FEDERATION SPACEFLIGHT CHRONOLOGY

TERRAN ORIENTATION

TERRANGLO LANGUAGE EDITION

BY RICHARD E. MANDEL

FIRST HISTORY (PRIME TWO) EDITION
MODIFIED OKUDA TIMELINE

Cover art composited from the work of
Andrew J. Hodges (DY-100) and Industrial Light and Magic (*Excelsior*)

This work is dedicated to Geoffery Mandel, who started it for all of us.

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Notes to self: no more than five major starships per section, ONLY canon/semi-canon/licensed/"reality" craft, OK to use fandom sources for back stories

Foreward

One of the most anticipated *TREK* reference books in recent years is also one that never got published. *Unseen Frontier: Declassified Images from the History of the Federation* promised to be the long-overdue replacement for the much-beloved yet timeworn *STAR TREK Space Flight Chronology* from 1980. It was going to be a "modern" look at *TREK*'s history, and Adam "Mojo" Leibowitz expected much from it. That is, until he ran into the accounting goons at Pocket Books. "*TREK* reference books don't sell," they told him, and pointed to dismal sales figures of Geoffery Mandel's *STAR TREK Star Charts* and Doug Drexler's *Deep Space Nine Technical Manual* to back up their claim. So, it went unpublished, and seemingly with it went any chance of updating the backstory of *TREK*.

Enter one Richard Evan Mandel, former hardcore *STAR TREK* fan in his youth, now a late middle-aged adult with gray in his hair and childhood long gone. A man who loves to write in his spare time, with a passion for research, who had always wanted to write a *TREK* reference book ever since he saw the premiere of the TAS episode "Beyond the Farthest Star" in those far-off days of youth. A man who finally had the spare time to do such a thing, who perceived the gap left behind by Leibonwitz's thwarted effort, and decided to step in the gap as best he could.

So here we are, almost two years later, and the *Federation Spaceflight Chronology* has made the rounds of *TREK* Internet fandom. I honestly never expected the original version to go over as well as it did. It was written by a former hardcore fan for fellow hardcore fans, and as such was out of sorts with "official" franchise canon. You accepted it anyway and praised my effort. For that I am grateful. That is why, when it came time to draft the Second Edition, I decided that this one would be for you: the "canon" fans, those of you who go by the chronology sanctioned by the *TREK* franchise. I appreciated how you accepted my earlier work even though it didn't quite fit your view of the *STAR TREK* universe. Hopefully, this one will be more to your liking.

For better or worse, Michael Okuda's *STAR TREK Chronology* serves as the backbone for this work. It must by necessity, since this work is aimed at fleshing out the *STAR TREK* universe as close to canon as available sources permit. I know there are certain of you on the hardcore fringes of the *STAR TREK* universe that have a major problem with this. I would not be honest if I did not admit I have some reservations about it as well, given its known faults. I intend to address these as I go; nevertheless, I will be using the Okuda chronology for the sake of having some kind of consistency with other so-called "officially accepted" works. I am setting aside my personal preferences in order to produce a work that is consistent with canon, not fandom desire (and mine). That means it includes the *Enterprise* television series, warts and all, despite its major discrepancies and inconsistencies with almost everything *TREK* that came before it.

For those of you who still have problems with this edition of the *FSC*, I can only recommend the original *FSC* and First Editions, which you easily find with your favorite Internet search engine. This Second Edition is not for you. This is for the new generation of *TREK* mainstream fandom. This is for those of you who swear by canon and will always swear by canon no matter what. This one … this one's for you.

R. E. Mandel
(rtrodude@yahoo.com)

Before the Stars

The Terran quest for spaceflight

The Earth is the cradle of humanity, yet mankind cannot stay in that cradle forever.

- Konstantin Tsilokovsky (1903)

It is sometimes difficult for Terrans to grasp the fact that almost three centuries ago their ancestors were only thinking about powered flight. Today the concept of flight is taken for granted. Mankind flies in his atmosphere without a second thought and trips to the stars are commonplace. At the beginning of Terra's 20th century, however, the dream of flight was still very much that: just a dream. It was a myth as old as mankind himself, hearkening back to the ancient legend of Daedalus the craftsman fashioning wings for himself and his son Icarus out of feathers and wax. Humanity is known for its dreams. It is also known for having the knack of turning its dreams into reality.

When two American bicycle shop owners, Orville and Wilbur Wright, left their shop in Ohio for the sandy beaches of Kitty Hawk, North Carolina at the end of 1903 to test something called an *airplane* little did they know how their creation of fabric and wood was about to change the history of mankind. The Age of Flight began with the Wright Brothers and the first successful flight of their frail little airplane. The Space Age, a direct offshoot of the Age of Flight, was about to get underway in a mere four decades. In 1944 the Nazi German government successfully test-fired the A-4 missile, later known infamously by its official military designation of V-2. It was humanity's first true rocket in the modern sense. The success of the V-2 rocket rested on the pioneering research of three different men in three different countries: Konstantin Tsilokovsky of Russia, Robert Goddard of the United States, and Hermann Oberth of Germany. These three men are the godfathers of the early Terran space program. Its midwife was German scientist Werhner von Braun, who designed the V-2, and after World War II would go on to become the chief architect of the early American space program. Often ridiculed by their peers and scorned as impractical dreamers in their day, nevertheless these four brilliant scientists devised the basic theories and technology upon which most of the Terran space effort of the 20th century was based. Without them there would have been no Sputnik, no Vostok, no Gemini or Apollo. America would not have put a man on the moon by 1969 (Terran Old Calendar), nor would the Russians have pioneered the Terran space station, nor would have such revolutionary technologies as the reusable space shuttle and heavy lift vehicle been developed. Without these four men there would have been no Terran space program for decades.

The 20th century was a turbulent time, marked from start to finish by global tensions, political and social unrest, and unprecedented breakthroughs in science and technology. It was one of those rare times in human history when the entire planet went through a paradigm shift in both lifestyle and philosophy. Two world wars and dozens of smaller ones had a lot to do with that, forcing mankind to up his level of technology again and again in rapid succession. Things that were thought impossible at the beginning of the 20th century, such as computers, became an inexpensive commodity by

its end. So it was with the Terran space effort. The visions of the early pioneers in the 1920s and 30s were surpassed beyond their wildest imaginations before the century reached its end.

As with any planetary culture's space program rocket technology paved the way for the rest that would follow. The early efforts of the Germans, which arrived too late near the end of World War II to make their side any difference in the outcome, were capture and eagerly studied by the victorious Americans and Russians. The Russians were on the scene first and got most of the technology and notes. The Americans got the real prize, however. They got Werhner von Braun and his associates. So the official story goes. Whatever else they got, or was possibly spirited away before they could seize it (such as the long-rumored Vrill Program) has never been officially disclosed.

The Russians were first in overcoming almost every major hurdle at the start of the Terran Space Age. They put the first artificial satellite in orbit (*Sputnik I*), they put the first man in space (Yuri Gagarin), the first woman in space (Valentina Tereshkova), launched the first multi-occupant spacecraft (Voshkod), and built Terra's first operational space station (Salyut). It was around this point; however, that the Russian space program failed them. At the risk of oversimplying a complex issue their program had simply become too complicated for its own good. A string of calamites and launch failures over a decade finally resulted in the spectacular catastrophe that was the N-1 manned moon rocket launch test. The resulting explosion not only destroyed the rocket but took out its service gantry and most of the launch complex as well. Successive attempts resulted in equally spectacular explosions. It was at this point that the Russian government finally stepped in and put a temporary halt to the ambitions of Russian space scientists. Not that it mattered by this point anyway, they told their disheartened comrades. The Americans had already beaten them to the moon the year before.

The Americans had started late and a full year behind the Russians insofar as space technology was concerned. Nevertheless they plowed into the fray with all of the gusto and bravado for which their country was known. American President John F. Kennedy, a charismatic politician and a skilled leader to boot (a rare combination), had challenged his people to help their country build a space program that would "put a man on the moon by the end of the decade." His words still carry weight even today: "We do this thing not because it is easy, but because it is hard." He knew that the Americans had the skill, ingenuity, and resources to catch and pass the Russians in the great race to space. Kennedy would not live to see his dream, being slain by an assassin's bullet in 1963; however, the space agency that he founded would make sure his dream became reality. That was NASA, the National Aeronautics and Space Administration and the direct ancestor of UESPA. By the mid 1960s they had successfully duplicated almost every one of the Russian space triumphs. In 1968 they beat the Russians to the moon with the *Apollo* program. The first man to set foot on Luna, the Terran moon, was NASA astronaut Neil Armstrong. Six more missions would follow in the years to come. It was only the beginning of humanity's leap into space.

The biggest problem in getting mankind to the stars was the cost. It was expensive sending up large, one-way rockets that could never be used again. A reusable spacecraft would lessen the costs considerably. Other fanciful dreams such as orbital elevators and tethered satellites were batted around for years. In the end the reusable spacecraft would prove to be the most practical and cost effective approach as far as humanity was concerned. The Americans led in this effort this time around with their OV-100 *Enterprise* class space shuttles, with the Russians playing a close second with their own Buran program. They left the rockets to the Europeans and forged ahead with more advanced technologies. The Russians had pioneered space station technology and were the acknowledged leaders in the field; so naturally they were in charge of the StarLab program. It was the first space station to be built by a joint effort of spacegoing nations, and the first of many such programs on Terra.

It should come as no surprise that with all of the government activity in space commercial industry and private sector efforts wanted their slice of the pie as well. The privately financed *Conestoga One* rocket program was the first such successful effort, followed shortly thereafter by the Allen-Rutan effort *Spaceship One*. The latter was the first privately built reusable spacecraft, on a smaller scale than but in the same vein as the more expensive NASA space shuttle. These ventures were small, however, compared with commercial ventures. It was largely the backing of private corporations that helped fund the construction of NASA's Goddard Moonbase. Their involvement was purely selfish: zero-gee manufacturing techniques could produce a highly profitable return back on Earth. The same was true for the various planetary satellite networks that provided communications and cheap power on a global scale. Finally, their funding of efforts to explore the inner asteroid belt of the Sol System would bring

them financial windfalls the likes of which had not been seen since the petroleum boom days of the turn of the century.

There was also another reason for man to make the move into space. He was not alone in the universe. The fact that other intelligent species existed on other worlds was perhaps the best-kept secret of the governments of Terra in the 20th century. They consistently refused to divulge this information, despite the efforts of such leading scientists as Dr. Hogan Richman, simply for the fear of the impact that such knowledge would have on humanity. The Brookings Report, commissioned by the American government during the Cold War era, had determined that humanity's most probable reaction to a real alien encounter would be worldwide culture shock. Similar studies by the Russian KGB and Britian's U.N.I.T. had come to the same conclusion. Each national government set up one or more secret agencies to collect and collate data on possible and potential alien contacts. Oftentimes even the political leaders of these nations were kept in the dark as to the true nature and extent of such agencies. Their overall plan was to slowly disseminate the knowledge that mankind was not alone in the universe as one might slowly cook a good meal. Too much knowledge too soon and mankind might go into a cultural tailspin from which it might never recover. Too little too late and mankind would not be ready for the day when First Contact would inevitably happen … and it already *had*; at least in officially classified form. Terran leaders desperately wanted their world to be a spacefaring one by the time true First Contact was established. At least then they would be in a better position to bargain and establish something approaching normal relations with their new neighbors in the universe.

By the end of the millennium, and despite the brief horror of the Eugenics Wars, mankind was about to enter what would seem to be a new Golden Age. Due to the technology developed in the colonization of the Moon and Mars the standard of living went up radically over all of Terra. An agricultural renaissance was about to take place in outer space the likes of which had not been seen on Terra in many lifetimes. Cheap electrical power, in the form of beamed microwave from orbiting space satellites, would eventually account for more than 75% of Earth's power needs. Thus, two of the largest problems facing the people of Earth would be solved overnight. Public support for exploration and utilization of space would never be higher. The future of Man was assured … or so it seemed.

Saturn V

Boeing manned lunar rocket
(1967 – 1973)

Specifications as built

Dimensions
- Height: 110.6 meters
- Diameter: 10.1 meters

Mass
- Unloaded: N/A
- Standard: 3,040 GMT
- Full load: 3,150 GMT

Crew complement
- Officers: 3

Top velocity
- Maximum thrust: 10 km/sec (by time of third stage burn)

Endurance
- Standard range: 4-6 days (round trip from Earth to Luna)
- Maximum range: N/A

Armament as built
- Primary weapons: none
- Secondary weapons: none

Class listing

Starship name	Hull no.	Hull laid down	Launched	Status
AS-501 (Apollo 4)	SA-501	24 December 1966	9 November 1967	success
AS-204 (Apollo 5)	SA-204	---	22 January 1968	success
AS-502 (Apollo 6)	SA-502	13 March 1967	4 April 1968	success
AS-503 (Apollo 8)	SA-503	20 December 1967	21 December 1968	success
AS-504 (Apollo 9)	SA-504	---	3 March 1969	success
AS-505 (Apollo 10)	SA-505	---	18 May 1969	success
AS-506 (Apollo 11)	SA-506	---	16 July 1969	success
AS-507 (Apollo 12)	SA-507	---	14 November 1969	success
AS-508 (Apollo 13)	SA-508	---	11 April 1970	part. suc.
AS-509 (Apollo 14)	SA-509	---	31 January 1971	success
AS-510 (Apollo 15)	SA-510	---	26 July 1971	success
AS-511 (Apollo 16)	SA-511	---	16 April 1972	success
AS-512 (Apollo 17)	SA-512	---	6 December 1972	success
AS-513 (Apollo 18)	SA-513	---	19 February 1973	success
Skylab 1	SA-514	---	14 May 1973	success
AS-514 (Apollo 19)	SA-515	---	cancelled	---

Development history

25 May 1961	United States President John Fitzgerald Kennedy announces his country's intention to put a manned mission on Earth's moon (Luna) by the end of the decade in his famous "Rice Stadium speech."
1960-1962	Saturn I, predecessor to the Saturn V, is developed at NASA's Marshall Space Flight Center in Texas (United States) as part of Project Apollo, the United States lunar spacecraft effort. It is the creation of rocketry pioneer Werhner von Braun, who also developed man's first successful ballistic missile (the WWII era German V-2).
10 January 1962	NASA announces plans to build the Saturn V. At this point the rocket is to be built in separate stages, with each stage tested upon completion.
mid-1962	NASA decides on an all-or-nothing testing scheme for the entire rocket; i.e. it will be built and flight-tested as a single launch vehicle, with stage separation/firing as would happen in a regular mission.
1963	Rocketdyne produces the first of the F-1 rocket engines for Saturn V's main (first) thrust stage.
6 September 1966	Rocketdyne's F-1 successfully passes an exhaustive battery of NASA tests and is certified safe for use on the Saturn V.
27 January 1967	A flash fire caused by faulty wiring inside the capsule of Apollo 1 kills all three members of the groud test crew. The Apollo program is delayed by almost a year while the fault is traced down and fixed.
September 1967	NASA's Manned Spacecraft Center in Houston, Texas proposes a series of seven different types of missions for the Saturn V leading up to a full-blown mission to the moon. Two more will eventually be added detailing lunar surface excursion missions.
9 November 1967	Apollo 4 is launched. This unmanned mission, featuring a full *Apollo* payload for test purposes, is NASA's first full-scale test of Saturn V. The test is successful.
December 1968	Apollo 8 is launched. While generally overshadowed by the later Apollo 11 mission, this marked the first time that humans had left their world and traveled to another – in this case their own moon, Luna.
20 July 1969	Apollo 11's lunar excursion module (LEM) *Eagle* lands on the moon, marking the first time humans from Terra have set foot on another world. NASA astronaut Neil Armstrong does the actual honors, uttering the now-famous line, "That's one small step for a man, one giant leap for mankind."
13 April 1970	An in-flight explosion aboard Apollo 13 forces it to cancel its mission and return back to Earth in one of the most dramatic near-disaster events of the United States space program at the time. All three crewmen survive the event.
19 February 1973	Launch of Apollo 18, the last of the Apollo manned moon missions
23 February 1973	NASA astronauts Dickie Jordan and Garrison Smith discover a Slaver stasis box inside the Copernicus Crater not far from the landing site of their LEM. This discovery matches a 24-minute gap in Earth-to-Luna communications at the time due to "sunspot interference." No mention of the discovery is ever made in the official mission logs. This discovery will not be revealed until years later.
14 May 1973	A modified Saturn V is used to put the Skylab I space station in orbit. This marks the last use of the Saturn V as an operational spacecraft.

All surviving Saturn V components are subsequently donated to museums for display. This includes the complete, intact, and never-used AS-514 assembly intended for the cancelled Apollo 19 moon mission. It is the only intact Saturn V to survive the passing of years and can be seen on display at the Federation Air and Space Museum on Terra.

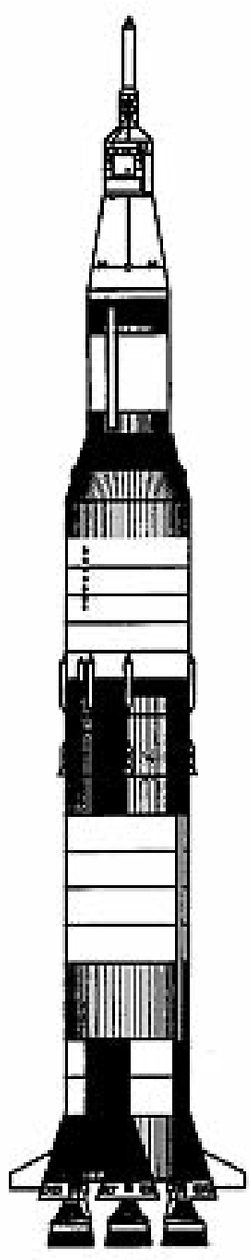
Factoids

All in all the Saturn V program had 14 successful program launches (13 for the Apollo program plus 1 for Skylab). 12 of these are considered fully 100% successful, with no loss of payload. Apollo 13 is only considered a partial success due to an in-flight explosion aboard the Apollo 13 service module, which happened after leaving Earth orbit. The fault was not that of the Saturn V and the crew returned safely to Earth several days later. No other Terran launch vehicle in this era can claim such a consistent record of successful performance.

Two missions, Apollo 6 and Apollo 13, both experienced failures of one of their F-1 engines during initial ground-to-orbit ascent. Their onboard flight control systems had been designed to handle such a contingency, however, and successfully compensated by burning the remaining four F-1 engines somewhat longer to make up for the loss of the fifth F-1. Both missions successfully achieved Earth orbit despite the loss of one of their F-1 engines.

Apollo 18 was the last of the Apollo program manned moon missions. Its chief claim to fame is the discovery of a Slaver stasis box in the Copernicus Crater on Luna, which was the landing site of its lunar excursion module (LEM). Inside was found a flying belt, analysis of which would result in the development of artificial gravity systems a few years later. This discovery was kept secret and was not revealed until "first contact" came about in the mid-21st century.

The attempts to replicate the Slaver flying belt had a cascading side effect on this and other technologies at the time. For example, the development of reliable field stabilizers for artificial gravity systems helped bring about the development of nuclear fusion reactors sooner than might have been the case. This in turn had its effect on early Terran spaceflight efforts, paving the way for the early fusion propulsion systems of such Terran spacecraft as the famed DY-100 series. The availability of these enabled Terran governments to better funding expeditions for more "alien tech" on other Sol System worlds, thus pushing spacecraft development even more than before. Had the Slaver stasis box not been discovered by Apollo 18, mankind might not have moved out into space as soon as it did.



Significant achievements during normal service life

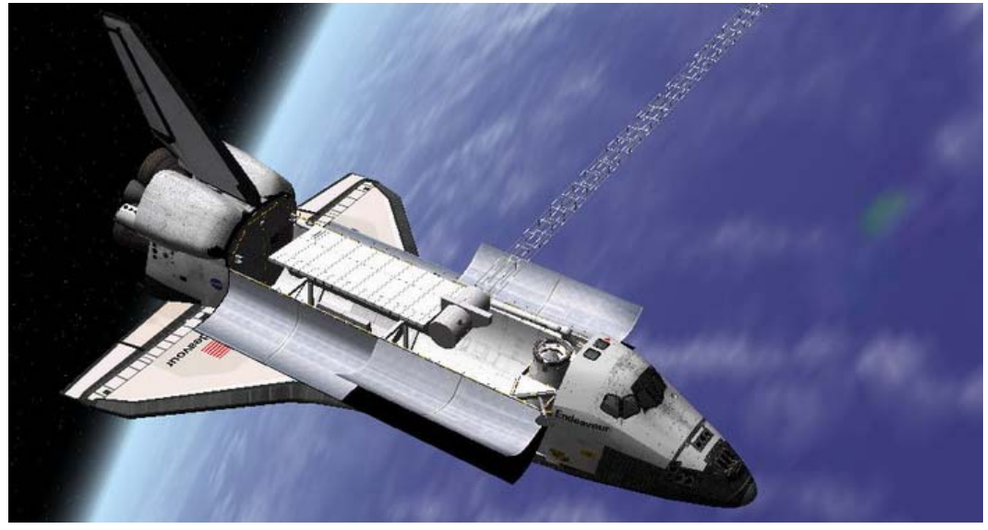
- First Terran spacecraft designed with capability to leave Terran orbit.
- First Terran spacecraft to deliver humans off-world (to Luna), conduct a surface excursion, then give them the capability to return safely back to their homeworld.
- Largest, tallest, and most powerful (in terms of thrust) manned space vehicle of Terra's 20th century.

Saturn V created by Werhner von Braun and associates for NASA
Visuals courtesy of NASA and OrbiterMods
Additional data courtesy of NASA's Johnson and Kennedy Space Center

Apollo 18 suppositions courtesy of Geoffery Mandel
(*U.S.S. Enterprise Officer's Manual*)

Enterprise

United Space Alliance OV-100 series space shuttle
(1976 – 2010)



Specifications as built

Dimensions
- Length: 37.3 meters
- Beam: 23.8 meters
- Height: 17.3 meters

Mass
- Unloaded: 68.5 GMT
- Standard: 93.6 GMT
- Full load: 109.0 GMT (*)

(*) Represents takeoff weight with full cargo bay and full fuel load. Landing gear is rated for a maximum safe landing load of only 104.0 GMT.

Crew complement
- Officers: 2
- Enlisted: anywhere from 3 to 5, up to 9 in emergency

Top velocity
- Cruising speed: 27.7 km/h (orbital insertion velocity)
- Rated maximum speed: 27.9 km/h
- Rated emergency speed: N/A

Endurance:
- Standard range: 5-7 days in planetary orbit
- Maximum range: up to 20 days in orbit (dependent on supplies)

Armament as built
- Primary weapons: none
- Secondary weapons: none

There were persistent rumors of military space shuttle conversions during the early days of the OV-100 program. A military space shuttle facility was built at Vandenberg Air Force Base as part of the initial setup for the program. It was never used, with the military shifting interest to the X-27 Raven program following *Challenger's* loss in 1987.

Class listing

Starship name	Hull no.	Hull laid down	Launched	Status
Pathfinder	OV-098 (1)	1977	N/A	museum
Enterprise	OV-101	4 June 1974	18 February 1977	museum
Columbia	OV-102	27 March 1975	12 April 1981	lost (2003)
Challenger	OV-099 (2)	21 November 1975	4 April 1983	lost (1986)
Discovery	OV-103	27 August 1979	30 August 1984	retired
Atlantis	OV-104	3 March 1980	3 October 1985	museum
Endeavour	OV-105 (3)	28 September1987	24 November 2002	retired

(1) Static test vehicle that was never flown nor capable of flight; also the first to be retired and retooled as a museum ship.
(2) Built up from structural test frame STA-099 (as opposed to the cost of converting *Enterprise* for flight), hence the odd break in hull numbers.
(3) Some listings give 15 February 1982 as the hull laid down date. This is actually the date of construction for *Endeavor's* crew module, which started out life as a spare.

Development history

1930s — German rocket pioneer Eugene Sanger and mathemetician Irene Bredt propose a recyclable rocket bomber as part of the Nazi rocketry program during World War II. The Allies will capture their research after winning the war, thus providing the spark for the space shuttle concept.

October 1968 — NASA commences Phase A study on a "reuseable space plane" inspired in part by the United States Air Force DynoSaur project. This will eventually evolve into the OV-100 series space shuttle.

June 1968 — Phase B study begins on an improved space shuttle design.

1969 — President Richard M. Nixon authorizes a space study that eventually concludes with the recommendation that the space shuttle program represents the most future of the United States space program.

17 September 1976 — *Enterprise,* the first official space shuttle, is unveiled to the general public in a roll-out ceremony at Rockwell International's Palmdale facility. It is designed as a full-scale testbed designed to validate the design's in-flight aerodynamics, with the capability for later upgrading to full operational capability.

18 February 1977 — *Enterprise* completes its first successful "captive" test flight while secured to the back of a modified Boeing 747 passenger jet.

12 August 1977 — *Enterprise* completes its first successful free flight. Explosive bolts are fired in mid-air, separating the shuttle from its 747 carrier, then astronauts Fred Haise and Gorden Fullerton piloted the fuel-less shuttle (designed to be the world's largest glider) to a safe landing on a dry lakebed at NASA's Dryden Test Facility in Nevada, United States.

12 April 1981 — *Columbia* becomes the first operational space shuttle when it is launched into orbit. At this time it carries only a two-man crew, consisting of commander John Young and pilot Robert Crippen. The only mission planned for this flight (STS-1) is to test the performance of the shuttle in orbit.

