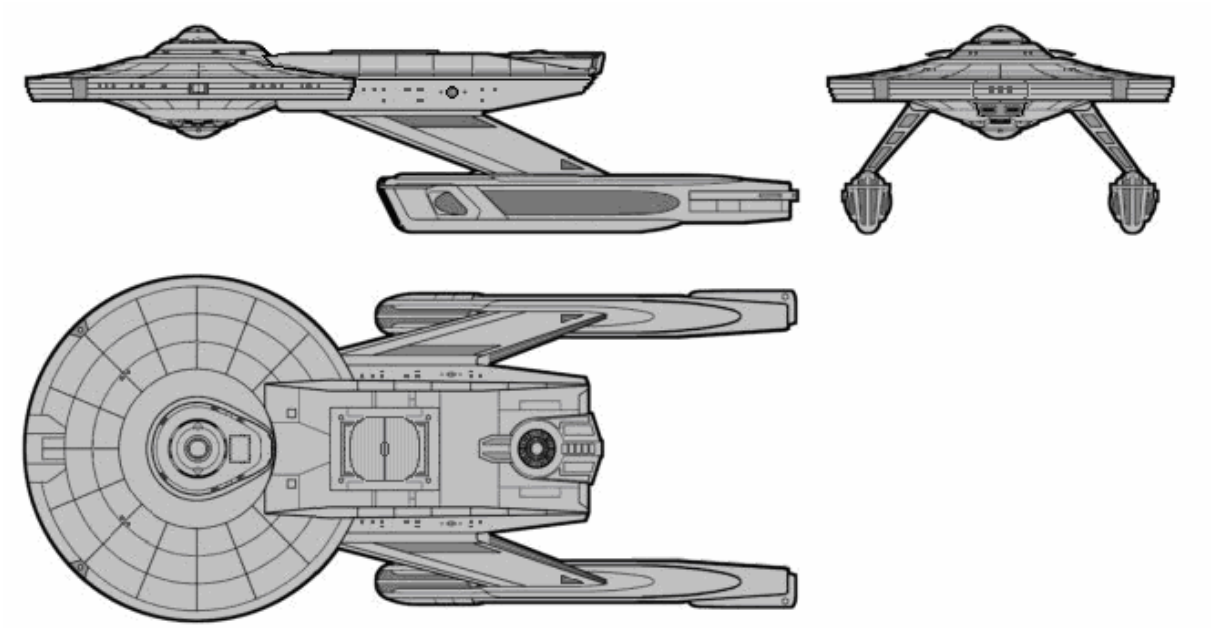
The illusion of peace wasn't quite shattered yet by a 2270 act of aggression against *USS Bakker* (NCC-1296). A criminal endeavor at Starbase 6 saw the temporarily idled research vessel used as a getaway vehicle. The audacious theft might have resembled various Klingon Imperial Intelligence coups of the recent past, but was quickly established to have been the work of petty criminals instead. Swift law enforcement action by Klingon cruisers deprived Starfleet of the petite explorer, but the act had no lasting diplomatic consequences either way.



A later view of the Bakker*, better showing the angled pylons taking the full load of the PB-45 engines. The interchangeable nature of the mission pod is also evident here.*

Forces driving for re-escalation existed independently of such events. A refitting craze gripped Starfleet at the introduction of linear excitation warp propulsion technology, and suddenly every existing platform was seen as a potential basis for a superfast, multipurpose combatant. The remaining flock of light exploratory cruisers was in 2270 deemed to be behind the times on all three aspects of the designation: more substantial armament, protection and propulsion was called for; exploration had to give way to defensive duties; and the proper moniker for a vessel of this size would from now on be destroyer. *USS Knutson* (NCC-1298) got the misfortune of trailblazing the conversion. She received the Setchuen LN-40 warp engine, one of the less successful attempts at a PB-45 successor, and had her aft hull stretched to accommodate the associated powerplant. An accordingly increased number of lateral sensor berths was to compensate for all the survey assets lost with cutting off the ventral mission pod.

The actual mission gear Starfleet hoped to fit aboard was unrelated to survey duty. Paired torpedo launchers were to turn the *Knutson* into the twin-engined counterpart to the projected *Charger* single-nacelle light destroyers. The better endurance and accommodations of the *Knutson* were lost in the conversion process, as the torpedo system took up a lot of room at the lower bow, and the outer hull equipment cavities and consumables tanks were reappropriated for extra shield conduitry and a double-wall structure of somewhat dubious protective worth.