13 November 1981 — First flight with the Shuttle Remote Manipular System (STS-2) a mechanical arm design to assist shuttle astronauts with moving cargo bay payloads and effecting repairs on satellites while in orbit.

4 April 1983 — *Challenger* becomes the second operational space shuttle (STS-6). It is built around a former static test frame (STA-099), which is actually less expensive than converting the older *Enterprise* to full operational capability. Because of this decision *Enterprise* will never become a fully operational space shuttle.

28 November 1983 — First use of the SpaceLab research facility, designed to fit within a space shuttle cargo bay, on a shuttle mission (STS-9). This would be *Columbia*'s last flight for almost three years due to scheduling and servicing needs.

30 August 1984 — *Discovery* becomes the third operational space shuttle (STS-41). It was also the only one designed to mount a fully fueled Centaur rocket upper stage inside the cargo bay itself for satellite launches. *Challenger* will also receive this modification. This capability was never used and set aside as too dangerous after the loss of *Challenger* in 1988.

October 1984 — *Enterprise* is put on static display at the 1984 World's Fair.

3 October 1985 — *Atlantis* becomes the fourth operational space shuttle (STS-51J)

18 November 1985 — *Enterprise* donated by NASA to the Smithsonian Institution for use as a museum ship.

28 January 1986 — After receiving the fateful order, "*Challenger*, you are go for power up," NASA's third operation space shuttle explodes 73 seconds into launch with the loss of the entire crew. The entire shuttle fleet is grounded for two years while NASA traces the fault that caused the explosion. It is eventually found to be a sub-standard O-ring in one of the shuttle's solid fuel rocket boosters. It burned through during launch, allowing ignited solid rocket fuel to spray directly onto the shuttle's main external fuel tank, which in turn exploded shortly thereafter. Both the solid rocket boosters and the main tank are redesigned and other steps taken to prevent a repeat occurrence.

1987 — The United States Congress authorizes and grants funding for the construction of a new shuttle to replace *Challenger*.

29 September 1998 — The launch of *Discovery* marks NASA's first successful post-*Challenger* shuttle mission (STS-26) and the return of the space shuttle fleet to operational status.

29 October 1998 Congressman John Glenn, the first American to orbit Terra 36 years earlier during the days of the Mercury program, becomes the oldest NASA astronaut as part of the crew of the space shuttle *Discovery* on a mission to study the effects of weightlessness on aging. Glenn was 77 years old at the time of his second space flight.

24 April 1990 *Discovery* carries aloft the Hubble Space Telescope (STS-31), humanity's first operational telescope whose images would not be affected by atmospheric distortion.

7 May 1992 *Endeavor* becomes the fifth and final operational space shuttle to join the fleet. Like *Atlantis* before it, *Endeavor* is built from an existing test frame and with existing spare parts as opposed to the high cost of converting *Enterprise* to full operational status. On its first mission (STS-49) it captured and then successfully redeployed the wayward Intelsat IV communications satellite.

3 February 1995 *Discovery* performs the first orbital rendezvous with the Russian Mir space station (STS-60).

27 June 1995 *Atlantis* launches on the first space shuttle mission to dock with the Russian Mir space station (STS-71), using a cargo bay docking module designed for use with the similar *Buran* space shuttle. The mission is a success, allowing for future space shuttle visits to Mir. It also served as a dress rehearsal for similar missions to the future International Space Station.

4 December 1998 *Endeavor* ferries up the first American component (the Unity module) of the new International Space Station (STS-88). It will be the first of many such missions by the space shuttle fleet, supplementing the Russian and European space programs in ferrying construction materials, crews, and supplies.

11 October 2000 *Discovery* files the 100th successful space shuttle mission (STS-92).

1 Feburary 2003 *Columbia*, the oldest operational space shuttle, disintegrates during re-entry from its current mission (STS-107) when part of its heat suppression system fails, killing the entire crew. The wreckage from the disintegrating shuttle covers three American states once it finally falls to Terra. The fault is immediately traced to debris that dislodged part of the shuttle's ceramic tiles during launch – the same that served as a heat shield for re-entry. Damage had been suspected by ground control but their efforts attempts to ascertain its extent were overruled by NASA administrators. As with the *Challenger* disaster before the entire space shuttle fleet is grounded for two years while steps are taken to resolve the problem.

late 2003 American president George Bush announces his intent to retire the space shuttle fleet in the near future, replacing it with more modern craft.

6 July 2005 Space shuttle flights resume once again with the successful launch of *Discovery* to the International Space Station (STS-114), ferrying supplies and fuel.

11 September 2008 *Atlantis* is the first space shuttle to be retired following the completion of its final mission (STS-125), a routine supply and upgrade mission for the International Space Station. It retires early as a cost-savings measure in order to keep *Discovery* and *Endeavor* operational until more *Venture Stars* can be built. Critical systems to be used as spares are stripped out of *Atlantis* following her retirement, after which the decommissioned shuttle is converted for use as a museum ship.

2010 Both *Discovery* and *Endeavor* were originally scheduled for retirement this year. *Discovery* is the only one retired due to construction delays in the *Venture Star* program, resulting in *Endeavor* remaining as the lone operational space shuttle. *Discovery's* retirement, like *Atlantis* before it, is to provide spares in order to keep the youngest shuttle in the fleet operational for as long as possible until the other *Venture Stars* can enter service.

14 May 2020 *Endeavor* is officially retired, having served longer and flown on more missions than any other space shuttle in Terran spacecraft history.

Factoids

Pathfinder (OV-98) was a full-scale steel-and-wood space shuttle model used by NASA for development purposes. Originally it had no name or designation; these were added in 1983 in homage to its unique place in the development of the shuttle program. *Pathfinder* was later fitted with a mockup cockpit and used for static ground tests and shuttle pilot simulation training (as opposed to an airborne *Enterprise* flight). A Japanese organization funded restoration of *Pathfinder* for a 1983-1984 traveling exposition after it had sat in storage for several years. After this it was returned to NASA for use as a museum piece. *Pathfinder* is noticeably shorter and has other minor dimensional differences with an actual space shuttle. Its mass is 75 GMT, which approximates a shuttle with a "moderate" payload.

Enterprise (OV-100) as built had no engines or thermal protection for re-entry. It was fitted only with the controls and subsystems necessary for atmospheric testing. It was considered for conversion to a fully operational shuttle at various times, especially after the loss of the *Challenger* (OV-103) in 1989. Instead, *Endeavor* (OV-105) was built using a spare test frame and components that might have gone for an *Enterprise* full orbiter conversion. It was cheaper to build *Endeavor* in this manner than to partially dismantle *Enterprise* and refit it for full operational capacity. Despite this *Enterprise* retained the capability for full operational conversion, including its internal wiring and equipment subsystems mounts, throughout her service lifetime. It was officially decommissioned 18 November 1985 and converted into a museum ship. It can be seen today at the Federation Air and Space Museum on Terra.

Despite the many accolades lavished on the program, the OV-100 series space shuttle never achieved its intended goals of low cost, high volume orbital insertion missions for Terran satellites and other spaceborne payloads. Actual program costs were double for each shuttle launch than best estimates had predicted and the originally projected one-week turnaround time between launches proved to be a pipe dream. Most objective observers have deemed that the only reason it continued operation for as long as it did, given its cost overruns, was due to the fact that it was Terra's largest capacity heavy-lift vehicle system at the time – a fact that would prove of prime importance in orbital space station construction. Despite the cost overruns, plus the dramatic losses of two shuttles (*Challenger* and *Columbia*) due to design failures, the United States shuttle fleet represented a large step forward in Terran spaceflight capability. It was the first of its kind – humanity's first reuseable spacecraft – and in retrospect it has deservedly earned its place as the premier Terran spacecraft of its era.

Significant achievements during normal service life

- Humanity's first (partially) reuseable spacecraft
- Unique "space truck" design, with its large cargo bay, allowed it to ferry up to 22.7 GMT of cargo per mission
- Most flights of any American Terran spacecraft launched in the 20th century.

Space shuttle created by Rockwell International for the United Space Alliance

Additional data courtesy of NASA's Johnson and Kennedy Space Centers

Visuals courtesy of NASA and OrbiterMods

Buran

NPO Molynia *vodushno kosmicheskiy* (space shuttle) (1985 - 1993)

Specifications as built

Dimensions
- Length: 36.4 meters
- Beam: 23.9 meters
- Height: 16.5 meters

Mass
- Unloaded: 82 GMT
- Standard: 96 GMT
- Full load: 145 GMT (*)

(*) Represents takeoff weight with full cargo bay and full fuel load. Landing gear is rated for a maximum safe landing load of only 131 GMT.

Crew complement
- Crew: 2
- Passengers: 4-10 (depending on mission requirements)

Top velocity
- Cruising speed: 27.7 km/h (orbital insertion velocity)
- Rated maximum speed: N/A
- Rated emergency speed: N/A

Endurance
- Standard range: 2-4 days in planetary orbit
- Maximum range: up to 10 days in planetary orbit

Expected service lifetime: N/A

Armament as built
- Primary weapons: 1 LKS Proton space laser system (optional)
- Secondary weapons: none

Class listing

Starship name	Hull number	Hull laid down	Commissioned	Status
unnamed	OK-GLI	1978	8 November 1983	museum
Buran (Blizzard)	OK-1K1	1980	15 October 1987	lost
Ptichka (Little Bird)	OK-1K2	1988	---	cancelled
Baikal	OK-2K1	1990	---	scrapped
Burya	OK-2K2	1991	---	scrapped
Kutuzov	OK-2K3	1992	---	scrapped

Development history

1930s	Russian scientist Sergei Korolev works on a rocket-propelled "space glider" as part of his rocketry research.
1960s	The design bureau of Mikyoan-Guerivich (MiG) draws up initial plans for a reuseable spacecraft based on an airplane. Project Spiral, aka "50-50," is a strictly military project, intended to orbit nuclear weapons, with a projected top atmospheric speed of Mach 6. It is developed in response to the USAF X-20 DynoSoar.
1969	The accidental detonation of a United States orbital nuclear warhead 104 miles above Earth orbit results in, among other things, the cancellation of such weapons systems. Both the United States and Russia decided to fund research into more reliable space weapon delivery systems, such as space shuttles.
17 February 1976	The Soviet Government gives initial authorization for the *Buran* space shuttle program "... as a response to the military space plane of the United States."
11 June 1976	The final design for *Buran* is approved, as well as its method of launch. It will be sent into orbit via a stacked booster system, similar to that used for the American space shuttle program. One major difference is that *Buran's* booster will be a single solid-fuel boster unit, as opposed to the two-part system (solid-fuel boosters and shuttle external tank) used in the American design.
12 December 1976	The final design for the Energia booster is approved by NPO Energia.
18 December 1976	The Soviet Ministry of Aviation gathers a select group of Project Spiral designers and engineers as well as members of three other design groups into a new organization designed to produce, and build Buran. The stated public goal for the system is for use as a heavy lifter, similar to the American space shuttle, with its first few missions intended to launch components of a replacement Mir space station into orbit. In truth the Ministry of Aviation is unsure as to what it will do with *Buran* once it becomes operational.
1978	Construction begins on the OK-GLI *Buran* program testbed
1980	Construction begins on *Buran*, the lead craft in the Russian space shuttle program.
1983	The OK-GLI atmospheric test craft for the *Buran* program is built. It will function like *Enterprise* in being used only to test the aerodynamics of the design. Like *Enterprise*, it will never see space flight. As a consequence of its intended purpose, however, it will be one of the few *Burans* ever finished.
16 March 1983	Australian reconnaissance photographs the recovery of a Molynia shuttle testbed from the Pacific Ocean after a suborbital flight. This is the first public evidence to the rest of the world that Russia's Soviet government is developing its own space shuttle program. The testbed is considerably smaller than the actual shuttle will be and is built to a modified Project Spiral design. The purpose of the flight had been to test various aspects of re-entry on a lifting body.
24 March 1983	Hours after the famous "Star Wars" speech by American president Ronald Reagan, Soviet president Yuri Andropov discusses with his advisors ways of having *Buran* and other similar programs fitted with spaceborne laser systems.
September 1983	The Soviet government sets up a special commission to continue investigation into fitting Russian spacecraft, including *Buran*, with the experimental LKS Proton space laser system.
December 1983	The main body of *Buran* is delivered to NPO Energia for fitting of electronics and static stress testing.
1984	Death of Vladimir Chelomei, developer of the experimental LKS Proton space laser system. With his death the project is officially abandoned, although side work along similar lines continues on a smaller scale.
29 December 1984	OK-GLI conducts its first "taxi test" on a specially constructed 5 km long runway at the Bakinour Cosmodrome.
10 April 1985	OK-GLI conducts its first successful atmospheric test flight under the command of cosmonauts Igor Volk and Rimantas Stankavichus.
1985	Construction begins on *Ptichka*, the second shuttle in the *Buran* program. One major difference between it and *Buran* is that it includes a "crew survival module." This is a first for the Russian space program, as none of its prior spacecraft had any provision for crew survival due to craft loss.

15 May 1987 — The Energa booster performs its first successful launch of a payload into orbit. The mission as a whole is deemed a failure, however, because the payload's own thrusters misfire and cause it to be thrown off trajectory.

15 October 1987 — *Buran*, the first fully operational shuttle of its class, is completed.

May 1988 — OK-GLI is retired after its 24th and final test flight without operational mishap. Its frame can no longer stand the constant stress of repeated flights. Authorization is given to prepare *Buran* itself for its first mission, which will be an unmanned test flight.

26 October 1988 — The Soviet State Commission authorizes *Buran's* first launch.

15 November 1988 — *Buran* is launched on its one and only operational flight: two orbits around Terra in full automation mode. The flight is a complete success, exceeding the program staff's wildest expectations.

1989 — Preparations begin for a second *Buran* flight. This will be the first to be manned and the first time *Buran* is to visit Mir. The flight is repeatedly delayed over the next four years due to lack of funding.

Construction of the four additional shuttles intended for operation as part of the *Buran* program is stopped due to lack of funding. *Ptichka* is the one closest to completion (95-97%), with only minor work required to make it fully operational. The others were less than 40% complete, as they had started construction later and were being built to a slightly improved design. All four shuttles will languish on in this state for the next four years until the program is officially cancelled. All three of the later *Burans* will eventually be scrapped.

1991 — The collapse of the Soviet economy leads to the dissolution of the Soviet government. Russia is reborn as a nation in its own right, although it inherits a heavy load of debt (and many political disputes with former Soviet states) from its predecessor.

Intended launch date for *Ptichka's* first mission. It would have been unmanned, just like *Buran's* first mission.

1992 — All funding for the *Buran* program is suspended indefinitely.

30 June 1993 — Russian president Boris Yeltsin formally cancels the *Buran* program. The stated reason is that it serves no clear purpose, now that the Cold War with the United States has ended. The real reason is that the Russians no longer have the money to fund *Buran*, thanks to the country's rapidly collapsing economy.

NPO Energia president Yuri Semenov publicly acknowledges the cancellation of the *Buran* program. He announces that his company will re-market its Energia booster as a commercial heavy lift vehicle. It will become the first HLV in Terran history.

27 June 2001 — NPO Energia opens its hangars to Western space engineers in order to demonstrate that the *Buran* program is ready to resume given sufficient funding. This is a publicity event intended to generate such funding from Western sources; however, it never materializes.

9 May 2002 — The government of Kazakhstan, which now owns the Bakinour Cosmodrome (and *Buran* by default), puts *Buran* and its Energia booster up for public auction to any willing buyers around the world. The auction is scheduled to conclude on 22 May 2002. Several American buyers express interest, although they decline to name a price in public.

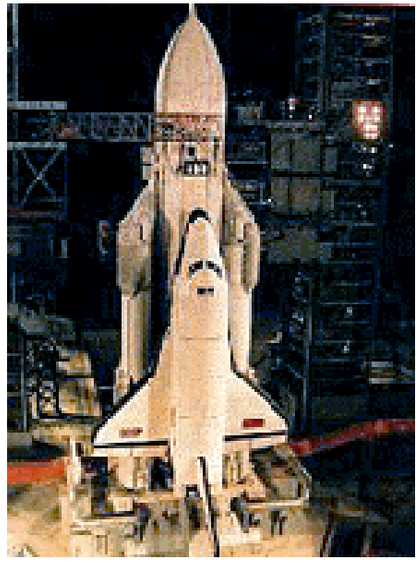
12 May 2002 — The ceiling of the hanger in which *Buran* and its Energia booster assembly are being stored collapses due to years of poor maintenance. *Buran* and its booster are both destroyed by falling steel girders and seven maintenance workers are killed. This disaster brings a premature end to Kazakhstan's *Buran* auction. For many, this marks an ironic end to the *Buran* program.

Immediate efforts are undertaken to save *Ptichka*, the only sister craft of *Buran*, from suffering a similar fate.

2003-2005 — Two of the surviving *Buran* static testbeds are "fabbed up" and converted into museum showpieces for public display. A third is sold and converted into a restaurant as part of a theme park display. All will eventually be destroyed or dismantled over the passage of time.

2005 — The Russian government sells the *Buran* program's OK-GLI atmospheric testbed, the only other *Buran* to ever fly (even if in limited capacity) to a German museum. It has been sitting in a disassembled state in the nation of Bahrain for years after a world tour, with the Russians lacking the money to bring it back home. This will be the only intact example of a *Buran* to survive the passing of time. It can be seen today at the Federation Air and Space Museum on Terra.

Factoids



The biggest asset of *Buran* was also its biggest liability. It was clearly a copycat project, designed to duplicate American success in building and operating a reusable space shuttle. Because the American program came first the Russians could benefit from American development data and avoid some of the mistakes that had been made with the *Enterprise* series. *Buran* represented the pinnacle of Soviet spaceflight achievement … and that was its downfall. *Buran* was the most costly program in Soviet spaceflight history (about 20 billion rubles as of 1993) and it was one that lacked a clear sense of purpose. There was no line of companies waiting to use it as there had been for the American program, nor was the Soviet military really prepared to take advantage of *Buran*'s potential. In addition, it was about this time that the long-staggering Soviet economy began its collapse – one that would bring about the downfall of the Soviet government itself. *Buran* was cancelled despite succeeding in its one and only flight simply because the Russians couldn't fund it anymore. In this manner the only viable alternative to the American space shuttle died a premature death. It was the right system; however, it came about at the wrong time, in the wrong country, and at the wrong price.

Buran sported several improvements over the *Enterprise* class of space shuttles. It had a higher orbit and de-orbit capability, with a designed maximum orbital ceiling of 500 km (some sources report 1000 km). It could use its engines during re-entry. The improved design of its one-piece Energia booster would have prevented a *Challenger* style disaster. It also sported an improved heat shield design, one that would have prevented a *Columbia* style disaster. The biggest difference of all, though was that it was capable of a completely automated flight with no crew on board. This type of computer control was impossible with the American space shuttle at the time and was based on technology originally developed for the Russian's own *Progress* class of supply transports for its space station program. This computer control system would serve as the basis for the automated flight control system developed for the Douglas-Yakovlev DY-100 series of spacecraft. The American space shuttle fleet was back-fitted with a similar system from 2003 to 2005 during the down time resulting from the *Columbia* disaster.

There were frequent accusations of the Russians stealing American technology to build *Buran*. In all honesty *Buran* was an entirely "home grown" project based on the Russian's own considerable experience with and development of space technology. It used a solid rocket booster (Energia) instead of the American combination system, and its internal electronics were quite different. The two space planes looked alike because the optimum physics of large-scale atmospheric lifting bodies determined their shape.

Buran had a slightly larger cargo capacity than *Enterprise* because of its design. It did not have *Enterprise's* extra motors and connections for use with an external fuel tank, allowing it to carry an extra 10-15 tons of cargo into orbit. *Buran's* propulsion and fuel storage was limited to only what it needed to maneuver in orbit and maintain its altitude. Successful orbital insertion depended completely on its Energia booster.

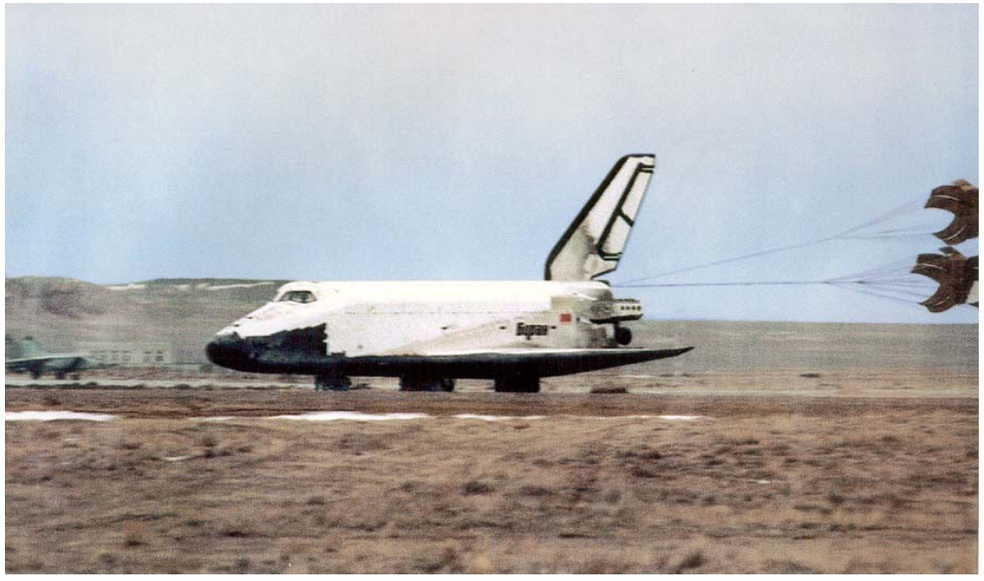
The Energia booster was the first Soviet launch vehicle since the failed N-1 with enough thrust to make it capable of carrying a payload all the way to Luna, Earth's moon. Such enormous thrust was required in order to lift a fully loaded *Buran* into orbit.

The main reason why *Buran's* first flight (and as it turned out, its only one) was unmanned was because its life support system had not yet been certified safe for use. The decision was made to proceed anyway for two reasons. First, to provide concrete proof that all of the funding allocated for *Buran's* development was yielding solid results. Second, it was the perfect opportunity to test *Buran's* automated flight control system.

In 1984 Soviet president Yuri Andropov authorized the development of a version of the experimental LKS Proton space laser system that could be fitted to *Buran* or other Russian spacecraft, such as the small-scale Spiral test bodies that NPO Molynia was flying for *Buran* testing at the time. It is believed that the main project was terminated not long afterward due both to political squabbling and the unfortunate death of the LKS Proton's creator, Vladimir Chelomei. While *Buran* never received this system during its all-too-short operational lifetime, it is generally accepted that it would have been fitted with a similar weapons system given Soviet space strategy had not the Soviet Union collapsed and *Buran* cancelled. The Soviets had already tested spaceborne weapons systems by this time. Developing such a system for *Buran*, given its operational capabilities, would not have been all that difficult.

There are several undocumented reports that *Buran* was so badly banged up after its one and only fight that it needed extensive rebuilding for its next mission. This would have been the main reason behind the delay in its planned second launch. Both the photographic evidence of the day and documentation later released by NPO Molynia weigh strongly against these reports, although the theory remains popular with some.

The Mir docking module originally developed for use with *Buran* was later given to the Americans, who adapted it for use with their own space shuttles. It was used on several missions to dock with Mir until the Americans developed their own system. The main complaint about *Buran's* Mir module was its close proximity to the shuttle crew cabin, which represented a potential safety hazard in the event of a docking mishap. The later American system used an extension to overcome this issue.



Buran coming in for a near-perfect landing on its one and only flight, 15 November 1988

A reproduction *Buran*, fabbed from a test frame, sits atop an Antonov transport plane at the Baikonur annex of the Federation Air and Space Museum at Terra

Significant achievements during normal service life

- First Terran manned spacecraft capable of total automation flight without crew intervention or even a crew on board.
- First Russian spacecraft designed to allow its crew to escape and survive in the event of an in-flight emergency *(Ptichka)*.
- *Buran* was to have been the first manned Terran spacecraft fitted with laser weaponry.
- The Energia booster, originally developed for use with *Buran*, was reworked into the first commercial heavy lift vehicle (HLV) in Terran spaceflight history.

Buran class space shuttle developed by NPO Molynia

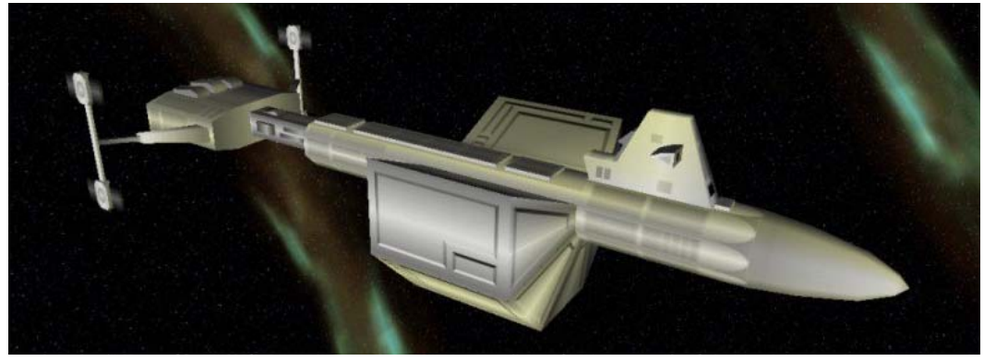
Information based on materials provided courtesy of Mikoyan-Guerivich, NPO Molynia, NPO Energia, Wikipedia, and RussianSpaceWeb.com

Orbital nuclear platform incident based on material from the classic _STAR TREK_ episode "Assignment Earth"

Images courtesy of NPO Molynia and OrbiterMods

Savannah

Douglas-Yakovlev DY-100 series
(1989 – 2018)



Specifications as built

Dimensions
- Length: 105.4 meters
- Beam: 48.7 meters
- Height: 32.3 meters

Mass
- Unloaded: 2,650 GMT
- Standard: 2,720 GMT (with 5 cargo pods)
- Full load: 2,985 GMT (with 12 cargo pods)

Crew complement
- Officers: 4
- Enlisted: 18
- Passengers: up to 98 (in suspended animation)

Top velocity
- Cruising speed: 155,000 km/h
- Rated maximum speed: 180,000 km/h
- Rated emergency speed: 192,000 km/h

Endurance
- Standard range: 900,000 km
- Maximum range: 387,000,000 km (long-duration configuration)

Armament as built
- Primary weapons: none
- Secondary weapons: none

All DY-series spacecraft could be configured with various weapons pods mounted in place of one or more cargo container pods on their cargo container rings. Weapons mix reflected the technology of the era – usually lasers, projectile weapons of some kind (such as rail guns), missiles (early drones), or some combination of all. Nose-fitted lasers and "saddlebag" conning tower missile racks were common for military models.

Class listing

Starship name	Hull no.	Hull laid down	Commissioned	Status
Copernicus	DY-99	5 January 1988	13 April 1989	museum
Savannah	DY-100	20 April 1990	12 October 1991	converted
Mayflower	DY-101	1991	14 February 1993	converted
Botany Bay	DY-102	1991	17 July1993	lost (1)
Nikita Khrushchev	DY-103	1992	02 June 1994	converted
King Charles	DY-104	1992	17 June 1994	converted
Mao Tse-Tung	DY-105	1992	26 June 1994	converted
Half Moon	DY-106	1992	25 October 1994	lost (2)
Vasco de Gama	DY-107	1992	17 November 1994	converted
James Cook	DY-108	1993	20 December 1995	converted
Werhner von Braun	DY-109	1993	14 March 1997	converted
Robert Goddard	DY-110	1993	-----	cancelled

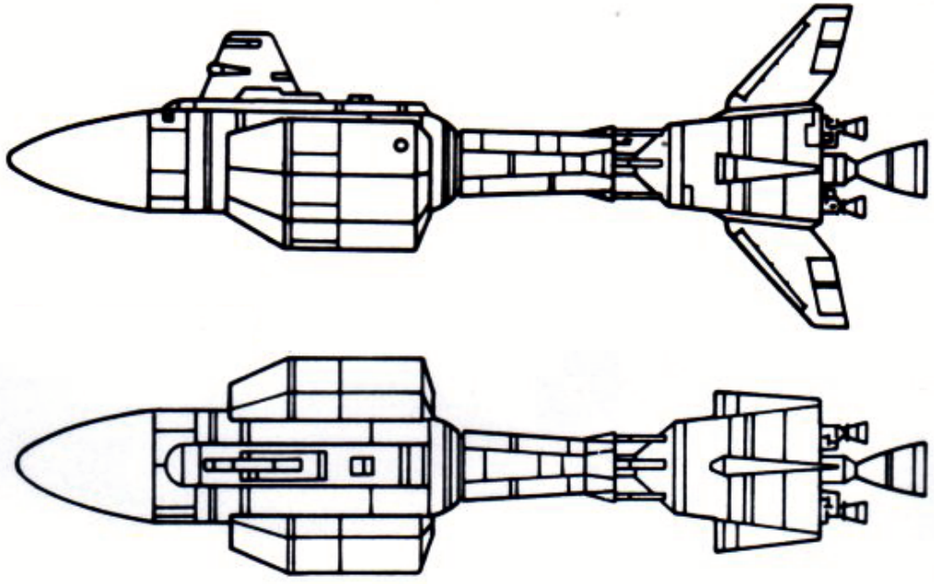
(1) Recovered from deep space in 2267 by the starship *Enterprise* (NCC-1701) during a routine patrol. Its original destination appears to have been Tau Ceti but it was knocked off course due to meteor damage. Currently on display as a museum ship.

(2) Returned to Terra by the Vulcans after first contact in 2063. It had been stolen in order to return two Vulcans, who had crashed on Earth, back to Vulcan. Currently on display as a museum ship.

Development history

1987	A series of successful peace talks among the most powerful nations of Earth successfully concludes. Among its many outcomes is an agreement for the joint development of what will become Earth's first purpose-built interplanetary spacecraft. McDonnell Douglas of the United States and A. S. Yakovlev of the Russian Federation found the Douglas-Yakovlev consortium.
1988	The Douglas-Yakovlev consortium begins construction of *Copernicus* under the aegis of UESPA's Project Daedalus. This is the first full-scale DY-100 series prototype. It will also be the only ship in the series to utilize a fission rocket propulsion system.
1989	Construction of *Copernicus* completed. Prototype successfully launched into Earth orbit for a series of tests and trial runs. *Copernicus* achieves a maximum velocity of 0.005c in space trials. This is "an incredible velocity" give the state of Earth's spaceflight development at the time. Ten more DY-100s are authorized to an improved design using a fission power planet. This build group will also be known as the *Savannah* class. These are designed primarily for transporting personnel and materials to Earth's new colonies on Luna and Mars, as well as beyond. These will have extensive scientific and surveying equipment and a single excursion craft, as well as extensive cryosleep facilities for up to 98 passengers
12 October 1991	*Savannah*, the first production model DY-100, is completed and enters service. Its first flight is a test run to Luna, which it completes in 22 hours.
14 February 1993	DY-101 *Mayflower* enters service on the Earth-Luna supply run.
1994	DY-100 development project temporarily halted due to the Eugenics Wars. The last two ships in the class, DY-109 *Werhner von Braun* and DY-110 *Robert Goddard*, are cancelled. Work continues on completing the other ships, which are already at advanced stages of completion.
September 1994	The next three vessels in the DY-100 series (*Half Moon, Vasco de Gama, James Cook*) are each scheduled for 16-month exploratory journeys to the Sol System inner asteroid belt upon their completion.
	The re-routing of all DY-100 class spacecraft to missions away from Earth around this time is designed to keep them out of the hands of the Augments.
17 July 1995	DY-102 *Botany Bay* launches from Earth. Its first mission is an 11-month round trop to Mars and back to ferry colonists and supplies.
26 January 1996	DY-102 *Botany Bay* stolen from Mars orbit and used by former Augment tyrant Kahn Noonien Singh and his followers to escape Earth. The ninth DY-100, *Werhner von Braun*, is re-authorized as a replacement.
February 1997	DY-105 *Mao Tse-tung* is refitted and launches on its first Earth-Mars round trip. It replaces the stolen *Botany Bay* on this important supply run.
15 March 1997	DY-109 *Werhner von Braun*, last of the DY-100 series, is completed. Its assignment is to replace the lost DY-102 *Botany Bay* on the Earth-Mars supply run.
2011	DY-103 *Nikita Khrushchev* ferries medical personnel and supplies to the Martian Colonies in effort to combat "Martian fever" epidemic.
2014	Originally planned date for the decommissioning of the DY-100 class. This was put on hold due to the failure of the DY-300 prototype.
2016	DY-100 *Savannah* and DY-104 *King Charles* removed from service for use as testbeds (via conversion) for the new DY-500 series.
2018	UESPA decides to decommission the last six DY-100s remaining in service due to the advent of the new DY-500 series. DY-106 *Half Moon* and DY-107 *Vasco de Gama* decommissioned and placed in storage inside a converted missile silo located in the Western Desert.
21 March 2018	DY-109 *Werhner von Braun*, the last remaining operational DY-100 in UESPA service, is decommissioned.
January 2045	DY-106 *Half Moon* stolen from storage and piloted out of the Solar System by person or persons unknown.
26 June 2267	DY-102 *Botany Bay* found adrift and recovered by the *Enterprise*.

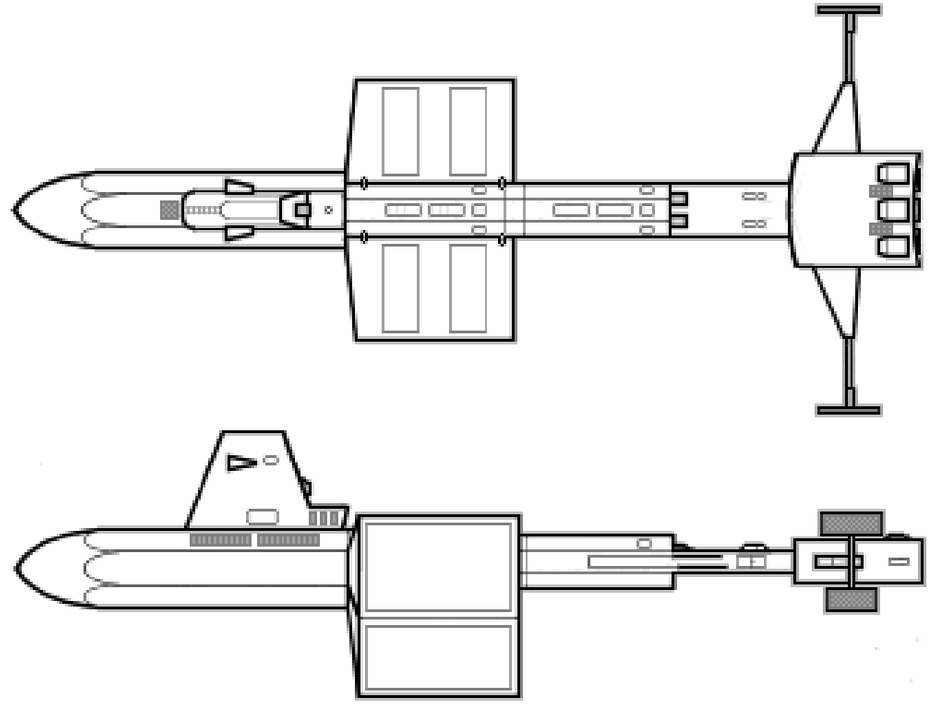
Schematics



DY-99 *Copernicus*, prototype vessel for the DY-100 series. The original design called for a separated engine section. The Amjet AFRM-1 nuclear fission rocket engine of *Copernicus* was soon abandoned for a more powerful and efficient Yoyodyne YFE-1 fusion reactor drive system, which became available just in time for the DY-100 production model. This left *Copernicus* as the only original DY-series vessel with a fission propulsion system. Another major difference between *Copernicus* and her offspring is the cargo container pod arrangement. These had to be mounted directly to the hull of *Copernicus* due to its use of the AFRM-1 for propulsion; consequently, *Copernicus* had only one docking ring for cargo pods. Its containers were also smaller and of a different design than those used in the production model. The *Copernicus*-style cargo container system would be revisited in later DY-series models, albeit for different reasons.

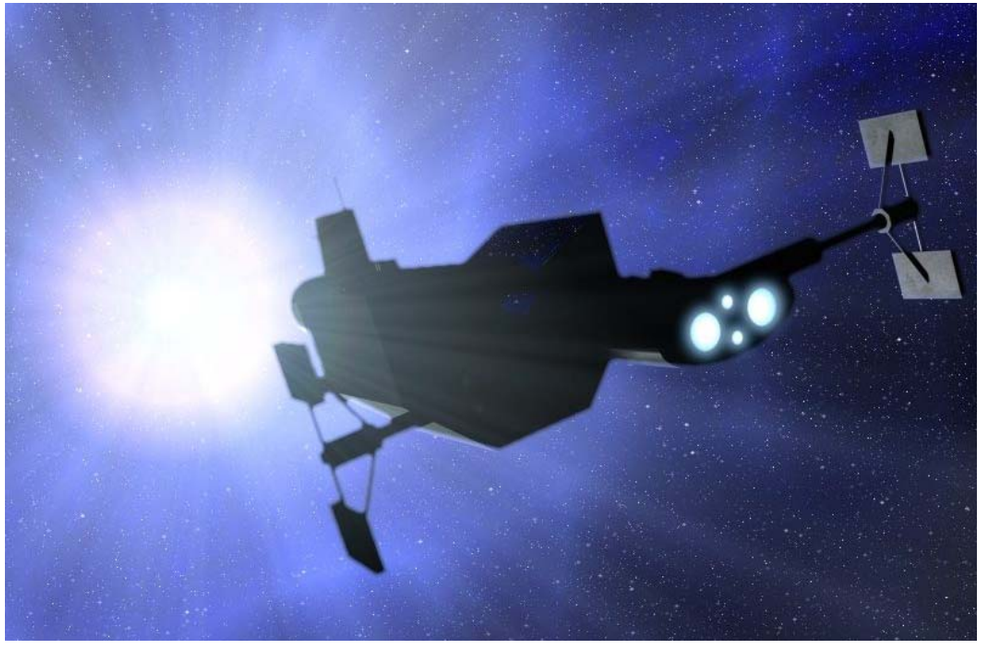
The altered specifications for *Copernicus* are as follows:

Length:	100 meters
Beam:	23.4 meters
Height:	34.9 meters
Standard:	2,720 GMT
Crew:	2 (plus up to 20 additional personnel as needed)
	no cryosleep facilities installed



DY-100 in the most common operating configuration. Five container pods are mounted U-style on the foremost amidships cargo ring. The centermost pod was of a type usually designed for transport of liquids, such as deuterium fuel (see below), while the rest were usually of the bulk goods type. Other cargo pod designs were available for other missions, such as the cryosleep facility equipped colony pod. There was even a weapons pod for military and police applications. A maximum of sixteen (two “doughnuts” of eight) could be mounted through the use of both docking rings. The DY-275 “stretch” transport of 2025 was little more than a slightly redesigned and elongated DY-100 with four such docking rings, thus providing twice the pod capacity.

Fuel interlocks, which were part of each cargo pod clamp, allowed the crew to tap into the deuterium carried in a liquids pod as an additional fuel source, thus significantly extending a DY-100’s range. This is why almost every DY-series vessel in service beginning with the DY-100 carried at least one liquids pod (centerline bottom), which it used to increase its available fuel storage. This design feature would be copied onto all subsequent models. This foresight would justify itself during the Great Space Rush, when many older DY-series craft were purchased for use as cheap colony vessels.



Significant achievements during normal service life

- First "true" Terran interplanetary spacecraft.
- First production Terran spacecraft capable of leaving orbit and journeying to other planets within the Sol System without difficulty.
- First production Terran spacecraft with a nuclear propulsion system (fission in *Copernicus* prototype, fusion in all subsequent production models).
- First production Terran starship class to utilize an artificial gravity system.
- First production Terran transport vessel to utilize a modular container pod system for greater flexibility in cargo capacity and varieties capable of being carried.

DY-100 class starships created by Walter Matthew Jeffries

***Copernicus* schematics by Rick Sternbach**
DY-100 production model schematics by Neale Davidson (Pixel Sagas)

Visuals by the Stress Puppy, Andrew J. Hodges, and Paul Davies

Additional data culled and combined from the following sources:
***U.S.S. Enterprise Officers Manual* by Geoffery Mandel**
***STAR TREK Space Flight Chronology* by Stan & Fred Goldstein w/ Rick Sternbach**
***DY-100 Comparison Chart* by Michael Morissette (Starstation Aurora)**
***DY-100 Blueprints* by Kevin Willcocks**
***A Hobbyist's Guide to the UFP Starfleet* by Timo Saloniemi**
***The Unofficial STAR TREK Fandom Chronology (v1.7)* by James Dixon**
various DY-series schematic musings by "Reverend Trigster"

First Steps

Mankind explores the Sol System

The age-old question has indeed been answered. Man is not alone.

- Shaun Geoffery Christopher (2020)

With the dawn of a new millennia in Terran reckoning mankind found himself no longer limited to a single world. He had both the desire and the technology to break the bonds of his homeworld and venture forth into the void. That he did, establishing his first permanent off-world colonies in the Sol System. The first beachheads had already been established on Luna and Mars only a few years before. Within the quarter-century both of these had grown into full-fledged, self-sufficient colonies. New footholds would be established in the inner asteroid belt as well as the Jovian and Saturnian moons. The giant L-4 and L-5 space cities were built in orbit around Terra, with additional ones planned for Mars and other colonized worlds. Mankind even dared to plan for exploration beyond the bounds of his own solar system. This period is known in Terran history as the Planet Age: the period of time in which mankind was no longer limited to just one world for his habitations. It was but the beginning.

Along with this drive into space came a wave of industrialization and technology to support it. Major spaceyards were built both in Terran and at Mars for the building of a new generation of Terran spacecraft. These would finally allow humanity to break the bonds of his star Sol and venture into great Sea of Stars. In the meantime, though, there was plenty enough exploration and colonization with the Sol System to go around.

With any wave of colonization comes the commoner in time, seeking new fortunes or simply to start anew. The First Great Space Rush began in 2014 with the passage of the Space Homestead Act and would continue for some three decades thereafter. Its generous settlement policies opened the door for the average human to take his or her family, pull up stakes, and resettle off world. In this he was only following the examples of his ancestors: the great Oklahoma Land Rush, the California and Alaskan Gold Rushes, the settlement of the Australian Outback, the German colonization of South Africa, and so on. There are countless parallels in human history. It is one of the idiosyncrasies of humanity: to venture forth against all reason and judgment into an untamed wilderness in order to better one's self and family. So it was then and so it was now. A veritable wave of humans sallied forth into the asteroid belt seeing quick riches through raw mineral mining. Along the way, they ensured that humanity would no longer be a Terra-centric species. Mankind was in space to stay.

Even with all of the incredible advances that had put mankind into space in so short a time a common consensus was lacking. The Eugenics Wars reminded everyone on Terra what a few well-armed madmen could do to the planet. If humanity was to survive it needed to get its act together and head for the stars before it destroyed itself in another war. The dawn of a

new millennium saw Terra's first one-world government in the form of the New United Nations. One of the first acts it passed was the United Space Initiative, confirming to all that man's ultimate destiny was in the stars. UESPA was reorganized and, as part of this, the United Earth Solar Fleet (UESF) was born. This organization was independent of any Terran nation, using its growing off-world resources to further space exploration efforts. In time it would also take over police and military duties for Terra's off-world colonies. It was the forerunner of Star Fleet.

Around the same time that the UESF was founded UESPA found it needed a better means of coordinating the science and survey missions of Terra's various spacefaring nations. UESPA itself had become too bureaucratic by this point to continue in this task. Instead it created the International Space Agency (ISA) to act as both liaison and coordinator among the various national space agencies. Unlike the UESF, the missions of the ISA were always of purely scientific nature, even though the UESF was sometimes involved in support. The ISA can rightly be said be the Terran forerunner of the organization we know today as the Federation Bureau of Sciences.

Perhaps the most portentous discovery in this period of Terran history was the confirmation of non-Terran intelligent life in the universe. Firm evidence had already been discovered at the end of the 20th century, when the astronauts of Apollo 18 stumbled across a Slaver stasis box on the moon. The million-year-old flying belt found inside, still fully functional, gave Terra advanced anti-gravity technology long before it would have developed it on its own. There were also the striking images of the face on Mars first photographed on the Sidonia plain by the Viking space probe. Further follow-up missions, including a secret side excursion by the Mars Probe One mission, confirmed that the remains of a once-vibrant alien civilization that predated humanity by thousands of years existed on Mars. What the *John Carter* astronauts found in the Sidonia ruins would be kept a carefully guarded secret for generations. What could not be hid by the New United Nations were subsequent discoveries of fossilized alien life on Mars, as well as evidence of strip mining on the Jovian and Saturnian moons stumbled across by Colonel Christopher's Saturn-Titan Probe. The cat was now out of the bag, to borrow a Terran euphemism. After the initial predicted culture shock wore off, though, mankind's natural curiosity took over. Humanity might no longer be unique in the universe; however, it was no longer alone, either. A desire began to fill the hearts of man to seek out this new life, these new civilizations … to boldly go where no man had gone before. That desire would eventually take man to the stars and beyond.

Certainly the most talked-about effort of Terran colonists during this time (and lied-about, depending on the taleteller) was the mining of the Sol System's inner asteroid belt. It was the American Wild West all over again, with spaceships and early lasers instead of horses and six-shooters. There were no "space Indians" to contend with (yet); however, there were territorial wars aplenty as miners and homesteaders fought over claims – and not always with words, either. The local UESF garrisons were kept busy breaking up one mining war after another or rescuing swindled homesteaders from the claims of unscrupulous mining companies. Eventually, though, as the region stabilized somewhat and its population boomed, large quantities of nickel and iron were shipped back to Terra and Mars. These would be sent either in raw form via mass driver or in refined form via transport ship. It saw the mining town of Asterpolis grow from a regional space capital to one of the most important colonial settlements in the Sol System. This gave the asteroid miners a newfound place of importance among their peers in the early Terran colonies. Even today the people of Asterpolis take pride in their mining heritage. Daily and weekly tours are conducted of the most important mining sites. The important role that Asterpolis and the asteroid miners played in the Earth-Kzin Wars is not given short shrift, either, with a fully reconstructed UESF asteroid laser defensive base available for public inspection as part of the tour.

Such a large expansion of the Terran space colonies required an infrastructure to match. Huge space farms were built to grow food under otherwise hostile conditions. A new generation of space transports were built to supply these rapidly growing populations. Douglas-Yakovlev lost its former monopoly on civilian space travel as better and roomier designs from competing companies gained public acceptance. It still had its military contracts, however, and in these it would continue the historic heritage of the legendary DY-series spacecraft design.

Venture Star

Lockheed-Martin OV-200 class space shuttle
(2011 –2138)

Specifications as built

Dimensions
- Length: 38.8 meters
- Beam: 28.7 meters
- Height: 11.6 meters

Mass
- Unloaded: 28.4 GMT
- Standard: 116.6 GMT
- Full load: 127.0 GMT (with 20.4 GMT max payload)

Crew complement
- Officers: x
- Enlisted: x

Top velocity
- Cruising speed: x
- Rated maximum speed: x
- Rated emergency speed: x

Endurance
- Standard range: x
- Maximum range: x

Expected service lifetime: x

Armament as built
- Primary weapons: none
- Secondary weapons: none

It was rumored at the time that there was a military version of *Venture Star*, code named *Flying Wedge*, which was eventually fitted with lasers and missiles. The existence of this craft was repeatedly denied by the United States government. No solid evidence was ever discovered that proved otherwise.

Class listing (first build group only)

Starship name	Hull number	Hull laid down	Commissioned	Status
Venture Star (1)	OV-199	11 February 1998	2001 ?	scrapped
Lindbergh	OV-200	2007	8 July 2011	museum
Earhart	OV-201	2008	2012	scrapped
Wright	OV-202	2008	2012	scrapped
Langley	OV-203	2009	2013	scrapped
Yeager (2)	OV-204	2011	---	cancelled

(1) Half-sized (53% scale) unmanned prototype used to flight-test the design concept
(2) Incomplete hull converted into structural integrity test frame STA-2004 in 2014.

Development history

2 July 1996 — Lockheed Martin's famed "Skunk Works," which had earned its worldwide reputation buiding such advanced aircraft as the SR-71 Blackbird and SR-75 Aurora spyplanes, is select to build the X-33 *Venture Star* prototype. Its main competitors were the United Space Alliance (aka Boeing/Rockwell), which had proposed a second-generation OV-100; and Douglas-Yakovlev, which had submitted a design inspired by the British Rocket Group's Flying wedge II HLV.

6 March 1997 — Work begins at Edwards Air Force Base on a special launch facility for *Venture Star's* X-33 prototype. This will be an unmanned, reduced-scale model of the design. Recovery will be accomplished using the backup landing facility normally used for the recovery of space shuttles (and used for OV-100 testing in the late 1970s)

31 October 1997 — A revised X-33 prototype design passes its five-day Critical Design Review. Lockheed Martin is given the go-ahead for both prototype flight testing and initial construction of the prototype. The biggest difference from the original design is the addition of wing-like stabilizers to the aft of the craft. This prevents the roll problems encountered during prototype development.

11 February 1998 — Construction begins on the X-33 prototype at Lockheed Martin's Palmdale facility in California (United States).

20 March 1998 — Rocketdyne is forced to admit scheduling issues with its subcontractors will delay development of its J2S aerospike engines for the X-33 prototpye by three to five months.

27 October 1998 — Lockheed Martin is forced to announce an additional six-month delay in the first planned test flight of the X-33 due to "late delivery of its aerospike engines."

6 November 1998 — The Hawthorne Report is issued. It advocates the use of commercially funded reuseable launch vehicles (RLVs) such as the *Venture Star* program over the aging OV-100 space shuttle program.

13 November1998 — The first full-power (100%) test of the X-33's J2S aerospike engine is conducted.

24 November 1998 — The first full-power (100%) test of the full-scale Rocketdyne RS2200 aerospike engine is conducted.

16 December 1998 — The special *Venture Star* launch facility at Edwards Air Force Base is completed.

13 January 1999 — A major setback in the *Venture Star* program occurs when the #1 fuel tank for the X-33 is deemed unusable due to "total failure of its lobe skin." A new tank will have to be built from scratch.

21 January 1999 — The launch of the X-33 is delayed again due to the tank failure. A new launch date is tentatively set for July 2001.

26 January 1999 — Venture Star LLC is founded as a private company to oversee the commercial applications for the *Venture Star* program.

1 Feburary 1999 — By this date program cost overruns due to development issues surrounding the X-33's propulsion system are estimated to have exceeded US$ 36 million.

15 February 1999 — The earlier failure of the X-33's #1 fuel tank is now found to have been due to "faulty readings from improperly calibrated field equipment." A new series of tests have found no problems with the lobe skin of the now-scrapped #1 tank. This finding is withheld in order to avoid public embarrassment.