The major changes in Baker *appearance – the new warp engines on their aft-slanted pylons, the lengthwise extension of the aft hull, the cosmetic modifications on the saucer – actually mattered less to her mission capabilities than the internal gutting performed to accommodate the twin torpedo launchers. The bulging, duonetically transparent berths on the aft hull upper flanks at least were retained for possible (but never realized) remounting of scientific sensors.*

The *Knutson* experiment was followed with series production of a slightly different model, with a more potent Mk 9 'Common Claw' torpedo launcher rather than the Mk 14 of the *Chargers*. The class ship spearheaded the modification, a telltale sign of the unhurried schedule of the refitting project: there were more capable destroyer types under consideration already, and the *Bakers* rode largely on inertia now. Two full flotillas were completed by first refitting the eight remaining survey designs and then adding seventeen newbuilds; the first flotilla was completed by 2276, the second by 2282. Setchuen sized its casting of LN-40 coils to fit this procurement program, and then discontinued the type.

In frontline use, the *Bakers* initially added to the confusing multitude of single-flotilla destroyer designs. Their range of applicability was greater than that of the *Chargers*, and few were tasked with escort duty. Instead, border starbases enjoyed the rotation of offensive half-flotillas of *Bakers*, led by modern scouts of appropriate warp performance when available. No dedicated flotilla leader design was created out of *Baker*; and indeed the type would have been somewhat undersized for housing flotilla command gear. Rather, the manageable dimensions encouraged mass production, and the *Baker* eventually became the only late 23rd century destroyer type to be procured to the strength of three full combat flotillas.

At the turn of the century, the class was still at full fighting strength, despite the alarmingly dwindling supply of LN-40 spares - the Khitomer-imposed retirement of *Makin* and *Kolm-An* assault transports had alleviated that problem somewhat, even though their LN-40A wasn't completely compatible with the earlier model. In contrast, the single-nacelled destroyers of the Klingon conflict were disappearing from around the *Bakers*, class by class. Moreover, their replacements represented obvious *Baker* thinking, only now through *a priori* deliberation: the *Polaris* heavy destroyers were twin-engined light cruisers by design, and destroyers only by relative performance, while the humbler spaceframes of the *Hardin* destroyers packed firepower hitherto

undreamed of. With such a splendid heritage, the *Baker* class could well be declared the winner of the messy and confused destroyer race, despite the lack of decisive combat engagements or stories of outstanding heroism.

Makin

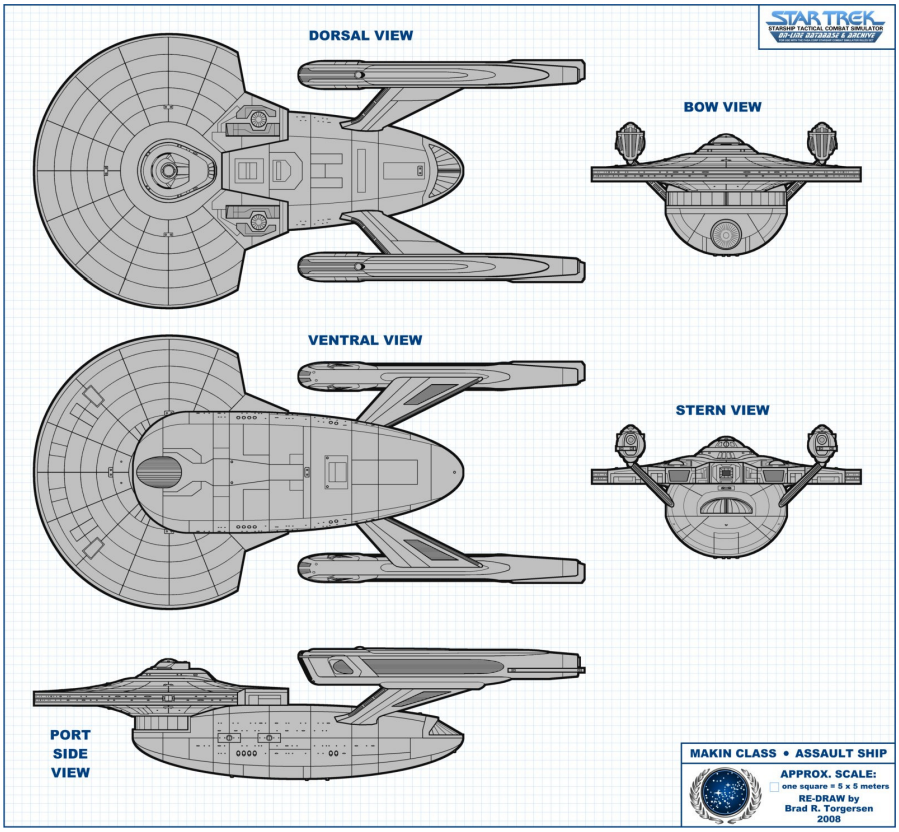
Assault ship
2268-2299

Completed:	68
Length:	252.2 m
Beam:	125.2 m
Height:	60.9 m
Mass:	612,200 tons
Cruise speed:	w 5
Max.speed:	w 7.0
Endurance:	2 years
Officers:	7
Crew:	31
Troops:	1,800
Cargo:	30,000 tons
Weapons:	4 phaser V emitters in 2 twin banks on dorsal primary hull 4 phaser V emitters in 2 twin banks on ventral primary hull
Shields:	1-layer forcefields Primary navigational deflector beam on fwd secondary hull Auxiliary navigational deflectors on fwd primary hull
Laboratories:	None
Transporters:	4 GP (6-pad), 6 assault (20-pad), 2 emergency evacuation (22-pad), 6 cargo; Mk III Select ships brought to Mk IV standard after 2273
Auxiliaries:	2 assault barges