26 February 1999 — NASA decides to "definitely continue" to support Lockheed Martin's *Venture Star* program despite its numerous development issues.

5 March 1999 — The *Venture Star* launching facility at Edwards AFB is formally dedicated.

11 September 1999 — The first "hot fire" test of the full scale RS2200 aerospike engine ends in failure. A flaw in the engin causes a hydrogen leak, which in turn causes a fire on the test stand. The test has to be aborted.

4 November 1999 — The *Venture Star* program suffers another major setback when another of the X-33's fuel tanks disintegrates during a cryogenic and structural load test. Fortunately, no one is injured.

7 January 2000 — Lockheed Martin commits itself to investing an additional US$100 million into the *Venture Star* program "provided it isn't cancelled."

22 March 2000 — The X-33's J2S engines are successfully tested for the first time for a full burn equivalent to that required for atmospheric ascent and low orbit insertion.

10 August 2000 A final report is released concerning the fuel tank failure of last November. Microscopic cracks in both the inner and outer skins were created as the tank was filled with supercooled fuel due to unpredicted deterioration of the adhesive holding the tank skins together. In short, the report cites the original tank design as flawed and that failure was inevitable.

29 September 2000 NASA approves Lockheed Martin's redesigned X-33 fuel tanks, which will be built out of an aluminum-lithium composite.

1 March 2000 NASA officially announces that the *Venture Star* will not be part of its pace Launch Initiative program due to "development issues."

The *Venture Star* program comes within a hair of being cancelled due to continuing issues with the X-33 prototype. Lockheed Martin is given one last chance to make the prototype work; however it is forced to dump the aerospike system in favor of conventional fusion propulsion. Its new backer is none other than the United States Air Force (USAF), who are interested in *Venture Star* for its military applications. This, according to some, marks the beginning of the *Flying wedge* program.

Lockheed Martin's Leon Racefield becomes X-33 project director.

10 March 2000 The United States Congress approves allowing the USAF to take over *Venture Star* development so long as both it and Lockheed Martin are willing to absorb continued development costs. This both are willing to do, since the X-33 prototype is now essentially complete (75%) and lacks only the installation of final computer flight systems, new fuel tanks, and its redesigned J25 aerospike engines.

14 April 2001 The USAF officially assumes full control of the X-33 program.

11 April 2001 Fabrication of the new composite fuel tanks is completed.

mid-2001 The new composite fuel tanks are installed in the X-33 prototype, now officially named *Venture Star*.

2002 The completed *Venture Star* is delivered to Edwards AFB for flight testing.

2003-2004 Seven atmospheric tests are performed with the *Venture Star* prototype. The first three are unpowered, the next four at partial power. All proceed as planned. A tentative launch from the new launch facility at Edwards AFB is tentatively scheduled for late 2005.

2005 The success of the rebuilt *Venture Star* again sparks Congressional interest.

28 November 2005 *VentureStar* successfully launches into orbit from Edwards AFB. It returns to Edwards after completing three orbits. This first flight, like that of *Buran*, is completely automated, with the intent being to test *VentureStar's* flight control systems. The flight is deemed an unqualified success.

9 December 2005 A motion is submitted in the U.S. Congress to take *VentureStar* away from the USAF and return it to NASA, raising a firestorm of protest.

2006 As *Venture Star* completes three more successful flights, a compromise is eventually worked out over attempts to wrest *Venture Star* away from the USAF. They will be allowed to keep the working *Venture Star* prototype, as well as one full-sized version, for use on dedicated military missions. The others will go to NASA. The USAF is quick to agree, since it lacks insufficient funds to build the fleet of *Venture Stars* that NASA has long envisaged … and that the fickle U.S. Congress now seems ready to accept.

Full funding for a fleet of five *Venture Stars* is approved by the U.S. Congress, with the obvious intent of replacing the aging OV-100 space shuttle fleet.

2007 Construction begins on *Charles A. Lindbergh*, the first full-scale *Venture Star*.

2008 Construction begins on *Amelia Earhart*, the second production *Venture Star*.

Construction begins on *Wright* (as in "Wright brothers"), the third production *Venture Star.* This is the one reserved for the USAF and will be fitted differently than the others, per its intended military profile.

2009	Details concerning the "intended military aspects" of *Wright* are leaked to the press on a number of Internet web sites. Most of them are false; however, they provoke a public furor over the presumed "militarization" of space. Both NASA and the USAF are forced to expend considerable public relations efforts to reassure the public that *Wright* is not being built as an "armed space cruiser."
	News about the *Wright's* military aspirations helps to revive similar programs in both Russia and the European Common Market.
	The USAF resists public pressure to turn *Wright* over to NASA. The issue also survives a vote in the U.S. Congress, albeit barely (and somewhat unfairly), by pointing out the delays in military satellite launches caused by the *Columbia* and *Challenger* disasters.
8 July 2012	*Lindbergh* is launched on its first mission. On the surface it is a simple four-day test flight to the International Space Station to deliver supplies and transfer personnel. In actuality the mission is configured to test every single aspect of the *Venture Star's* capabilities.
12 July 2012	*Lindbergh* returns successfully from its first mission.
2013	*Lindbergh* begins daily flights on the Earth-Luna run originating from the Cape Canaveral spaceport in the United States.
2022	By this time Venture Star has proven so successful that Lockheed Martin licenses out the *Venture Star* design to anyone who wants to build it due to overwhelming customer demand.
	Both Douglas-Yakovlev and the British Rocket Group are among the first to obtain *Venture Star* building licenses.
2027	This is the "break-even point" for Lockheed-Martin's *Venture Star*. At this point the company has earned back all of the money it invested in *Venture Star's* development and construction. From this point forward it will go on to become one of the most profitable spacecraft licenses in the early days of Terran spaceflight.

Factoids

Venture Star was the third, the largest, and the last of the Terran space shuttle programs to enter service. It was also known as the Space Ferry due to its cargo capacity, which approximated that of the older OV-100 series. It came at a time when Terra was undergoing a transition to spacecraft capable of interplanetary voyages and as such represented something of an expensive throwback (given the relative cheapness of HLVs). The design still had its uses, though, especially with the retirement of the original *Enterprise* class space shuttles c.2020. *Venture Star* was developed to be their successor and as such performed admirably in the role.

Venture Star was the name given to both the program and the prototype craft. Production *Venture Stars* were named after famous United States aviators. The lead craft was named for Charles Lindbergh, the first human to fly solo across the Atlantic Ocean. The others were named for pioneering aviatrix Amelia Earhart, Orville and Wilbur Wright (the inventors of the Terran airplane), Samuel P. Langley (a friendly competitor of the Wright brothers), and Charles Yeager (the first Terran to fly faster than the speed of sound). Other aviation pioneers reportedly considered for *Venture Star* naming included James Doolittle, Billy Mitchell, Howard Hughes, Ruth Law, Jackie Cochran, and Sally Ride.

There were to have been 12 craft in the original *Venture Star* program. This was scaled back to a more modest six due to funding issues and the availability of other, less costly Earth-to-orbit alternatives, such as the various HLV rocket programs. *Yeager* was cancelled when only 35% complete due to political dissatisfaction with the future of the program. It was eventually stripped for spare parts and converted for use as an additional structural integrity testbed. The move appears to have been made to save the *Yeager* spaceframe from scrapping in the event it was ever needed to build a replacement *Venture Star* for one lost in service. Fortunately, for the sake of the program, such an event never happened. *Yeager* was eventually partially rebuilt as a mockup for museum display purposes. It is currently on loan to the Starfleet Museum Branch at Memory Gamma.

Perhaps the main achievement of *Venture Star* was its "one piece" design. It was the first Terran spacecraft designed to operate as a single stage to orbit (SSTO) craft; that is, it could achieve spaceflight under its own power and return safely as a single vehicle without assist of any kind. The earlier *Enterprise* and *Buran* programs only accomplished this with the return phase; they still required booster rocket assist for take-off.

Not only were the production *Venture Star* craft the only Terran space shuttles capable of orbital insertion without rocket assist, but they were also the only ones that ever performed Earth-Luna round trips. For these they were refueled from orbit before embarking on the short hop to one of the many moonbases or private commercial sites on Luna.

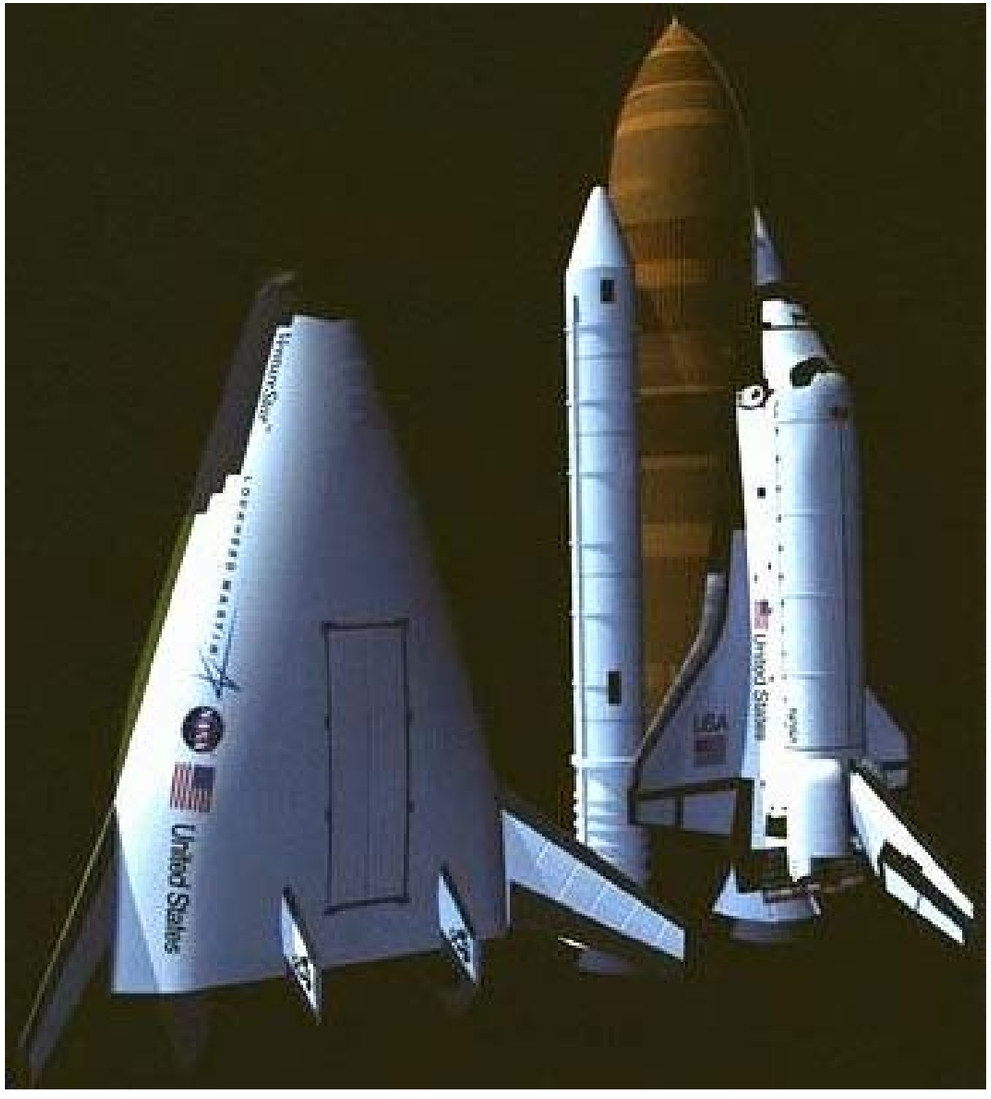
Venture Star was originally designed with only a low earth orbit capability. The eventual replacement of its aerospike engines with a fusion propulsion system gave it extended range above and beyond its original design. Thus an original design drawback that might have meant the cancellation of the program (say, in an alternate version of events) actually wound up being a blessing in disguise.

The biggest advantage of *Venture Star* over previous space shuttles was that the program effectively paid for itself. The craft was specifically designed for commercial use an as such was the first reuseable Terran spacecraft available for private sector charters. Commerical firms could charter a *Venture Star* for whatever purpose they needed, whether it be ferrying cargo up to a waiting DY-series for intersystem transport to something as mundane as replacing an aging communications satellite. *Venture Star's* payload capacity (20.5 GMT) combined with its range (Earth-Luna round trip with fuel to spare) and relatively low operating cost soon made it an attractive alternative to HLVs. Within ten years of the program's inception *Venture Star* charter demands became so great that the design was licensed to private industry for construction. This accounts for the rapid building of additional *Venture Stars* in the following years, making it in effect the first successful Terran transport spacecraft in terms of profits earned. Over 300 craft directly based on or derived from the *Venture Star* design would eventually be built by the Terrans over the next century (such as the *Crusader*) for use by its growing number of space colonies. It would also influence and inspire similar designs in certain offworld cultures that Terrans would encounter during this time, most notably the Centaureans. A surprising number of these are still in use today, in addition to more modern descendants inspired by the base *Venture Star* design. Because of this it can be rightly said that *Venture Star*, the last of the classic Terran space shuttles, was also the most influential Terran spacecraft ever built.

Venture Star makes for an interesting comparison to its predecessor, the OV-100 program, and the contemporary DY-100. It paid for itself within fifteen years of the *Lindbergh's* first launch. The OV-100 program never paid for itself and it took Douglas-Yakovlev a little over two decades to cover its initial outlays for the DY-100 program.

Schematic

Side view of *Venture Star* as built. Note its overall physical resemblance to the NASA lifting body test vehicles of the 1960s, most notably the M3F2 and the HL-10. These were popularized in *The Six Million Dollar Man*, an entertainment program of the era and credited with helping to spark future public interest in such craft.



Size comparison between the full scale OV-200 *Venture Star* production model and the older OV-100 *Enterprise* class space shuttle. The self-contained nature of *Venture Star* caused it to be about as large as a complete OV-100 stack (orbiter + fuel tank + booster rockets). Such a solution was incredibly expensive at the time, yet it helped pave the way for true Terran starships that did not rely on external boosters for initial flight. Oddly enough, *Venture Star's* size and configuration approximate those of a re-useable launch vehicle that was at one time considered for the OV-100 space shuttle program.

Langley (OV-203) launches a commercial communications satellite. Wiithin a generation of *Venture Star's* entry into service its numbers would swell significantly. Lockheed Martin licensed the design to other companies for construction, and soon the skies of both Terra and its fledgling space colonies were full of *Venture Stars*. Every major spacecraft consortium was soon building its own *Venture Star* variant under license, causing its creator Lockheed Martin to reap a tidy profit in the process. It would eventually prove to be a perfect short-range partner for such long-range Terran spacecraft as ISA's *Aventeur* and Douglas-Yakovlev's DY-series.

Venture Star being prepped for its historic first launch from Edwards AFB, 28 November 2005. The crew gantry is in place since it would be present during an actual manned launch and every single aspect of the *Venture Star* launch system was being tested. It also provided ground crews with a means of accessing *Venture Star's* crew compartment all the way up to final countdown, although this proved to be unnecessary.

Bonchuune (right top) was typical of a second-generation licensed *Venture Star* offshoot. It featured a more aerodynamic design and a fusion-based propulsion system. *Bonchunne* spent most of its service life performing resupply runs to various space stations in Earth orbit. Its last assignment before decommissioning was to serve as a testbed for conversion of existing spacecraft to warp propulsion. It was preserved by the UESPA Association and can be seen today at Terra's Federation Air and Space Museum.

Significant achievements during normal service life

- Last and largest of the Terran space shuttles
- First "one piece" Terran spacecraft; i.e. designed for operation as a single entity without boosters or add-ons of any kind.
- First reuseable Terran spacecraft specifically designed as a commercial transport.
- Most influential Terran-designed spacecraft of its era.

***Venture Star* program created by Lockheed Martin**

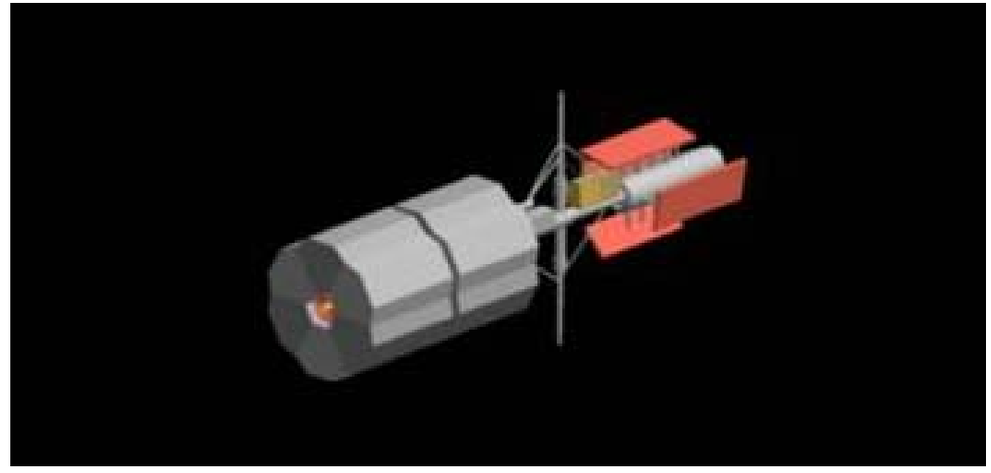
Timeline derived from the X-33 historical research of Andrew J. Butrica

Additional data based on materials developed by Doug Drexler, Mark Bonchuune, Stan and Fred Goldstein, Rick Sternbach, and Hasbro Industries

Visuals courtesy of Lockheed Martin, OrbiterMods, and CBS Paramount

Aventeur

UESPA/ISA intersystem explorer
(2018 – 2030)



Specifications as built

Dimensions
- Length: 125 meters
- Beam: 28.5 meters
- Height: 59.3 meters (including antennae clusters)

Mass
- Unloaded: 2,810 GMT
- Standard: 3,000 GMT (with all fully loaded cargo pods)
- Full load: 3,750 GMT (with both cargo pods and fuel)

Crew complement
- Officers: 3
- Enlisted: 12
- Passengers: up to 94 (via specially configured pods)

Top velocity
- Cruising speed: 700,550 km/hr
- Rated maximum speed: N/A
- Rated emergency speed: N/A

Endurance
- Standard range: 150 million km (Earth-Mars) or 25 days with standard 15-man crew
- Maximum range: 2.7 billion km (Earth-Saturn) or 288 days with standard 15-man crew

Armament as built
- Primary weapons: none
- Secondary weapons: none

All *Aventeurs* could be configured with various weapons pods mounted in place of one or more cargo container pods on their forward cargo container rings. Weapons mix reflected the technology of the era – usually lasers, projectile weapons of some kind (such as rail guns), missiles (early drones), or some combination of all.

Class listing

Starship name	Hull number	Hull laid down	Commissioned	Status
Flight of Fancy	IBS-0001	15 March 2012	4 August 2020	scrapped
Aventeur	IBS-0002	4 December 2014	30 August 2018	museum
Lewis & Clark	IBS-0003	4 July 2015	1 June 2019	scrapped
Marquette & Joilet	IBS-0003	18 October 2015	27 September 2019	scrapped
Livingstone	IBS-0004	20 February 2016	14 March 2020	scrapped
Przhevalsky	IBS-0005	22 June 2016	21 August 2020	scrapped
Cheng Ho	IBS-0006	7 November 2017	---	cancelled
Kawaguchi	IBS-0007	6 February 2018	---	cancelled
Battua	IBS-0008	---	---	never built

Development history

2010 — The International Space Agency (ISA) is granted funding for its first series of five manned interplanetary exploration craft. They soon begin taking bids for a proposed design

2012 — A joint Anglo-French space development consortium submits the winning entry for the new ISA explorer program. The design is named *Aventeur*, which in French means "adventurer."

15 March 2012 — Structural integrity test frame IBS-0001 begins construction.

2013 — The ISA decides for political reasons to name the rest of the craft in the *Aventeur* series after famous explorers from around the world, thus highlighting the countries and alliances that have agreed to fund *Aventeur* construction.

4 December 2014 — The first component of *Aventeur* is successfully launched into orbit by the European Space Agency on top of a Energia HLV from the Baikonur Cosmodrome in Kazakhstan.

4 July 2015 — The first component of *Lewis & Clark*, the second vessel in the *Aventeur* class, is launched into orbit by NASA on top of a Goliath HLV from the Kennedy Space Center in the United States.

February 2018 — The tragic lost of the NASA interstellar prototype explorer *Cyclops* results in, among other things, a re-evaluation of the *Aventeur* program (since portions of their designs are similar). The last three ships in the series are eventually cancelled. *Cheng Ho*, which was 30% complete at the time of cancellation, will be cannibalized for parts and systems to keep the existing five *Aventeurs* operational. *Kawaguchi* had only just begun orbital assembly and is quickly disassembled. *Battua*, which had been scheduled to begin construction by the end of the year, is never laid down. The remaining ships of the *Aventeur* class will be constructed to a modified design in order to avoid the fate of *Cyclops*. The first two will have minor modifications designed to address *Cyclops*-associated issues.

30 August 2018 — *Aventeur* is completed in orbit in a special commissioning ceremony. It immediately begins taking on stores and provisions for its first planned mission, which will make it the first manned Terran spacecraft to visit the planet Jupiter.

1 January 2019 — *Aventeur* launches from Earth orbit on its first mission, known officially as the Earth-Jupiter probe. Estimated time of arrival is 44 days, with allowanced being made to fly over the Sol System inner asteroid belt instead of attempting passage through it.

16 February 2019 — *Aventeur* arrives safely at Jupiter only two days behind schedule. It will spend the next six months making a thorough survey of the gas giant and its system of moons.

1 June 2019 — *Lewis & Clark* officially enters service once its last components are fitted into place and the complete ship powered up for the first time. It immediately begins taking on stores and provisions for its first planned mission. It will follow in *Aventeur's* wake, becoming the first manned spacecraft to visit the planet Saturn.

17 August 2019 — Having gathered the last of its survey teams and restocked its supply of fuel from Jovian sources, *Aventeur* fires its main engines and departs from Jupiter. It will conduct a delayed stopover at the inner asteroid belt enroute for two months so as to chart safe paths for future Terran starships to cross.

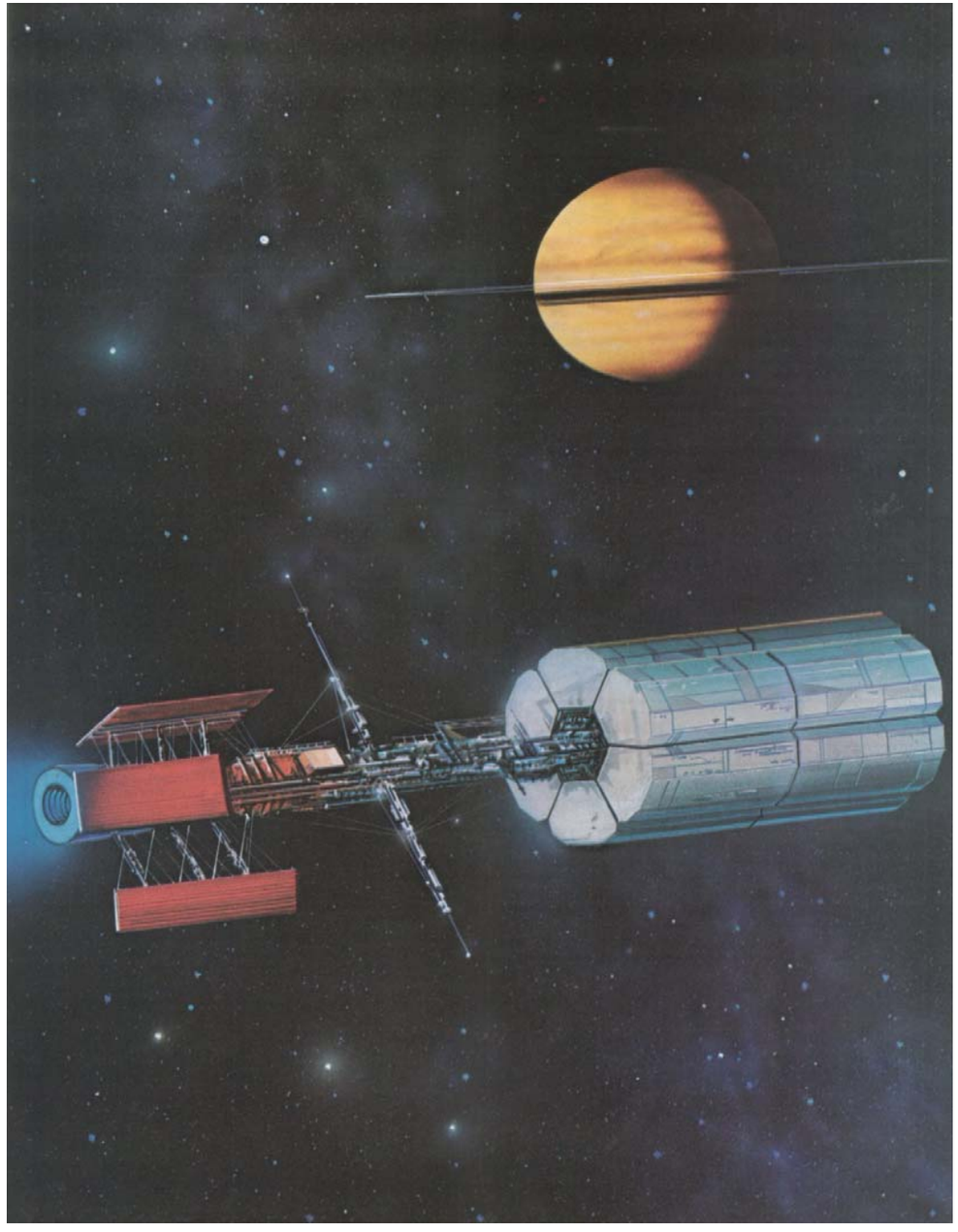
27 September 2019 — *Marquette & Joilet* completes orbital construction to become the third *Aventeur* class explorer to enter service. It will be the first *Aventeur* to visit the Sol System's inner planets.

15 December 2019 — *Aventeur* successfully returns to Earth orbit. Its success is trumpted in the world press, fueling public support for the fledgling ISA explorer program. This will be the greatest mission of its service career.

16 January 2020 — *Lewis & Clark* launches from Earth orbit on its first mission, known officially as the Earth-Saturn Probe.

14 March 2020 — *Livingstone* completes orbital construction to become the fourth *Aventeur* class explorer to enter service. It is tentatively scheduled for a six-month mission to survey the Sol System's inner asteroid belt.

30 April 2020 — *Lewis & Clark* arrives at Saturn a mere 85 days after launch. This first leg of its odyssey passes largely without incident, save for communications checks with ISA craft at Mars and a well-publicized four-day rendezvous with the *Aventeur*, which is enroute back to Terra from its own mission.



7 May 2020	Colonel Shaun Geoffery Christopher, commander of the Earth-Saturn Probe, reports to ISA that he has found unquestionable evidence of alien visitation to Saturn's moons and ring systems. As his regular mission broadcasts are being carried "live" on world broadcast systems there is no way for world governments to conceal his report. Subsequent follow-up explorations by him and his crew are also carried "live" on all broadcast media. The findings of Colonel Christopher and the crew of the *Lewis & Clark* will have profound implications for humanity in the years to come.
10 May 2020	*Livingstone's* mission profile is changed by the ISA upon completing their analysis of reports coming in from the Earth-Saturn Probe. It will be dispatched on a follow-up mission as soon as it finishes space trials and taking on of supplies for such an extended voyage.
11 June 2020	*Livingstone* is launched towards Saturn.
16 July 2020	What starts out as an extended one-day "side trip" by the *Lewis & Clark* to the Saturnian moon of Iapetus turns into the discovery of the first "official" alien spacecraft within the Sol System. The dead hulk had been trapped in orbit around Saturn for millennia, possibly longer. Colonel Christopher and his team take numerous samples from the wrecked spacecraft and its technology before returning to the *Lewis & Clark* for the return trip home.
17 July 2020	*Lewis & Clark* fires its main engines and begins the return trip to Earth, bringing with them many artifacts of the first "public" unveiling of intelligent life outside the Sol System.
4 August 2020	The ISA authorizes the "building" of the *Flight of Fancy* from the sole *Aventeur* test frame as part of the publicity surrounding the discoveries by the *Lewis & Clark*.
21 August 2020	*Przhevalsky*, the last ship of the *Aventeur* class, completes orbital construction and enters service. It too is scheduled for a follow-up misson to Saturn as soon as it is feasible.
12 October 2020	Amidst great publicity and fanfare, *Lewis & Clark* returns to Earth orbit. Colonel Shaun Geoffery Christopher and his crew become instant media celebrities
11 November 2020	*Przheyalsky* is launched towards Saturn.

2021	*Aventeur* is sent on the "doomed" Europa mission that results in the loss of the research submersible *Nautilus* with all hands.
	Przhevalsky is badly damaged by a meteor strike while attempting to make passage of the inner asteroid belt on its return trip to Earth. It will take its sister ship *Marquette & Joilet* almost sixteen months to circle back for a rendezvous and jury-rig a means of towing the damaged vessel home. *Przhevalsky* is declared unsalvageable and sold for scrap almost immediately upon its return to Earth. The conspiracy theorists of the day will maintain that the event was rigged in order to conceal *Przhevalsky's* "true cargo" (advanced, possibly operational alien artifacts) from prying eyes.
2022	*Livingstone* relays the last messages of the doomed DY-500 transport *Courageous* back to Earth.
2025	The *Aventeur* class is officially removed from ISA exploratory service and turned over to UESPA for reassignment.
2025-2030	The *Aventeur* class spends the last five years of its service life as glorified freight haulers, ferrying raw materials from the inner asteroid back to Earth and its growing space colonies for further processing.
2030	The *Aventeur* class is officially withdrawn from service, having been surpassed by superior and more modern designs.
	The Utopia Planita Orbital Shipyards of Mars is successful in obtaining the class ship *Aventeur* for restoration as part of its growing collection of historic Terran spacecraft. It quickly becomes the centerpiece of its new Museum Complex, an orbital facility especially designed for the preservation of historic starships.
2034	A public campaign to save the *Lews & Clark* from the scrapper's torch is unsuccessful. Many artifacts from within the ship are preserved, however, as well as mementos of the historic Earth-Saturn Probe of 2020. They can be seen today aboard *Aventeur*, the only surviving ship of its class, at the Utopia Planitia Orbital Spaceyards Museum Complex in the Sol System.

Factoids

Flight of Fancy (IBS-0001) was a structural integrity frame that never saw actual service. It was given its name and "mocked up" to full *Aventeur* appearance for several exhibitions in 2020, immediately following the discoveries of alien life by the *Lewis & Clark*. It was eventually sold for scrap in 2038.

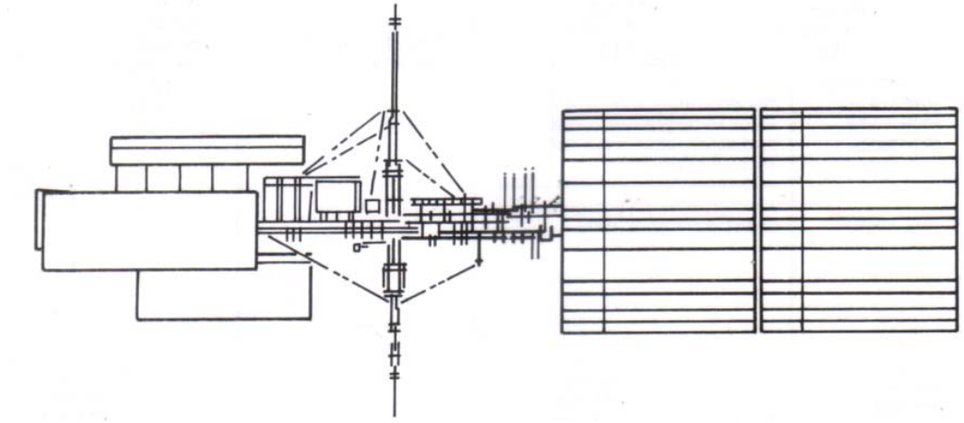
Each of *Aventeur's* six main engines was capable of a sustained thrust of 135,000 kg. Such a massive burn was normally only used during initial mission start and the occasional course correction maneuver. A chemical fueled steering thruster system was normally used to maintain relative attitude and routine thrust using liquid hydrogen as its primary propellant.

The biggest advantage to the *Aventeur* design was its capability to refuel in flight using available raw materials. It was the first Terran starship specifically designed with this in mind. *Aventeur's* designers had known the intended destination for these craft was the gas giants of the outer Sol System and had planned accordingly. One of its cargo modules contained a dedicated fuel processing plant capable of synthesizing new fuel both for its ion impulse plant and its steering thruster system from available raw hydrogen sources. This on-board refinery was small and crude by today's standards; however, it allowed an *Aventeur* to maintain station at any convenient raw hydrogen source (say, a planetary gas giant) for as long as its on-board crew consumables held out. Once the *Aventeurs* were relegated to commercial service these refineries were removed and replaced with standard cargo containers. One was obtained for *Aventeur* during its restoration as a museum ship, thus preserving an example of this unique capability.

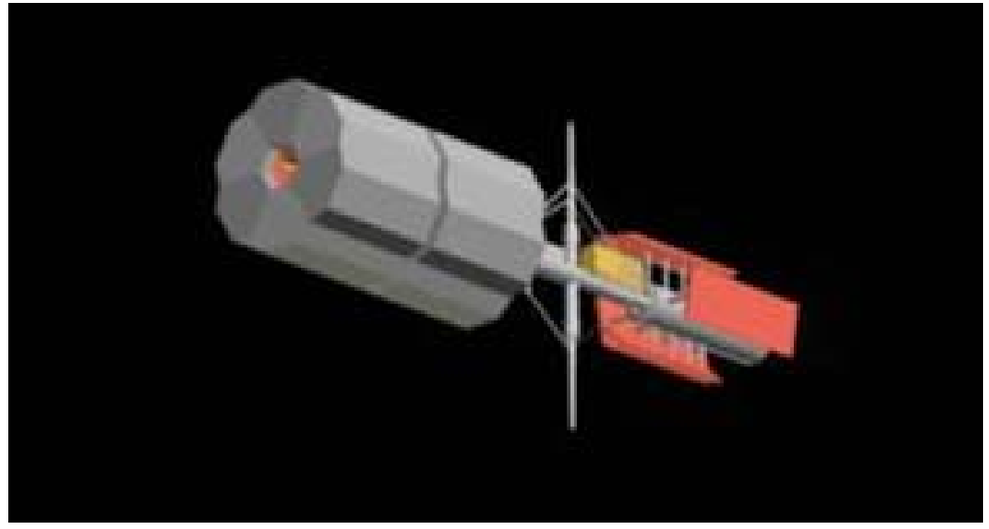
One of the little-known facts nowadays about *Aventeur* is that it had an four-man emergency escape module in addition to its EVA craft.

Colonel Shaun Geoffery Christopher, commander of the Earth-Saturn Probe, would later become Chief of Staff of the United Earth Space Forces. After his retirement he would write a popular book named *Awakening*, in which he described his own experiences in the discovery of alien life both with the Earth Saturn Probe and beyond.

Schematic



Aventeur as she appears today, fully restored to her original 2020s era configuration. The assembly on the left consists of four massive lattice-sliced radiator panels surrounding a Yoyodyne/Amjet Mark II ion impulse engine, which was the first ever in Terran production. The center assembly is the ship proper, with extended boom antenna arrays required for its sensor and communications suites. To the right is its cargo pod assembly, whose capacity dwarfed that of all other sublight Terran vessels until the arrival of the *Galileo* class. It was primarily for this reason that they spent most of their last years of their service lives as interplanetary transports



Significant achievements during normal service life

- First Terran spacecraft equipped with an early form of what is known today as impulse drive.
- First Terran starship designed to refuel its engines using off-world or non-colony sources during its journeys.
- *Lewis & Clark*, the ship used for the Earth-Saturn Probe of 2020, involved in the first "public" discovery of undeniable evidence for corporeal, non-human intelligent life.

Aventeur class starships created by Stan and Fred Goldstein and Rick Sternbach as first published and illustrated in the _Star Trek Space Flight Chronology_

Schematic by Rick Sternbach

Visuals by Rick Sternbach and Steve Baron

Selected additional materials inspired by information from the CoDominion alternate future novels by Jerry Pournelle and on the conjectures of Dr. Richard Hoagland and the Enterprise Mission

Wheeler

Douglas-Yakovlev DY-500 series
(2018 – 2130)

Specifications as built

Dimensions
- Length: 107.6 meters (DY-100 conversions); 145 meters (Mark I and II); 151 meters (Mark III)
- Beam: 32.6 meters (DY-100 conversions); 46.8 meters (Mark I and II); 67.3 meters (Mark III)
- Height: 32.3 meters (DY-100 conversions); 41.8 meters (all series, tower to ventral fin)

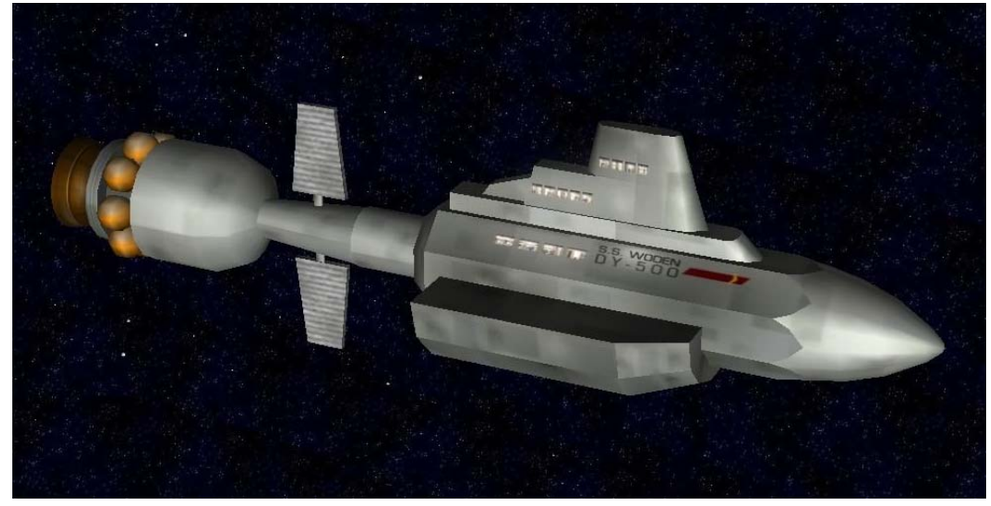
Mass
- Unloaded: 4,000 GMT (DY-100 conversions)
- Standard: 4,170 GMT (Mark I); 4,600 GMT (Mark II and III)
- Full load: 5,250 GMT (Mark II and III)

Crew complement
- Officers: 11
- Enlisted: 44
- Passengers: up to 100 (in suspended animation)

Top velocity
- Cruising speed: 0.0045c
- Rated maximum speed: 0.035c
- Rated emergency speed: 0.86c (*UNSS Courageous*, 2022)

Endurance
- Standard range: 1.2 years per S.O.P.
- Maximum range: 2.5 years per S.O.P.

Armament as built: none



DY-500 Mark II, also known as the DY-500 Mark II. This was the most popular and best known of the four different DY-500 class starship configurations.

All DY-series spacecraft could be configured with various weapons pods mounted in place of one or more cargo container pods on their cargo container rings. Such configurations were rare (but not unknown) outside of military or police service duties. Weapons mix reflected the technology of the era – usually lasers, projectile weapons of some kind (such as rail guns), missiles (early drones), or some combination of all. Nose-fitted lasers and “saddlebag” conning tower missile racks were common for military models.

Class listing (Mark I) – DY-500 Mark I (Block I) – new builds

Starship name	Hull no.	Hull laid down	Commissioned	Status
Wheeler	SSV-0100	---	15 March 2019	retired
Courageous	SSV-0103	---	---	lost (2022)
Tiller	SSV-0108	---	---	---
Mariposa	NAR-7678	---	20 October 2024	missing

Class listing (Mark II) – DY-500 Mark II (Block II) – new builds

Starship name	Hull no.	Hull laid down	Commissioned	Status
Thor	SSV-0115	---	07 February 2038	---
Woden	SSV-0116	---	---	lost
Asgard	SSV-0117	---	---	---
Freja	SSV-0118	---	---	---
Sparta	NAR-	---	---	---
Hokule'a *(Star of Gladness)*	NAR-	---	2102	---

Class listing (Mark III) – DY-500 Mark III (Block III) -- "DY-550" from SFC

Starship name	Hull no.	Hull laid down	Commissioned	Status
John Cabot	NAR-	---	2120	---
Lord Nelson	NAR-	---	2120	---
Francis Drake	NAR-	---	2124	---
New Zealand	NAR-	---	2135	---

(50 total in all three build groups, including all variants – ed.)

Development history

2016 — The DY-100 series spacecraft *King Charles* and *Mayflower* are retired from service in order to be converted to DY-500 series prototypes.

15 March 2019 — *Wheeler* is the very first original DY-500 Mark I to be launched.

2022 — *Courageous* becomes the first DY-500 to be lost in space when a malfunctioning fusion reactor causes it to rocket out of the Sol System, its engines locked on full power. No trace of the ship nor its crew have ever been found.

20 October 2024 — *Mariposa* is the last of the original DY-500 Mark I new builds to be launched.

07 February 2038 — *Thor* is the first of the DY-500 Mark II to enter service. Only six of this class will be new builds, with the rest of the class comprised of converted Mark I hulls. This conversion process, along with current events, will drag out the time needed to construct the six new builds over the next decade.

2049 — All of the original DY-500 Mark I vessels are phased out of service by this date. Most are immediately placed on the auction block and sold to the highest bidder. Many will languish in storage over the next century.

DY-500 class starships, both Mark I and Mark II, comprise the bulk of the spacecraft defending the Sol System during the first two Earth-Kzin Wars.

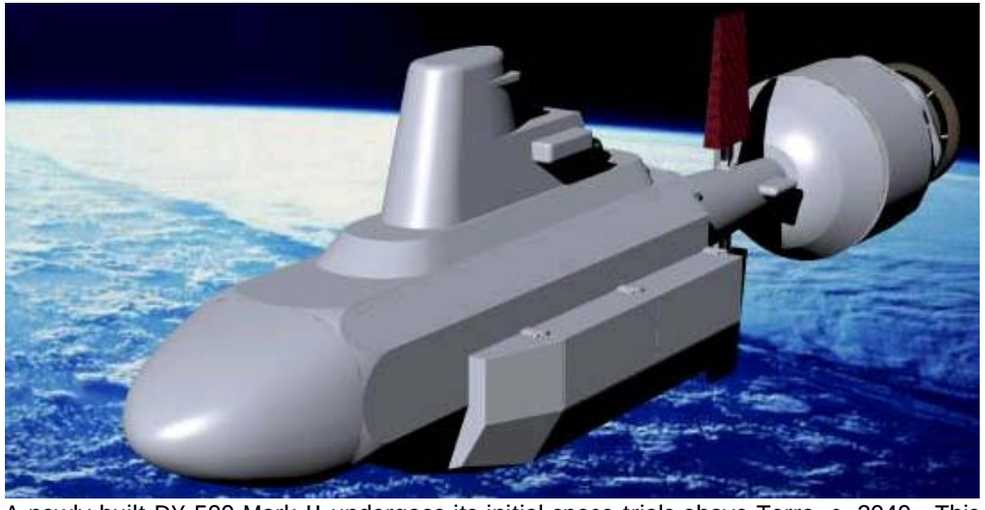
2102 — The DY-500B *Hokule'a*, under the command of Melinda Snodgrass, is launched from the Sol System on a mission of deep space exploration.

2120 — The DY-500C *Lord Nelson*, under the command of Yong Jae Kim, is launched from the Sol System on a mission of deep space exploration.

c.2125 By this time older decommissioned DY-500s, mostly Mark II and Mark I that have been converted to Mark II, are selling for bargain prices on the used starship markets. Many are quickly snapped up by cash-hungry colonists seeking a cheap yet reliable means to find a new home. Many will require varying degrees of repair and rebuilding in order to make them spaceworthy again.

27 November 2123 The *Mariposa*, a rebuilt DY-500 (Mark II conversion) reconfigured as a colony ship under the command of Walter Granger, is launched from the Baikonur Cosmodrome on Terra. Her destination is the Ficus Sector. Two very disparate groups make up the colonists: technology-loving scientists and Irish neo-Transcendentalists. The fate of the ship remains unknown.

19 November 2268 The aged DY-500 *Woden*, now serving as a converted automated ore transport, is destroyed by the starship *Enterprise* (NCC-1701) due to its dysfunctional experimental M-5 ship's computer.



A newly built DY-500 Mark II undergoes its initial space trials above Terra, c. 2040. This image was made before the craft had received its final paint job – and along with it its name and hull registry number.

Factoids

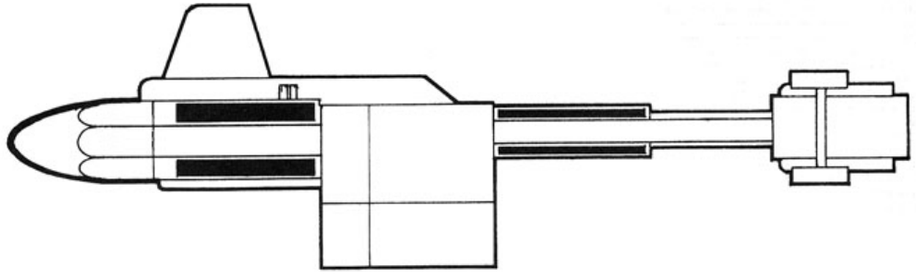
All DY-100s still in service were eventually converted to a modified DY-500 Mark I configuration. They can be distinguished from the Mark I by the arrangement of the radiator fins for their fusion power plants. They are easily distinguished from the Mark II and Mark III by their cargo ring configuration and engine assemblies.

No DY-500 Mark I has survived in its original configuration. All of these were converted to the Mark II configuration at some point in their service lifetime.

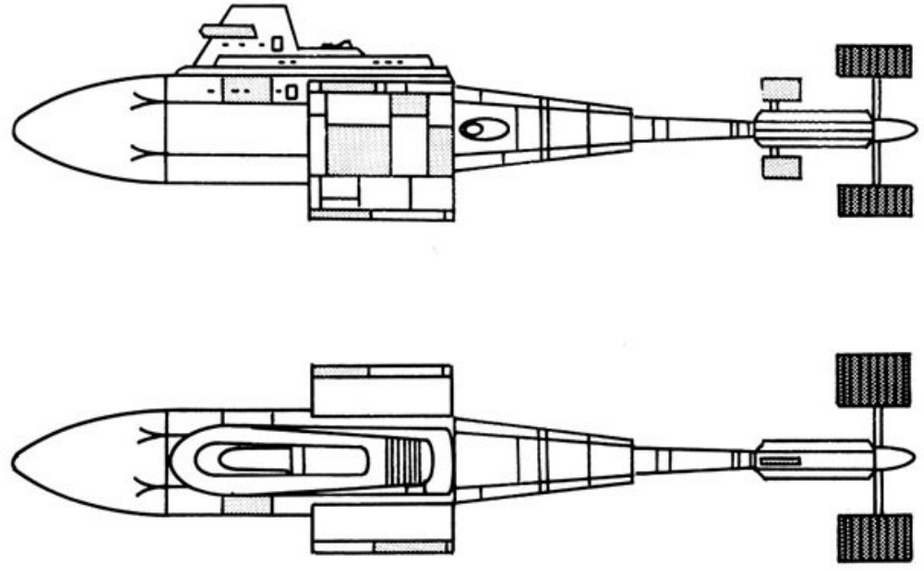
The DY-500 was quickly pressed into service as humanity's main defender during the first two Earth-Kzin Wars. The class as a whole racked up more kills than any other Terran starship class during the Battle of the Sol System save the DY-X, itself a close cousin of the DY-500.

The DY-500 Mark III was the third and final iteration of the DY-500. It is sometimes referenced as the DY-550 series in certain publications due to its original assigned build group hull numbers. These were built by Great Britian to support the spacefaring efforts of Terra's European Hegemony during the early 22nd century. All of these are named for famous British persons or locations and all carried the British HMS prefix (His/Her Majesty's Starship). This prefix reflected Great Britian's government by a constitutionally limited monarchy at the time of launching. The DY-500 Mark III is easily distinguished from the Mark I and B by the massive, aft-mounted "skid plates" for its second-generation ion impulse drive.

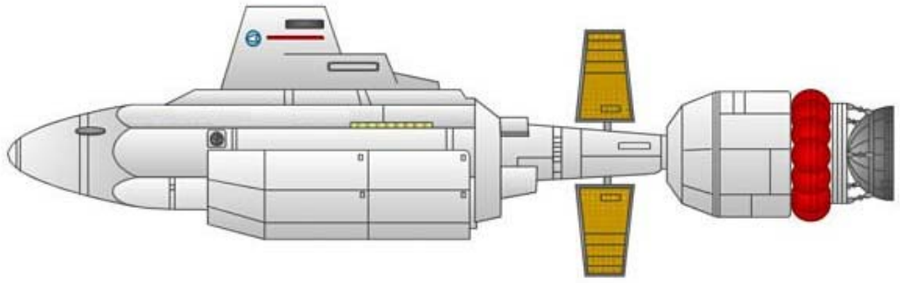
Schematics



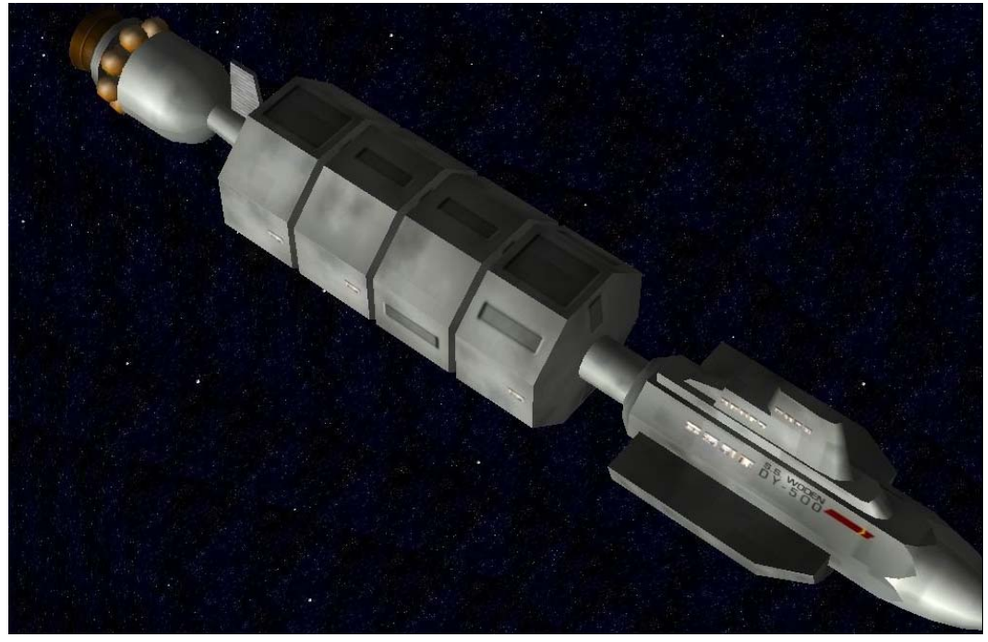
DY-500 conversion from the older DY-100 class, circa 2018. The only part of the originally DY-100 that remained was its forward hull, complete with its single small craft capability. The entire engine assembly was replaced with an uprated Yoyodyne YFE-6 fusion reactor system, with friendly rival Amjet providing the six FTS-10 thruster nozzles for the engine package. The entire "conning tower" assembly was replaced by a modernized "humpback" design that provided the necessary extra room for the ship's new control systems suites. The second cargo ring was removed on some conversions, primarily those whose buyers (mainly the military) intended them for use outside the transport sector.