Ships of historical interest:

USS Makin (NCC-2318)

SOURCES:	D ST:ID (FASA, Brad R. Torgersen) (N FASA) (H FASA, own)



One of the many support and logistics type programs that got halted in mid-stride was Starfleet's effort to give its planetary assault fleets the same sort of flexibility that its cruiser-based primary combat force already enjoyed. A fast assault transport had been designed in parallel with the *Chandley* and *Coventry* assault frigates, similarly utilizing a full starship hull but skimping on propulsion to afford decisive numbers to be built. There had been initial momentum behind the program: the saucer for the prototype ship, *USS Makin* (NX-2320), had come courtesy of the earliest Organian cutbacks on frigate production, and a whale of a secondary hull was mated to it during 2268 already. Yet the political convenience of the truce and the expenses of finding a modern alternative to the outdated PB-45 warp propulsion system worked towards a common outcome: the first five vessels otherwise completed were left to languish for several years, only running occasional impulse trials.

Purchasing of the largely untried Setchuen LN-40, ultimately in the customized LN-40A version with an added field attenuator endcap, finally allowed Starfleet to complete the sixth vessel, *USS Sir Galahad* (NX-2330), into a capable mixture of fast transport and credible self-defense combatant in 2274. The bloated secondary hull ovoid of 55 m width and 161 meter length could accommodate on its fifteen decks some eighteen hundred tightly packed Marines and their vehicles, relying largely on six assault transporters for delivering them to their meeting with the enemy. For series production, the manufacturer adopted a modern primary hull configuration that closely resembled the *Daran* frigate hulls, with twin RST 1220 impulse units. Two phaser berths on each saucer surface, to port and starboard, were fitted with FH-2 twin emitters, and the option existed for adding more weapons on various primary and secondary hull berths. The primary hull wasn't provided with the originally planned ventral combat sensors, however; instead, there was a multi-element surface scanning array, and a rudimentary datalink allowed for modern formation-wide coordination of defensive fire.

Predictably, after being brought up to 2270s standards, the *Makin* class gained a 55% increase in unit price, largely due to the R&D expenses of the LN-40A engine. Sixty-eight ships were still funded to completion, allowing Starfleet to deploy well-equipped surface combat units to riskier spots than had been possible with stock transports such as *Cochrane* colonizers, and in greater numbers than by the specialist *Whirlwind* assault ships. Direct frontline insertion of troops was still out of the question, however, since increasing shield activity in surface engagements had by then rendered the transporter-based delivery method impractical. Thus the two TBL-7 assault barges stored in the wide-door shuttlebay saw extensive use, and arrangements were made to ship more barges aboard other starships such as through-deck carriers to give flexibility to the landing operations.

An aft view of USS Gelves*, showing off the wide landing deck and, between the two barges, offering a glimpse of the vast vehicle hangars beneath. Note also the rare LN-40 engines, slightly smaller and less capable but not sufficiently cheaper than the LN-64 series to be practical in the logistics role. The enlarged LN-41 of the tug/tender fleet would represent a better balance of these characteristics.*

One of the vessels was lost in action: the *Nassau* was cut open by a swarm of Klingon-associated attack craft while trying to evacuate Tyson III in 2278, with significant loss of life. The *Pisagua* was eventually utilized in a crew training role, her spacious accommodations providing for both starship operating crew and Marine piloting and deck handling crew trainees. Training rather than combat was typical for most of the other vessels as well: they wore out their engines and spaceframes in hauling troops in wargames or from garrison to garrison. The fatigued *Makins* were finally idled by Khitomer limitations and quietly scrapped during the following decade, being too expensive to be operated in a pure logistics role. For the final two decades of the Klingon crisis, they had kept alive the art of the dedicated assault transport; beyond this point, emphasis would once again move towards barge-based delivery from a vessel of a more conventional transport configuration, such as the *Phobos* and *London* classes described in later entires.

In bow view, these assault transports of Makin *class look deceptively like* Excelsior *heavy cruisers... A* Makin *could beam down her full brigade of 1,800 marines, 9 heavy tanks and 32 light support vehicles in 25 minutes, slightly less rapidly than a* Continent *class vessel. However, when forced to rely on direct physical delivery, she was severely handicapped in comparison with her heavier stablemate. A tactically viable loading of the two available assault barges would mean very piecemeal delivery of the vehicles, spreading it across at least twelve sorties per barge.*