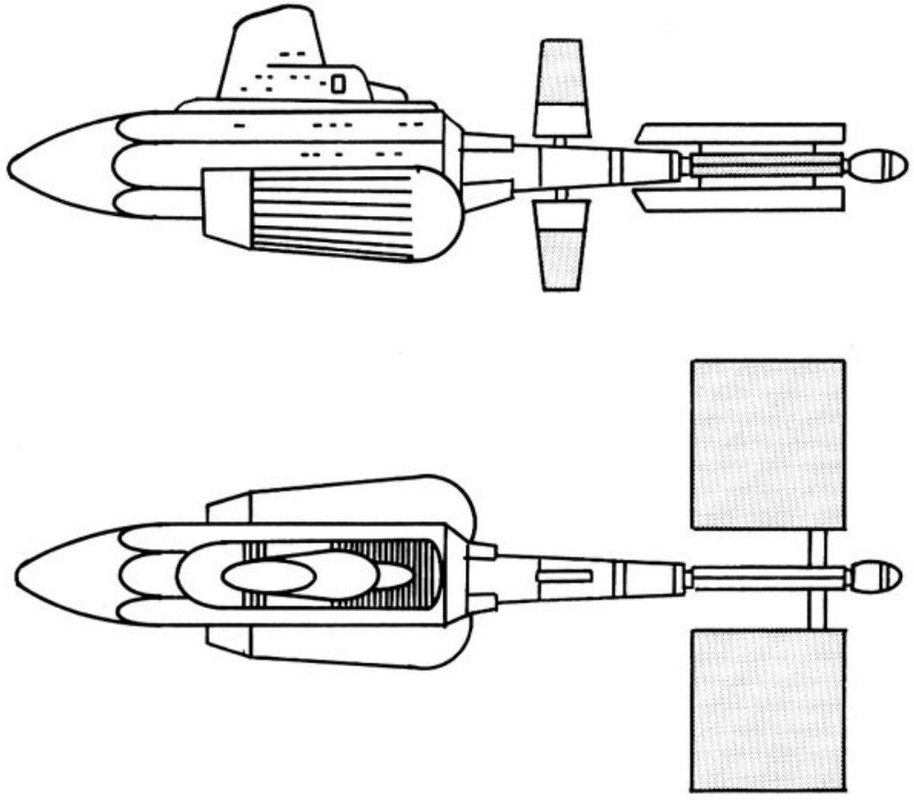
DY-500 Mark I. This represents the original configuration of the DY-500, circa 2020. Main propulsion was provided in the form of five Amjet FTS-12 impulse thrusters in a Quincaux configuration slaved to a Yoyodyne YFE-12 fusion reactor. This also powered the DY-500's experimental magnetohydrodynamic (MHD) generator, which soon became the standard for Terran starship power systems. The DY-500's bow, which in the DY-100 had housed a single excursion craft, was reconfigured as a ship's lifeboat. It was fitted with a single Amjet ECE-16 chemical rocket engine that could rocket the bow away via an emergency separation maneuver. This capability was never used insofar as is known; however, it would serve as the basis for a more sophisticated emergency separation system that was part of the later *Leif Ericcson* class military cruiser.



DY-500 Mark II, circa 2040. This was the most successful of the DY-500 configurations, both in terms of versatility and popularity. The most obvious change is in the main engine. The old Yoyodyne/Amjet system has given way to a Yuma PFI Mark I pulsed fusion impulse drive. This revolutionary new form of Terran spacecraft propulsion was a by-product of the failed spinner drive project of the early 21st century. It took the basic principles of the theoretical spinner drive and applied them to current power plants, resulting in a tremendous leap forward in sub-light speeds and acceleration. Ironically, only six DY-500 Mark II new builds were ever constructed due to a myriad of reasons. Instead, the entire Mark I production run was converted to the Mark II configuration. Most of the later Mark IIIs would be retrofitted to the Mark II configuration as well.



A modernized, fully loaded DY-500 on a typical transport run. This one has been fitted with an extended boom-and-ring adapter, allowing it to carry up to 36 older DY-100 Mark III cargo containers. Such modifications are still quite common for DY-500s still in use by the civilian and commercial sectors.



DY-500 Mark III, circa 2120. This was something of a step back in terms of DY-series evolution, replacing the highly successful but costly Yuma power plant with the British Rocket Group's DOVETail (Double Vented Exhaust Tail) impulse drive. DOVETail was cheaper by far than the Yuma PFI but had two major drawbacks. First, it was somewhat slower than most contemporary impulse drive systems. Second, the massive aft radiator plates required by the DOVETail system were a serious liability insofar as pirates and marauders were concerned. One or two well-placed shots could damage or destroy them, forcing a reactor shutdown due to rapid heat build-up. By century's end almost all DY-500 Mark IIIs had been backfitted to the Mark II configuration due to persistent issues with DOVETail.

Significant achievements during normal service life

- Most successful of the Terran DY-series of sub-light starships
- One of the first Terran starships to see space combat (First Earth-Kzin War)
- First Terran starship design to see extensive use as a colonization vehicle
- Oldest Terran starship design still in (limited) operational service.

DY-500 class starships created by Stan and Fred Goldstein and Rick Sternbach as first published and illustrated in the *Star Trek Space Flight Chronology*

Additional data culled and combined from the following sources:
***STAR TREK: The Next Generation* episode "Up the Long Ladder"**
***U.S.S. Enterprise Officers Manual* by Geoffery Mandel**
***STAR TREK Space Flight Chronology* by Stan & Fred Goldstein w/ Rick Sternbach**
***DY-Mark IIIomparison Chart* by Michael Morissette (Starstation Aurora)**
***A Hobbyist's Guide to the UFP Starfleet* by Timo Saloniemi**
***The Unofficial STAR TREK Fandom Chronology (v1.7)* by James Dixon**
"DY Starship Family" article by the *Journal of Applied Treknology*
Trekmania's Starship Stats Board

Schematics by Michael Morrisette (DY-100 conversions), Lawerence Miller (Mark I and III), and the Journal for Appled Treknology (Mark II)

Visuals by Roger Sorensen and Starforce Productions

Galileo

BRG/ISA interplanetary transport
(2028 – 2164)

Specifications as built

Dimensions
- Length: 300.0 meters (Mark I)
  322.4 meters (Mark II)
- Diameter: 120.7 meters

Mass
- Unloaded: 47,000 GMT
- Standard: 49,500 GMT
- Full load: 4,840,000 GMT (single sphere configuration)
  7,925,000 GMT (dual sphere configuration)

Crew complement
- Officers: 6
- Enlisted: 92

Top velocity
- Cruising speed: 200 million km/hr
- Rated maximum speed: 350 million km/hr
- Rated emergency speed: 375 million km/hr

Endurance
- Typical voyage: 2-3 days (anywhere within Sol System)
- Standard range: 2.5 years at S.O.P.
- Maximum range: 12 years with 6-man crew under E.O.P.

Expected service lifetime: 20 years

Armament as built
- Primary weapons: none
- Secondary weapons: none

Class listing (first build group only)

Starship name	Hull number	Hull laid down	Commissioned	Status
Galileo Galilei	ESC-0121	13 February 2024	4 June 2028	scrapped
Tycho Brahe	ESC-0122	3 July 2024	30 January 2029	museum
Percival Lowell	ESC-0123	29 November 2024	2 April 2029	scrapped
Nikolai Copernicus	ESC-0124	10 March 2025	14 October 2029	scrapped
Johannes Kepler	ESC-0125	20 August 2025	21 February 2030	scrapped
Cristiaan Huygens	ESC-0126	10 December 2025	28 July 2030	scrapped
Urbain le Verrier	ESC-0127	24 May 2026	4 September 2030	scrapped
William Herschel	ESC-0128	15 July 2026	28 October 2030	scrapped
Hannes Alven	ESC-0129	10 November 2026	8 December 2030	scrapped
Carl Sagan	ESC-0130	3 April 2027	12 May 2030	scrapped

Development history

7 December 2005 — The International Space Agency (ISA) is founded in a joint effort to coordinate the spacefaring activities of all of Terra's spacefaring nations. Among the initial goals it sets for itself is the launching of a class of spacecraft capable of both traveling to the Sol System inner asteroid belt and the Jovian gas giants beyond and returning with raw materials mined from them. This will eventually develop into the *Galileo* class.

10 July 2023 — *Galileo's* design is finalized by the British Rocket Group.

13 February 2024 — The first component of *Galileo* is ferried into orbit by the European Space Agency and construction officially begins.

4 June 2028 — *Galileo Galilei*, the lead ship in its class and the first in its build group (Mark I), is officially launched from Terran orbit in a special ceremony presided over by ISA chairman Jean Paul Barrett.

12 May 2030 — *Carl Sagan*, the last ship in the original *Galileo* build group, is launched from Terran orbit.

2030 — The first documented cargo pod conversion for a *Galileo* is observed in service on the Earth-Asterpolis run. The design is credited to Marshall Brek, a wealthy asteroid prospector operating out of the Icarus mining sector.

Galileo becomes the starship of choice for those individuals and companies mining raw materials from both of the Sol System's asteroid belts and its outer gas giants.

2032 — The Utopia Planitia Orbital Shipyards at Mars begins construction on the first of what will be 63 more *Galileo* class starships. All of these are built to a modified design (Mark II) intended for use as commercial transports. These will be named according to the whims of their buyers. Utopia Planitia also licenses Brek's *Galileo* cargo pod design for construction as a *Galileo* purchase option.

2041 — Start date of the so-called "Prospector War," according to most Terran historians. This was a free-for-all among independents and rival companies as to who could control and move the most raw materials out of the Sol System's inner asteroid belt for the most profit, with civilians and the local UESF garrisons caught in the middle.

2043 — The first "space pool" attack takes place in the inner asteroid belt in what historians will later record as one of the major incidents of the so-called Prospecting War. Cassius Del Rio, a space trucker with the Harbisol Mining Corporation, is arrested by the UESF for deliberately gunning his engines and jettisoning his *Galileo's* loaded forward pod into the path of a rival company's spacecraft. The effect on the ship is as if it had been hit with a mass driver: it is completely destroyed with all hands lost. Del Rio is sentenced to seven years imprisonment at a Martian labor camp for murder and wanton destruction of private property.

The *Galileo* class starship *Jackass* is destroyed in the second "space pool" incident, forcing a UESF clampdown of the inner asteroid belt.

2045 — The fifth and final "space pool" incident takes place when the *Freelight*, a *Galileo* class starship owned and operated by freebooter Marvin Flack, attempts to attack a UESF patrol ship with the maneuver. The patrol ship is successful in evading the jettisoned cargo pod; however, Flack manages to escape in the process. The UESF promptly impounds all remaining *Galileos* operating in the inner asteroid belt, regardless of the innocence or guilt of their owners, for the duration of the Prospector War. Flack is eventually apprehended and brought to justice after a four-month long manhunt in and around the inner asteroid belt's Rimshot Sector.

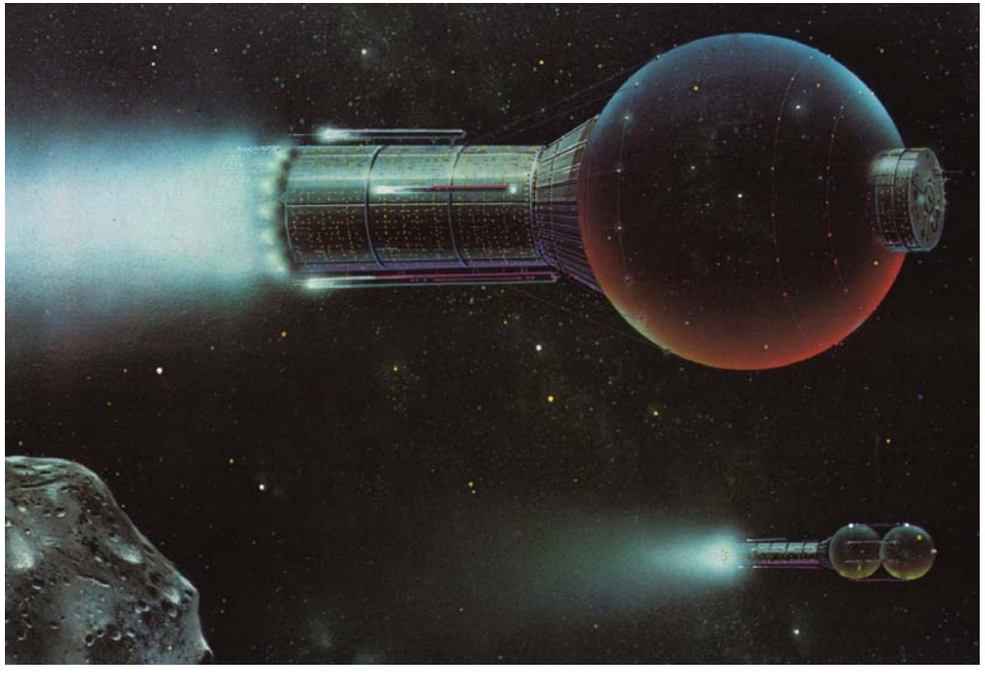
2052 — All impounded *Galileos* are returned to their owners by the UESF following the end of the so-called Prospector War.

Douglas Jones, the last *Galileo* class starship ever built, is produced at the Utopia Planitia orbital shipyards at Mars.

2060s — *Galileo* becomes the preferred transport of choice during the Earth-Kzin Wars due to its rugged construction.

2134 — Douglas-Yakovlev begins marketing a warp drive conversion kit for the sub-light *Galileo*. It is one of but many such conversion kits that it sells in conjunction with warp engine manufacturers for older spacecraft. This converts any *Galileo* into a faster-than-light starship capable of warp 2. The conversion also allows the original fuel sphere to be converted to a dedicated cargo hold. Prices suddenly skyrocket for these older vessels as eager buyers, well aware of their huge cargo capacity, seek bargain buys for warp drive conversion.

2141	The UESPA Historical Society purchases the decommissioned *Galileo* Mark I class starship *Tycho Brahe* for restoration as a museum ship. In time it will become one of only three surviving examples of an original, unconverted *Galileo*. The other three in question are the *Kepler* (Mark I), the *Douglas Jones* (Mark II), and the *Bouncing Betty* (Mark II), all preserved by private starship collectors.
2156-2160	All warp-capable *Galileo* class transports are pressed into service for use during the Romulan War. Only two will survive: the *Houstatonic* and the *Mary Ann*. Both are retired in 2162 following the end of the war. The *Mary Ann* will eventually be converted as a museum ship in honor of its wartime service. It is the only known surviving example of a warp-converted *Galileo* as of this date.
2164	*Galaxy Express*, the last known sub-light *Galileo* still in commercial service, is officially retired. It is scrapped shortly thereafter.



Two ISA-owned *Galileo* Mark Is rocket their way over the Sol System inner asteroid belt. *Alven* (foreground) is in the single fuel sphere configuration, while *Huygens* (background) is in the dual fuel sphere configuration.

Factoids

Galileo was the largest Terran starship of its era. This is because the bulk of the ship was a large sphere designed to hold the fuel for its fusion-powered ion impulse engine. This fuel sphere had a volume of 920,000 cubic meters and could carry up to 3 million metric tons of supercooled deuterium slush. A second sphere could also be fitted in front of the first, thus effectively doubling *Galileo's* range. This made *Galileo* the first manned Terran spacecraft designed with extended voyages outside the Sol System in mind.

Each of *Galileo's* 24 SpaceOp fusion motors had a fuel staging chamber of 370 cubic meters and could deliver a sustained thrust of 10 million kg.

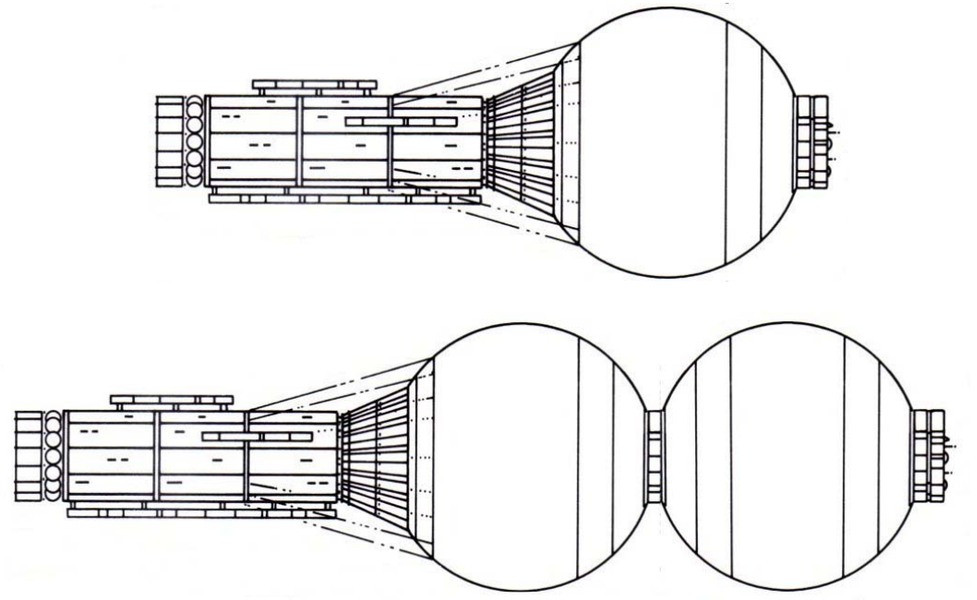
Galileo's excessive mass reflects the fact that most of the ship was built out of naval grade steel. It had a double steel hull with an extra layer of 70mm Scormax armor plate for good measure. This is because most of its in-system journeying was envisioned as taking place through the inner asteroid belt. It was designed to survive multiple impacts with small objects as it kept on flying non-stop to its intended destination. "Built like a tank, flies like a dream" was its main marketing pitch line. This construction was the major factor behind *Galileo's* legendary ruggedness and durability. It also accounts for why the class remained in service for so long.

A total of 73 *Galileo* class starships were constructed in four different build groups between 2028 and 2052. All vessels in the first build group were constructed at Terra and were designed as system explorers, quickly taking over for the obsolete *Aventeur* class in this role. The last three *Galileo* build groups were built as intersystem transports at Utopia Planitia's new orbital spaceyards at Mars. While prior Terran spacecraft had been assembled in orbit at both Terra and Luna, this was the first time a Terran spacecraft with intersystem capability had been built in orbit around another planet.

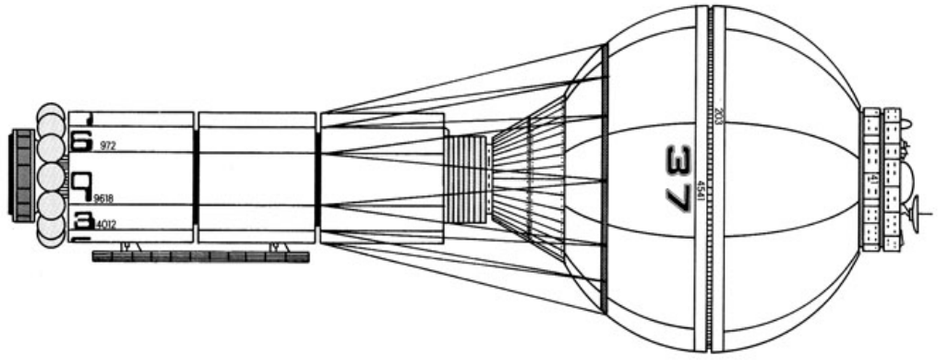
Not long after *Galileo* and its brethren began operating on the Earth-Asterpolis run, space trader Marshall Brek soon devised a new use for the design's second optional fuel sphere. What was required in asteroid belt prospecting was cargo capacity, not extended range. Those who were fortunate to own a *Galileo* were quick to purchase a second fuel sphere and then follow Brek's lead in converting it into an oversized cargo hold. This effectively turned *Galileo* into the largest capacity raw ore carrier in the Sol System at the time. This also earned *Galileo* the unofficial nickname of the "space supertanker." Several Terran space colony firms soon reaped handsome profits performing *Galileo* fuel sphere conversions for interested parties for the next two years before Utopia Planitia licensed the design from Brek. This development would also result in the deadly game of "space pool," so named for the spherical shape of the *Galileo's* main fuel spheres. In "space pool" *Galileo* fuel spheres were deliberately jettisoned into the path of spacecraft belonging to rival companies in order to keep them from delivering their shipments on time.

Concept art developed the British Rocket Group depicting two *Galileos* in orbit around Jupiter. The one in the foreground is taking on a load of asteroid ore, while the one in the background is drawing raw hydrogen directly from Jupiter's atmosphere.

Schematics



The original Mark I *Galileo* configuration (c.2030), shown here in both single-sphere and dual-sphere versions.



Galileo configuration, Utopia Planitia version, build groups two through four (c. 2050). This configuration is also known as the Mark II design, representing changes made by Utopia Planitia for commercial use. A new forward sensor module of a more simplified and utilitarian design replaces the older, more complex mission-oriented version. The fuel system interlock has also been improved by the simple removal of the clamp shrouds, thus allowing for less trouble-prone decoupling. The basic fuel sphere design remained the same across all four *Galileo* build groups, thus allowing its use with both Mark I and Mark II versions.

Significant achievements during normal service life

- Largest Terran spacecraft of its era.
- First major Terran spacecraft class to be built at another planet.
- First major Terran spacecraft designed to operate as a starship; that is, travel for extended durations outside the Sol System.

Galileo class starships created by Stan and Fred Goldstein and Rick Sternbach as first published and illustrated in the _Star Trek Space Flight Chronology_

Schematics by Rick Sternbach (Mark I) and Lawrence Miller (Mark II)

Visuals by Rick Sternbach and Steve Baron

Selected additional materials suggested by Russell T. Davies, Lawrence Miller (Brek conversion), and James Dixon

First Contacts

Mankind joins the Local Group systems

Those of us nurtured in a Federation that has kept the peace for a hundred years may forget that history is never simple, never linear, never predetermined, but is in fact the outcome of a tangle of subtext, chance, coincidence, and "what-if?"

- Garamet Jen-Saunor (2269)

It was during this period in mankind's history that the humans of Terra almost destroyed themselves in the third of three world wars that they had struggled for so long to avoid. Perhaps it was fortunate that many Terrans had already left their homeworld for the stars, for it was also during this era that mankind consolidated its hold on the Solar System, took its tentative halting steps into interstellar space, and made first contact with intelligent alien life forms. It is ironic, in retrospect, that the wanton destruction of so much human life was soon followed by the discovery of new lifeforms and new civilizations beyond the limits of Terra. These encounters would forever reshape humanity's culture even more so than its mindset was changed upon discovering beyond doubt that such life existed. Humanity, it seemed, had a destiny in the stars – a destiny that internal cultural and political squabbles simply could not be allowed to destroy.

The two alien cultures with whom the humans of Terra made first contact were with the Centaureans and the Vulcans. Centaurean first contact, which occurred in 2048 is nowadays not regarded as *true* first contact, since Centaureans were humans themselves. They were descended from 3rd century BCE Greeks transplanted to an artificially constructed world in the Alpha Centarui system by the Preservers over two millennia before. This appears to have been one of the last acts of the Preservers before they simply disappeared from the pages of galactic history. What was important about this event was humanity's introduction to the genius of Zefram Cochrane, a native of Alpha Centauri. At once he recognizied the signficance of the Terran visit to his homeworld and the impact it would have on his project. It was a new form of propulsion called the *warp drive*, one that promised sustainable faster-than-light travel using a matter-antimatter mixture as fuel. The propulsion system of *Icarus*, the first Terran starship to visit Alpha Centauri, was not all that removed from the new technology that Cochrane was proposing. He literally jumped at the chance to return to Terra on the *Icarus* and never looked back, so thoroughly acclimating himself to Terran culture that he would be indistinguishable from a native within a few short years. Alpha Centauri loss' was Terra's gain, for Cochrane's discovery would prove essential to the fight for survival in which the humans of both systems now found themselves.

It was not long after first contact with the Centaureans that humanity itself was threatened with destruction by the felinoid Kzinti. The unprovoked attack on the Terran exploration ship *Sakharov* touched off four bloody wars lasting a little over two decades. Earth-Kzin *War* would be more appropriate, as the idea of four distinct wars comes from the Kzinti

themselves. The terms describe the four waves of attack ships they sent to conquer humanity; four waves that took years to reach their destination due to the limits of their faster-than-light propulsion methods – hence "four Earth-Kzin Wars." Humanity itself adopted their description of the conflict out of convenience, but whether it was one war or four did not really matter. The victory of the humans over the Kzinti was inevitable, given their superior technology and the same ability to breed in numbers as their felinoid foes. The perfection of warp drive by Zefam Cochrane in 2063 only made certain the Kzinti's fate. It was just as the Vulcans had predicted … or possibly hoped, some still say. The true role of the Vulcans in the four Earth-Kzin Wars and the extent of their involvement behind the scenes is not and perhaps will never be fully known.

First contact with the Vulcans was officially made in 2063, right in the middle of the Earth-Kzin Wars. There had been an earlier incident in 2045 but the affair was quickly hushed up and concealed. The only official explanation ever given for the concealment of this earlier contact by the Terran and Vulcan governments, both then and now, was that "the time was not right." Those wishing to learn more about this earlier contact can consult the writings of the late Garamet Jen-Saunor. These can be accessed though the FedNet link to the Vulcan Academy of Sciences or read in novelized form in the book *Strangers from the Sky*. Be that as it may, the arrival of the scout ship *T'plana Hath* in 2063 immediately following the first successful test of warp drive by Zephram Cochrane is widely regarded as official Terran first contact with the Vulcans. They had long known of Cochrane's efforts and those of other faster-than-light pioneers in both the Sol System and at Alpha Centauri. They knew that in humanity they had found the culture with a drive to match the Kzinti's own, given sufficient technology. Their own cultural taboos forbade them from becoming directly involved in the Earth-Kzin Wars; however, there is a fair amount of circumstantial evidence that they did more than just sit on the sidelines and refuse to get involved. After the signing of the Treaty of Sirius they became humanity's greatest allies in the newfound depths of the Sea of Stars. Mankind was like a child testing the shallows of the ocean, looking out over the vast, immeasurable and unplumbed depths that lay before him. The Vulcans were there to help, and that they did – offering advice, star charts, and limited exchanges of technology. There were those that railed against "Vulcan restrictionism," to be sure. In the final analysis, though, it was a good thing that the Vulcans were there during the postwar period. Humanity needed to calm its fired-up martial spirit and replace it with the passion for exploration that it once had held. The Vulcans, in their own odd way, were there to make sure that it happened … in due time.

While it has nothing to do with the development of Terran spaceflight, one peculiar aspect of the Earth-Kzin War deserves mention. The fact that human females were intelligent and capable of fighting just as fiercely as human males proved to be a major factor in the eventual Kzinti defeat. There are many stories of unsuspecting Kzinti falling prey to the wiles of human women during the first two "wars," having the tables turned on them and in many cases losing the battle as a result. The best known, of course, is the story of UESMC Major Susan Hardigan's single-handed defeat of the Kzinti warrior Zrath-General, former governor of occuupied Alpha Centauri, during the reconquest of that world by humanity. The story is legend in both human and Kzinti cultures. "Hardigan's Rangers," as her special-ops unit was known, had run Zrath-General to ground during a failed escape attempt as part of the reconquest of Alpha Centauri by a Combined Forces invasion army. During the fierce fight that followed both Hardigan and Zrath-General were the only warriors left standing. The tale of their final duel, during which the human female used her cunning and agility to defeat a powerful opponent four times her mass and twice her

strength, has since become one of the venerated tales of today's Starfleet Marine Corps, descended from the old Terran Space Marines. It has also become, oddly enough, one of the great tales of the war recorded in the Hall of Warriors on Kzin. It is etched in stone beneath a stylized statue of Hardigan with her foot on Zrath-General's neck. It serves as a constant reminder to the prides of Kzin of just how badly they underestimated the capabilities of human females … and humanity as a whole.

The end of this era found the Sol System almost fully recovered from the effects of the Earth-Kzin Wars. The fact that it took place in so short a time (and with only minimal prodding from the Vulcans) was a graphic demonstration of the vibrancy of humanity – its unique ability to almost instantly rebound from disaster given sufficient impetus. That motivation it found in the stars, knowing now that there were more than just Vulcans and the Kzinti, knowning that there was room enough for any who were willing to make their own foothold in the infinite expanses of the Sea of Stars.

The Treaty of Sirius was signed in 2069, marking the official end of the Earth-Kzin Wars. Within the decade mankind had rebuilt the basic infrastructures of both the Sol System and Alpha Centauri, resulting in an economic boom that it would ride for the next century. Commercial and private spacecraft piled the intersystem route from the still-terraforming Venus all the way to the edge of the Kuiper Belt. The first commercial interstellar starliners made their appeaerance at this time. Some were converted sub-light craft while others were new-builds, designed to take the best possible advantage of the new technology of warp drive. Human expansion was not just limited to the Sol System alone, though. The *UES Amity* became the first human starship to visit Vulcan in 2065. By the end of the century humanity had encountered the Tellarites, the Andorians, the Denobulans, the Deltans, and dozens of more humanoid alien species … not to mention an almost equal number of non-humanoid ones. Once again, a sense of wonder for the stars and the mysteries that they held was stirring in mankind's heart. Once again, its explorer spirit of old was beginning to rise – and once loosed, would turn into a virtual tidal wave that only another interstellar war would prove capable of stopping.

Declaration

UESPA/UESF/Utopia Planitia ringship explorer
(2033 – 2070)

Specifications as built

Dimensions
- Length: 300 meters
- Outer diameter: 210 meters (reactor rings)
- Inner diameter: 28.7 meters (main hull)

Mass
- Unloaded: 50,500 GMT
- Standard: 52,700 GMT
- Full load: 53,400 GMT

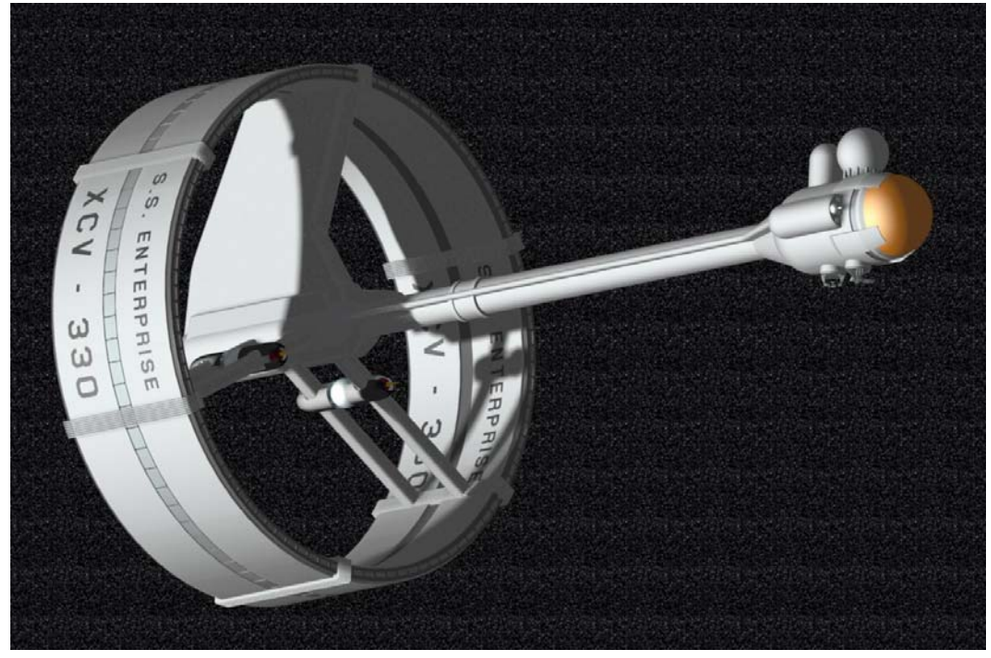
Crew complement
- Officers: 10
- Enlisted: 85

Top velocity
- Cruising speed: warp 0.40c (normal space-time continuum)
- Rated maximum speed: warp 0.50c (normal space-time continuum)
- Rated emergency speed: warp 0.58c (*Enterprise*, Third Earth-Kzin War)

Endurance
- Standard range: 2.5 years per S.O.P.
- Maximum range: 10 years per E.O.P.
  (at cruising speed and with full stores)

Expected service lifetime: 40 years

Armament as built
- Primary weapons: 2 laser banks (F only)
  2 rail gun turrets (bottom of command boom)
- Secondary weapons: none (civilian version)
  2 missile launchers w/ 20 MIM-07 “Gnat” each
  (military version, original configuration)
  2 Type II heavy particle beam cannon
  (military version, later configuration)



Class listing

Starship name	Hull number	Hull laid down	Commissioned	Status
Declaration	XCV-325	---	2030	scrapped
Mikasa	XCV-326	---	2033	scrapped
Flying Cloud	XCV-327	---	2034	scrapped
Glorire	XCV-328	---	2035	scrapped
Calypso	XCV-329	---	2036	scrapped
Enterprise	XCV-330	---	2037	museum
Half Moon	XCV-331	---	cancelled	
Victory	XCV-332	cancelled		

Development history

2030 — *Declaration*, the demonstrator for Utopia Planitia's new ringship class, is launched.

Although it performs adequately during space trials, a number of stress-related issues are uncovered relating to *Declaration's* single-brace, dual-ring design. The design is modified somewhat to add additional bracing both across the rings and inside them, in the form of three additional cross-ring struts and two interior hull braces.

UESPA awards Utopia Planitia a contract for seven ringships. Part of the funding comes from the UESF, who gets every other one produced in exchange for their support.

2033 — *Mikasa*, the first production model UESF *Declaration*, enters service.

2034 — *Flying Cloud*, the first production model UESPA *Declaration*, enters service.

Searcher, a scaled-down version of *Declaration*, enters service around this time. Its primary mission will be to survey the less prestigious star systems within range of Terra. *Searcher's* main claim to fame will be due to one of its members, *UES Sakharov*, which was the victim of mankind's disastrous first contact with the Kzinti.

2040 — *Enterprise* is launched towards Alpha Centauri as part of a joint UESPA/UESF effort.

23 June 2042 — The *Icarus* leaves on its history-making journey to Alpha Centauri.

3 August 2048 — First contact is made with the Kzinti during the infamous *Sakharov* Incident.

8 December 2048 — First contact is made with the humans of Alpha Centauri by the explorer *UES Icarus*.

2049-2050 — Timeframe of the "First Earth-Kzin War" per Kzinti historians. Their initial attempt to invade Alpha Centauri is repulsed with the help of the Terran starship *Icarus*.

2051 — *Enterprise* finally arrives at Alpha Centauri in the wake of the failed Kzinti attack. By some miracle they escaped the molestation of both the original fleet and the survivors of the attack. When asked how he did it, Captain Jefferson Matheson merely shrugs his shoulders and replies, "How should I know? Space is a big place."

2055-2056 — Timeframe of the "Second Earth-Kzin War" per Kzinti historians. Alpha Centauri is defended a second time from a Kzinti invasion fleet, although casualties are high. This comes too early for the *Leif Ericsson*, which has just entered production, and the handful that are finished by "war's end" arrive at Alpha Centauri too late to see any action.

Enterprise takes part in the successful defense of Alpha Centauri.

3 February 2055 — CDP generator technology is perfected.

2055-2059 — All *Declaration* class ringships are upgraded with CDP generators.

2058 — Plans and schematics for a CDP generator upgrade are received by the crew of the *Enterprise* via the Proxima geon hole communications relay. With Centaurean assistance they begin work at once on building one to install in their ship.

2058-2059 — *Enterprise* is upgraded at Alpha Centauri with improved weaponry and a CDP generator in order to better fight the Kzinti.

2059-2061 — Timeframe of the "Third Earth-Kzin War." Two Kzinti attack fleets attack the Sol System while two more attack Alpha Centauri.

2059 — Alpha Centauri is conquered. The survivors flee to the hills, caves, and oceans, while the rest attempt to flee the system in any starship they can get their hands on. Among the few that manage to run the Kzinti blockade is the ringship *Enterprise*, escorted by two DY-X cruisers. They will remain on the run from the Kzinti for three years.

5 April 2063 — Zefram Cochrane perfects warp drive. First contact is made with the Vulcans.

2065 — *Enterprise* and its escorts are located and rescued by the UESF.

2068 — *Enterprise* makes its triumphal return to the Sol System. The story of its three-year flight from the Kzinti will quickly become the stuff of legend.

2070	The decision is made to decommission all *Declaration* class ringships following the end of the Earth-Kzin Wars. Warp drive has made them obsolete.
2071	The Centaurean government formally requests permission to purchase *Enterprise* for conversion to a museum ship, due to the important role it played during the Third Earth-Kzin War.
2071-2073	*Enterprise*, the last active duty *Declaration* class ringship, takes its final journey. Its destination is the Proxima Shipyards at Proxima Centauri, where it will be preserved by the government of the Alpha Centauri Concordium of Planets.
2073	*Enterprise* is decommissioned and assigned a permanent berth at the Proxima Shipyards. Among the delegates from Terra attending the ceremony is former ship's commander Jefferson Matheson and former UESF commander-in-chief Hans Dietrich. Among the Centaurean delegates present is Prime Minister Asi Vacasiom, who as Minister of Space (and ranking surviving government official) had escaped the Kzinti aboard the *Enterprise* in 2059.
2083	The *Declaration* class is scrapped.

Factoids

The unusual geometry of *Declaration* coupled with its toridal reactor system allowed it to break all standing Terran space speed records during its space trials. It made headlines at the time and perked UESF interest in the class. What was not released to the press was that *Declaration* showed stress cracks and signs of metal fatigue along its single ring support pylon after returning from its space trials. In addition there had been measurable signs of torque on all three of its crossover ring supports. These problems were eliminated in the production version of *Declaration* by adding two more main support pylons within the ring, mounted at 120 degree angles to the original support pylon, plus three more crossover ring supports. The resulting configuration stabilized the stress on the reactor rings via a hex-and-inset-triangle layout for the ring pylons and braces. Even so, the Utopia Planitia engineers had proven that a single-support ringship was possible, given the right design and construction materials. They would receive telling confirmation of their vision once the first Vulcan ringships openly visited the Sol System in the late 2060s.

The addition of two more ring support pylons turned out to be a blessing in disguise for *Declaration*. They provided two more ready-made hard points for weapons systems mounting for a design whose unusual configuration limited the number of hard points available. The location of these two particular hard points were ideal for heavy energy weapons that could feed directly off of *Declaration's* toridal reactor system. This would stand the design in good stead once efficient particle beam weaponry was developed during the Earth-Kzin Wars.

Declaration as launched had just enough room for one small shuttle that it carried inside a cramped hanger within its command boom. Later production models had a somewhat enlarged command boom with the capability of carrying two such shuttles, again in close quarters.

The *Declaration* class ringships were the fastest pre-warp Terran starships ever made that utilized conventional fusion propulsion (as opposed to spiked anitmatter systems).

There were two distinct versions of the production *Declaration*: the UESPA version and the UESF version. The UESPA version was a dedicated exploration craft and carried only minimal weaponry in the form of twin boom-mounted lasers. The UESF version beefed up the ship's armament considerably, adding twin boom rail guns turrents and pylon-mounted missile launchers. Wartime upgrades to UESF *Declarations* replaced the pylon-

mounted missile launchers with particle beam cannon. A third rear-firing "belly" rail gun below the main engine was tried with *Mikasa* but not repeated on the other UESF hulls due to firing arc issues. Weapon rack hard points were also fixed on both sides of the crossover ring supports, although these were rarely used due to the danger that the presence of such munitions posed to the rings themselves. Wartime upgrades for UESPA *Declarations* were usually limited only to the extra boom rail guns.

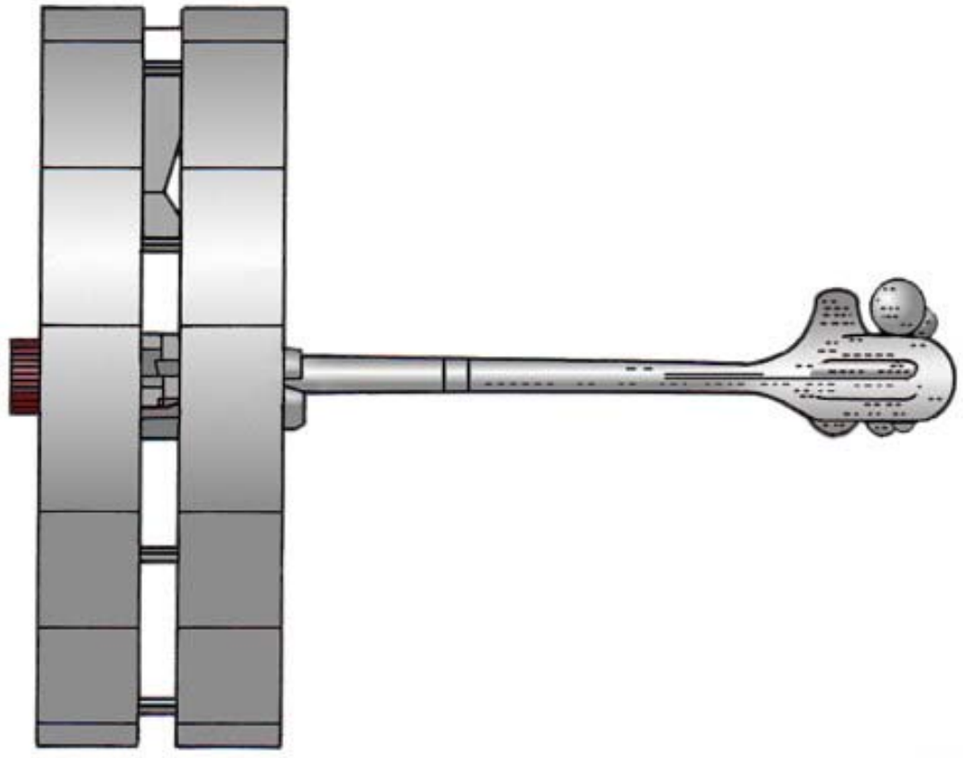
Half Moon (XCV-331) was cancelled during construction once UESPA decided to throw its support behind the new *Columbus* class explorers. The incomplete hull languished in the Utopia Planitia spaceyards until after the war, when it was converted to serve as a testbed for the postwar *Prometheus* class ringships. Construction never started on UESF's *Victory*, as it was cancelled for the same reason as *Half Moon*.

All *Declarations* received a CDP generator backfit during the Earth-Kzin Wars. This backfit started in 2056. *Enterprise* took the longest to backfit because the plans had to first be transmitted to Alpha Centauri via geon hole relay before the system could be built "on site."

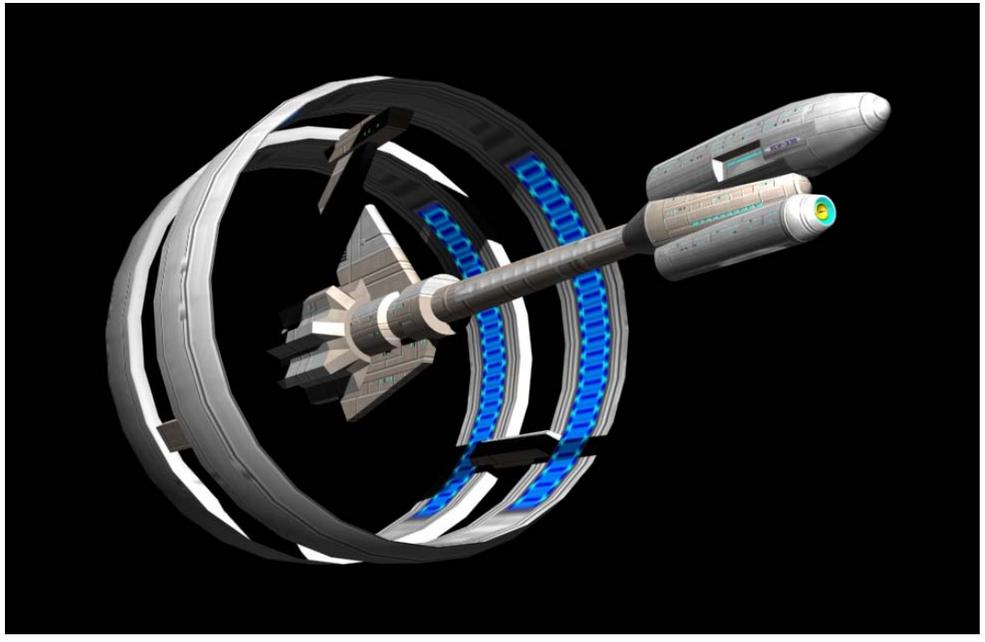
Enterprise (XCV-330) was the second Terran vessel to reach the Alpha Centauri system, although it had been the first launched. It was passed en-route by the newer and faster *Icarus* during its journey. Since *Enterprise* was already beyond the halfway point of its journey by that point its crew elected to continue the voyage. This made *Enterprise* the only *Declaration* class ringship ever to reach its intended destination. That was not the end of its tale, though, because *Enterprise* was destined to go down in history as one of the most famous starships of the Earth-Kzin Wars. It had just finished an extensive overhaul and upgrade at Alpha Centauri, being fitted with the latest in CDP generator technology, when the system was overrun by the Kzinti. *Enterprise*, which was one of the fastest and largest human starship in the system at that time, was used to evacuate a delegation of Centaurean government officials that had been visiting the ship just before the Kzinti overran the planet. *Enterprise* spent the next three years on the run from Kzinti forces before it was eventually found and rescued by a Combined Forces starfleet. Its many adventures during this period would forever associate the name *Enterprise* with interstellar adventure. It was partly for this reason that the name was chosen for the Terran Star Fleet's NX-project of the mid-22nd century.

Ringships, while visually impressive, would and have always remained more of a pleasant eye-catcher than a workhorse starship design. Early Terran starship engineers were never able to fully duplicate the efficiency of Vulcan ringship designs, thus limiting the development path of such designs. By the time that the warp 4 capable *Prometheus* came along in the early 22nd century humanity was fast becoming fixated with the Cochrane boom-and-nacelle approach to starship design. *Prometheus*, the heir to the *Declaration* legacy, would wind up being the last major Terran ringship class ever built.

Schematics

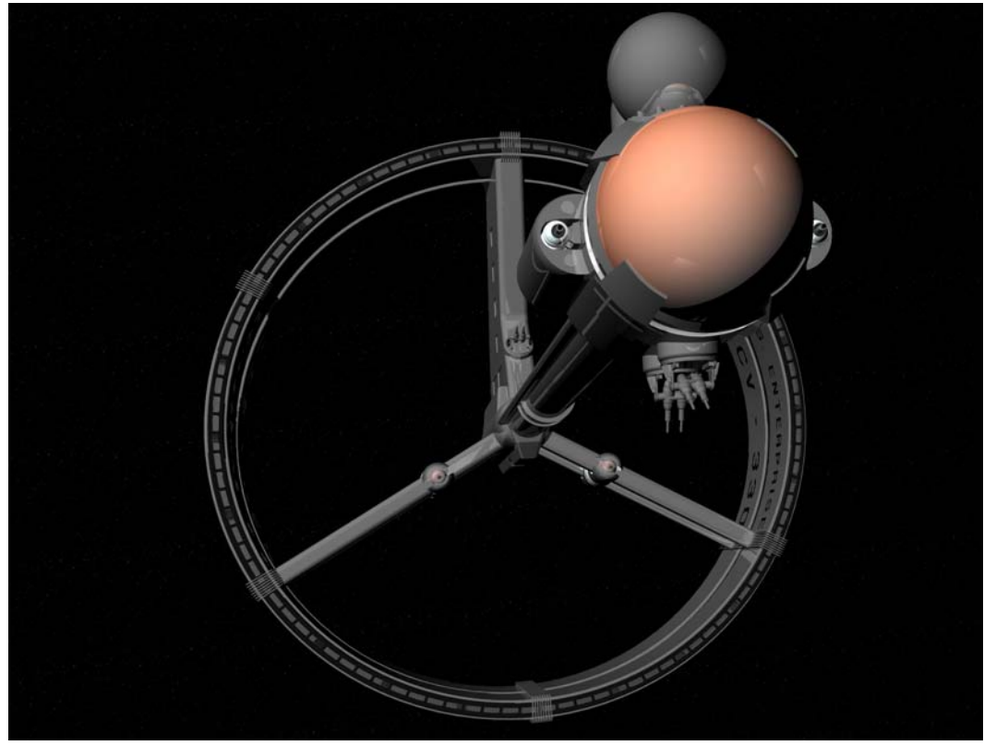


Flying Cloud as launched, c. 2032. *Flying Cloud* was typical of the UESPA-type *Declarations*, optimized for research and exploration as opposed to a more militaristic role. The middle bulge on the command boom is the housing for one of the ship's two lasers. These were fitted one to each side. The foremost two belly blisters on the command boom house specialized sensor and scanner suites. On a UESF *Declaration* these would have been replaced with rail gun turrets and a more sophisticated military sensor suite fitted into the rear blister.



A visual of *Prometheus* (above), the 22nd century descendant of *Declaration*. The visual similarities are immediately obvious. The influence of Vulcan engineering also evident, in particular the single support pylon for the ring. This had originally been part of *Declaration's* design, but the human technology of the 21st century was simply not up building a single support strong enough to withstand acceleration approaching the speed of light. Unfortunately for Terran spaceflight history *Prometheus* and her build group were the last of their kind. Humanity as a whole abandoned ringship development during the turbulent years of the Romulan War. No major human-designed ringship class having been built since.

Enterprise (image to right) was a typical UESF *Declaration*. The visual is how she appeared in 2068, shortly after her return to Terra near the end of the Earth-Kzin Wars. *Enterprise* had just been refitted prior to her flight from the Kzinti invasion of Alpha Centauri and the upgrades are evident in the visual. Particle cannons on the lower ring support pylons are present, replacing the original missile racks. The yard-fitted "cheek" lasers and UESF-mandated rail gun turrets are also in evidence on the command boom.



Significant achievements during normal service life

- Mankind's first purpose-designed major interstellar explorer class.
- *Enterprise* (XCV-330) became one of the most famous starships of its class due to its exploits during the Earth-Kzin Wars.
- *Starliner*, the Terran term originally coined to describe these vessels, quickly evolved into the now-familiar *starship*.

Declaration and Prometheus class ringships created by Walter Matthew Jeffries as interpreted by Rick Sternbach for the _Star Trek Space Flight Chronology_ and Geoffery Mandel for the _Star Trek Maps_

Additional background information courtesy of Stan and Fred Goldstein
Schematic by Rick Sternbach

Visuals by Cozmo Heavy Industries (_Declaration_ prototype), Cary L. Brown (_Enterprise_ ringship), and Atrahasis (_Prometheus_ ringship)

Columbus

ISA/Utopia Planitia deep space explorer
(2040 – 2070)

Specifications as built

Dimensions
- Length: 120.0 meters
- Outer diameter: 37.2 meters

Mass
- Unloaded: 8,600 GMT
- Standard: 240,000 GMT
- Full load: 242,500 GMT

Crew complement
- Officers: 4
- Enlisted: 36

Top velocity
- Cruising speed: warp 0.75 (normal space-time continuum)
- Rated maximum speed: warp 0.85 (normal space-time continuum)
- Rated emergency speed: untested

Endurance
- Standard range: not applicable
- Maximum range: 20 years at warp 0.75

Expected service lifetime: 25 years

Armament as built
- Primary weapons: 4 laser banks
- Secondary weapons: 25 MIM-08 “Greeble” anti-ship missiles
  4 SIS-15 “Thunder” tactical nukes
  (reported, *Columbus* only)

Class listing

Starship name	Hull number	Hull laid down	Commissioned	Status
Columbus	XCV-340	---	16 May 2040	lost
Magellan	XCV-341	---	---	lost
Vespucci	XCV-342	---	---	lost
Adam & Eve	XCV-343	---	12 February 2041	lost
Icarus	XCV-344	---	19 January 2042	museum
Prometheus	XCV-345	---	2 January 2043	lost
Enki	XCV-346	---	5 April 2044	lost

Development history

16 May 2040 — *UES Columbus* is successful launched during an ECON attack that wrecks the spaceyard that built it, marking its official entry into UESPA service.

9 June 2040 — *Columbus* receives extensive meteroid damage during its shakedown cruise when a faulty course change causes it to pass through the outer edges of the Kuiper Belt. It docks at the Utopia Planitia Spaceyards at Mars for repairs. This will take almost two years due to Utopia Planitia's unfamiliarity with the design and infrequent communications with a war-torn Terra.

12 February 2041 — *Adam & Eve* is launched.

4 July 2041 — After taking on provisions, the *Adam & Eve* accelerates out of the Sol System on a mission to explore Barnard's Star. The journey to get there is expected to last nine years.

19 January 2042 — *Icarus* is launched.

28 February 2042 — *Columbus* is re-launched from Utopia Planitia. It returns to Earth for further evaluation and additional work.

23 June 2042 — The *Icarus* leaves on its history-making journey to Alpha Centauri.

2 January 2043 — *Prometheus* is launched

3 May 2043 — The intended Arcturus mission for *Columbus* is scrubbed due to political issues. The mission is reassigned to *Prometheus* instead.

5 April 2044 — *Enki*, last of the *Columbus* class explorers, is launched.

24 August 2044 — After taking on provisions, *Enki* accelerates out of the Sol System with Epsilon Indi as its destination.

21 January 2045 — The UESPA Explorer program is put on hold for "political reasons." The real reasons are twofold; first, the growing cost; second, reduced UESPA resources due to the demands placed on its funding nations by World War III. The *Icarus, Prometheus,* and *Phaeton* are written off as "lost" and no attempt is ever made to recall them.

3 August 2048 — First contact is made with the Kzinti during the *Sakharov* Incident.

8 December 2048 — First contact is made with the humans of Alpha Centauri by the explorer *Icarus*.

2049 — The *Adam & Eve* is is boarded and captured by the Kzinti en route to Barnard's Star. The crew is taken captive and the ship destroyed.

2049-2050 — Timeframe of the "First Earth-Kzin War" per Kzinti historians. Their initial attempt to invade Alpha Centauri is repulsed with the help of the Terran starship *Icarus*.

2051 — All Terran exploratory vessels are recalled as part of the war effort against the Kzinti. *Prometheus* and *Enki* eventually receive these signals, date unknown, and turn back towards the Sol System. *Prometheus* is destroyed shortly thereafter by the Kzinti, date unknown (but confirmed by analysis of its debris field in 2086 and the direction of its travel). *Enki's* return trip is uneventful and it successfully makes it back to the Sol System by 2055.

2052 — *Icarus* begins the long return trip to the Sol System. Among the Centaurean delegate on board is Zefram Cochrane, warp drive pioneer.

2059 — Both *Enki* and *Columbus* are lost in the Battle of the Sol System, along with many others, in order to prevent the intended Kzinti conquest of Terra itself. *Enki* is sacrificed at Ceres, while *Columbus* is the first UESF ship destroyed at Terra.

2067 — The drifting remains of the *Adam & Eve* are found by a UESF patrol craft prior to the beginning of the Battle of Barnard's Star.

2070 — *Icarus*, the last surviving ship of its class, is decommissioned.

2081 — A hard-fought publicity campaign saves the *Icarus* from imminent scrapping. Public funds are raised by the UESPA association to purchase the vessel, with an eye towards restoring it as a museum ship.

2086 — Debris from the destroyed *Prometheus* is finally located, thus confirming its fate.

8 December 2088 — Forty years to the day after its historic mission to Alpha Centauri, the newly restored *Icarus* is installed as a permanent display at the orbital complex of the UESPA Spaceflight Museum on Luna.

Factoids

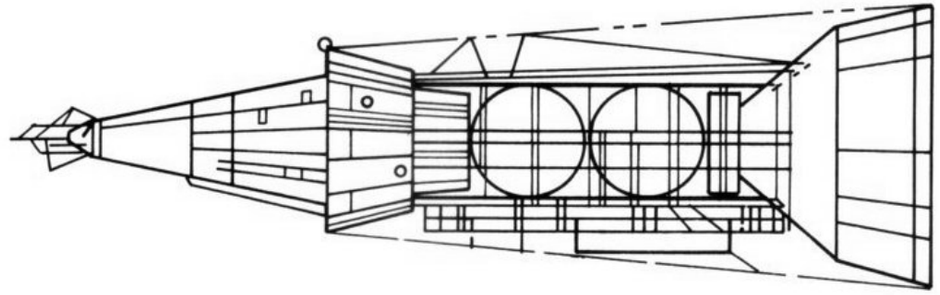
Columbus was the last starship produced at Terra prior to the conclusion of World War III. It was in the process of completion when the Eastern Coalition of Nations (ECON), believing it to be a military vessel, attacked the facility where it and its sister ships were being built. *Columbus* managed to escape intact before its dock was destroyed seconds later; however, two other hulls under construction (*Magellan* and *Vespucci*) were wrecked beyond repair. Four others which were under construction at Luna escaped a similar fate. *Columbus* was destined never to leave the Sol System. It received extensive meteroid damage when an improperly calculated course change caused it to swing through the outliers of the Kuiper Belt during its shakedown cruise. It was eventually repaired but later wound up being destroyed during the Kzinti attempt to conquer the Sol System during the Earth-Kzin Wars. *Adam & Eve* was sent on an expedition to Barnard's Star; however, it was destroyed en-route by the Kzinti just short of its goal. *Prometheus* met with a similar fate enroute to Tau Ceti, while *Enki* never left the Sol System. The development of CDP technology rendered it obsolete within a decade of its launch. It was eventually destroyed at the Battle of Ceres. This action saved the Sol System from a Kzinti invasion armada and would later be recognized as one of the key battles of the Earth-Kzin Wars.

Icarus would go on to fame as the Terran starship that made first contact with the humans of Alpha Centauri. It saw its only combat action during the Battle of the Line in 2059 defending Earth itself from the Kzinti. The only survivor of its class and destined for a post-war boneyard due to its obvious obsolescence, *Icarus* was saved from the scrapper's torch by a fierce publicity campaign. It can be seen today, restored to its original explorer configuration, at the orbital complex of the UESPA Spaceflight Museum on Luna. Museum lore has it that the aged starship's service tech have kept it fully functional and that it could be prepped for spaceflight with a minimum of effort.

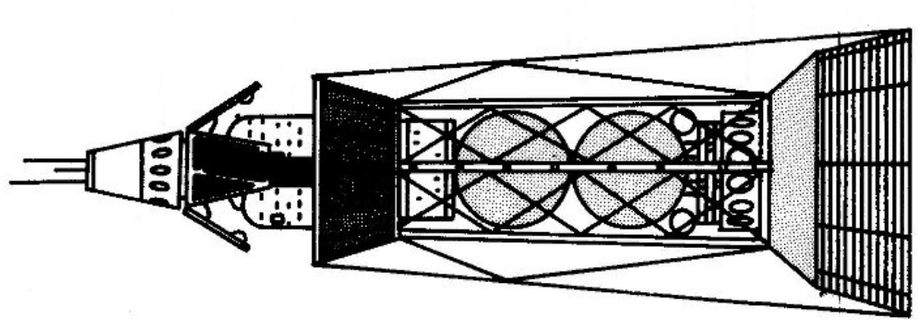
The interstellar journeying envisaged for *Columbus* meant that it was built with a full suite of cryosleep facilities for its crews. These were rarely used, if ever. Rapid advances in Terran propulsion technologies had rendered obsolete the need for cryosleep during spacecraft voyages of extended duration. *Columbus* was the last major Terran starship class equipped with a cryosleep suite of any kind during construction.

The spiked antimatter propulsion system first employed in *Columbus* was something of a novelty at the time; however, the basic theory had existed for years. A supercooled methane-deuterium slush fueled the initial fusion reaction, with pure antimatter being "spiked" into the reactor exhaust much like the afterburner system employed on Terran 20th century jet aircraft. This design was initially derided as "the most expensive [engineering] compromise in the history of mankind;" however, its results were unquestionable. An *Aventeur*-like fuel processing facility could be used to draw additional fusion reactor fuel from any gas giants orbiting the destination solar system or, in a pinch and with additional refining required, from any planetary atmosphere.

Schematics

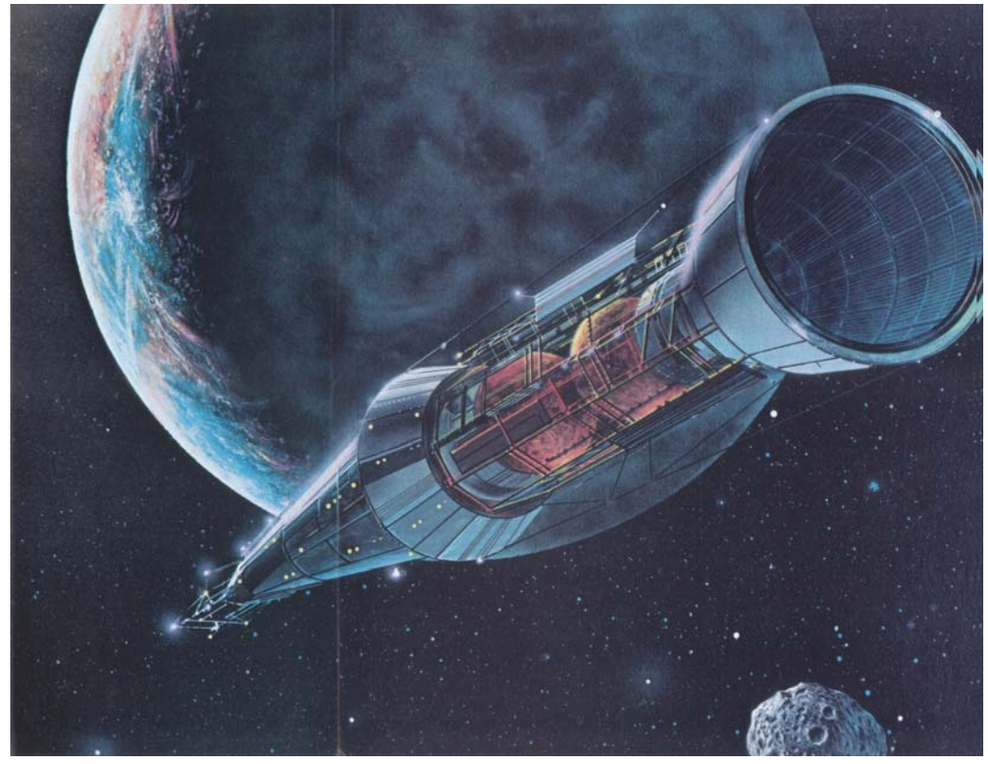


Columbus as launched, c. 2040. Crew spaces and storage holds are in the forward cone. The next two sections contain essential secondary systems, including storage holds and the ship's onboard fuel refinery. The two round spheres are fusion reactor fuel storage (methane-deuterium slush tanks), and are located just in front of the main reactor and antimatter injection system. This feeds a single giant thruster on the rear of the ship.



The configuration of *Columbus* and *Enki* prior to their destruction in the Battle of the Sol System, c. 2059. The entire forward section has been extensively modified, reflecting their intended use as military vessels. However well these intentions were, the exposed fuel tanks of *Columbus* and its sister ship *Enki* would prove to be their doom. Both were destroyed after taking direct hits to their midsections, blowing both ships apart from the resultant explosion. *Enki* had no crew, as it was part of an automated decoy fleet set to lure the Kzinti into a trap at Ceres. The crew of *Columbus* was not so lucky. They were still on board when their ship was destroyed, leaving no survivors.

Icarus in orbit above Athens, the capital city of Alpha Centauri VII and the major inhabited world of the Alpha Centauri system. This image was taken the same day that *Icarus* arrived from a nearby Centaurean solar sailing and was splashed on news headlines around the planet. The individual who took the image remains anonymous.



Significant achievements during normal service life

- First Terran starship design to utilize a spiked antimatter propulsion system, giving it the capability of near-superluminal speed.
- *UES Icarus*, a *Columbus* class explorer, was the first Terran starship to visit an inhabited world outside the Sol System.

***Columbus* class starships created by Rick Sternbach**
as first published in the *Star Trek Space Flight Chronology*

Additional background information courtesy of Timo Saloniemi

Schematics by Rick Sternbach and Lawrence Miller

Visuals by Rick Sternbach, Steve Baron, and Mark Nastaziak

Leif Ericsson

Douglas-Yakyolev DY-X/DY-750 cruiser
(2056 – 2094)

Specifications as built

Dimensions
- Length: 167 meters
- Beam: 90 meters
- Height: 24 meters

Mass
- Unloaded: 7,425 GMT
- Standard: 7,750 GMT
- Full load: 8,000 GMT

Crew complement
- Officers: 15
- Enlisted: 70

Top velocity
- Cruising speed: warp 0.30 (normal space-time continuum)
- Rated maximum speed: warp 0.75 (normal space-time continuum)
- Rated emergency speed: warp 0.90 (normal space-time continuum)
- CDP cruising speed (relativistic): warp 1.66 (1 hour maximum)
- CDP maximum speed (relativistic): warp 2.00 (10 minutes maximum)

Endurance
- Standard range: 6 months under S.O.P
- Maximum range: 1.5 years under S.O.P.
- CDP maximum range: 130 light-years

Expected service lifetime: 25 years

Armament as built
- Primary weapons: 2 RMHL Type 3 medium laser banks
  1 RMHL Type 2 heavy laser bank (optional)
- Secondary weapons: 57 MIM-13 “Goblin” anti-ship missiles
  18 SIS-23 “Wasp” tactical nukes (optional)

Class listing (selected ships only)

Starship name	Hull number	Hull laid down	Commissioned	Status
Leif Ericsson (1)	DY-750/XCV-425	3 December 2054	8 April 2055	museum
John Glenn	DY-754/XCV-426	11 November 2055	2 May 2056	lost
Vasco de Gama	DY-755/XCV-427	---	---	scrapped
Marco Polo	DY-766/XCV-438	---	---	museum
George Taylor	DY-779/XCV-451	4 October 2067	11 Dec. 2067	missing
Columbus	DY-790/XCV-462	---	---	sold

DY-series hull numbers were assigned by Douglas-Yakovlev during construction. XCV hull numbers were those officially assigned by the United Earth Star Fleet as part of the authorization process for the various class build groups.

Development history

2007	CDP generator theory is developed by Dr. Leonidas Solon, a native of Greece and resident professor of physics at the University of Cambridge in England.
2041	The Kzinti Empire conquers the Altair system.
3 August 2048	First contact is made with the Kzinti during the *Sakharov* Incident.
8 December 2048	First contact is made with the humans of Alpha Centauri by the explorer *UES Columbus*.
2049-2050	Timeframe of the "First Earth-Kzin War" per Kzinti historians. Their initial attempt to invade Alpha Centauri is repulsed with the help of the Terran starship *Icarus*.
2050	The surviving elements of the Kzinti invasion fleet retreat in the direction of Barnard's Star, which they plan to use as a base for their next invasion attempt.
2052	The United Earth Star Fleet (UESF) initiates an open competition with military contractors across the Sol System for a new UESF military space cruiser. There are three key requirements. First, it has to be capable of a planetary landing and takeoff under its own power. Second, it has to be capable of operating small craft for planetary survey and recon missions. Third, it has to be warp-drive ready even though practical faster-than-light technology is still decades away. Douglas-Yakovlev begins design work on the DY-X. The idea is to merge a DY-500 with a modified *Venture Star* in order to meet UESF contract requirements.
6 May 2053	World War III ends in an armistice, with the surviving members of the United and Eastern Coalitions signing a ceasefire. This event is precipitated by news of the Kzinti attack on Alpha Centauri.
1 April 2053	Douglas-Yakovlev's Luna Development division completes a working prototype of the DY-X just 129 days after the design is finalized. This prototype, *Leif Ericsson*, is two-thirds smaller than the intended design and has only one central fusion reactor (instead of the four – one main, two auxiliary, one emergency) as called for in the finalized design.
08 August 2053	Kashishowa Station literally disappears from the surface of the moon during a failed CDP generator test as the result of a faulty lithium-based energy converter. Development is set back for about a year while an improved converter assembly is built.
9 June 2054	Two designs are submitted as finalists for the new UESF military space cruiser program. These are the DY-X "Ranger" by Douglas-Yakovlev and the ES-1 "Delta Dart" by the newly formed Cosmadyne Corporation. Their prototypes will be extensively tested over the next three months before a final design is chosen.
19 August 2054	Douglas-Yakovlev's DY-X wins the UESF assault cruiser competition. Before it goes into production, though, the UESF will request that the design be modified to incorporate CDP generator technology. Douglas-Yakovlev's response is to simply enlarge the design, making its internal volume 150% more than the *Leif Ericsson* prototype. The smaller *Ericsson* is retained for use as a training ship.
3 February 2055	CDP generator technology is perfected.
11 November 2055	Construction begins on *UES John Glenn*, the first production model *Leif Ericsson*.
2055-2056	Timeframe of the "Second Earth-Kzin War" per Kzinti historians. Alpha Centauri is defended a second time from a Kzinti invasion fleet, although casualties are high. This comes too early for the *Leif Ericsson*, which has just entered production, and the handful that are finished by "war's end" arrive at Alpha Centauri too late to see any action.
2 May 2056	*UES John Glenn* is launched. It is immediately dispatched to Alpha Centauri. It will not make it in time for the Second Earth-Kzin War and will be destroyed covering the escape of the *Enterprise* during the Third Earth-Kzin War.
2059-2061	Timeframe of the "Third Earth-Kzin War." Two Kzinti attack fleets attack the Sol System while two more attack Alpha Centauri. The Battle of the Sol System rages for eight days. The first fleet is destroyed at the Battle of the Line over Terra itself, with the second is forced to fall back with one-fourth of its ships destroyed at the Battle of Ceres. *Leif Ericsson* is of the keys to turning the Kzinti tide at both battles, though at a tremendous cost in both ships and lives.

2059 — Alpha Centauri is conquered. The survivors flee to the hills, caves, and oceans, while the rest attempt to flee the system in any starship they can get their hands on. Among the few that manage to run the Kzinti blockade is the ringship *Enterprise*, escorted by two DY-X cruisers. They will remain on the run from the Kzinti for three years.

5 April 2063 — Zefram Cochrane perfects warp drive. First contact is made with the Vulcans.

2064-2065 — All UESF craft are hurriedly refitted with true warp drive. Every single surviving DY-X in the UESF inventory will receive this refit.

2065 — The ringship *Enterprise* and its DY-X escorts are located and rescued by the UESF.

2065-2069 — Timeframe of the "Fourth Earth-Kzin War," the last and bloodiest of them all. Humanity goes on the offensive, first driving the Kzinti from Alpha Centauri, then from their bases on Barnard's Star and Altair, and then drives deep into the heart of the old Kzinti Empire. They are able to tear it apart, system by system, planet by planet, piece by bloody piece, thanks to the perfection of warp drive.

2068 — *George Taylor* vanishes without a trace during the Combined Forces drive on the Kzinti home systems. The fate of the ship and its crew remains a mystery to this day.

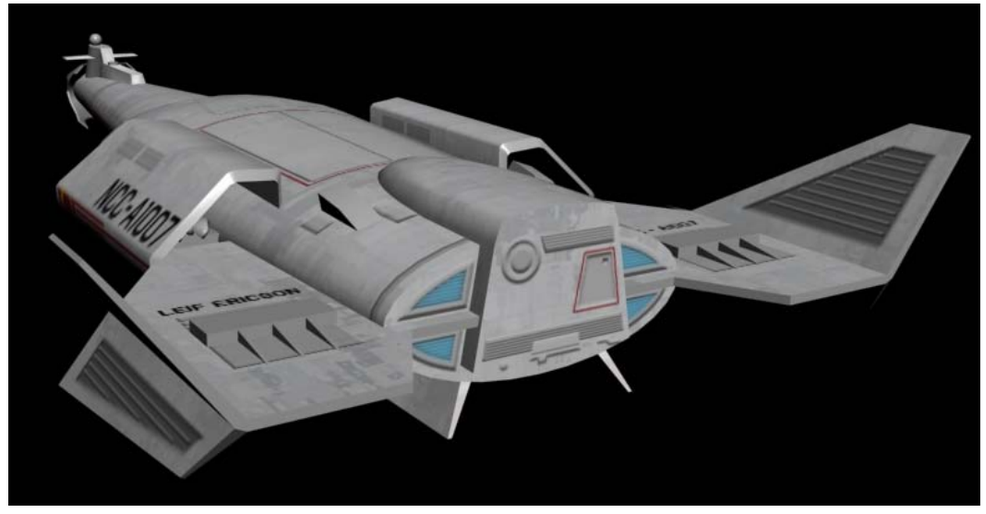
2070 — The end of the Earth-Kzin Wars finds most members of the *Leif Ericsson* class converted to the explorer configuration.

3 October 2073 — *Leif Ericsson*, under the command of Captain Harlan Anders, becomes the first Terran starship to visit Tellar Prime, homeworld of the Tellarites.

2089 — *Vasco de Gama* is the first (and only) *Leif Ericsson* to be scrapped. The public outcry over the event is such that the UESF cancels its plans to scrap the rest of the class. Even so, it has to unload itself of the burden of maintaining these older vessels while new designs and classes are entering service.

2094 — *Leif Ericsson* is officially retired from service. The class is re-designated as the Douglas-Yakovlev DY-750 series transport prior to its transfer civilian service. All *Leif Ericssons* in the UESF inventory, along with a number of older and odd hulls, are sold in what would later become known as "the great *Ericsson* auction." The UESF rakes in huge profits from the auction, which will go toward funding the development and operation of new starship classes. Every single *Leif Ericsson* is sold save two. *Leif Ericsson*, the class prototype, and *Marco Polo*, the first Terran starship to visit the Rigel system, have both been reserved for conversion to museum ships.

Most of the *Leif Ericssons* that were sold still continue in service today as transports or private excursion craft, customized to varying degrees by their owners over the years. Many saw action during the Romulan War, during which eleven were sacked or destroyed by the Romulans. Several were acquired by space pirates and use for illegal commerce raiding actions. These were eventually hunted down and destroyed or captured. At least nineteen survive today and continue operations in the civilian sector.



Pictured above is *Leif Ericsson*, the class prototype, as it appears today. Despite its age the UESPA Foundation has kept it fully operational, with only minor upgrades (such as a compact modern warp engine) as concessions to current starship technology. The UESPA Foundation uses it as an "unofficial spokesman" of sorts for their organization. It routinely visits major Federation worlds and can often be seen along with other vintage starships at various space shows around the Federation. Note that it bears the "A" prefix (antique) as part of its current starship registry number, which is required for such craft.

Factoids

It was under the DY-X program that *Leif Ericsson* was developed, and the designation continued to be used throughout the Earth-Kzin Wars. It was reclassified as the DY-750 armed transport when the surviving hulls were sold off to the civilian sector in the great *Ericsson* auction of 2094. It is by the DY-750 designation that the class is known today.

Leif Ericsson was the first Terran starship class to be fitted with a form of faster-than-light propulsion. The technology was officially known as the *continuum distortion propulsion* (CDP) generator; unofficially, it was simply called the *jump drive*. It was a radically modified form of the propulsion system first used on the *Columbus* class explorers. The unofficial name of "jump drive" came from the fact that the advanced fusion power plants used in Terran starships of the era were simply not powerful enough for sustained cruising at faster-than-light speeds. CDP generators were an engineering kludge designed to allow FTL travel for brief periods for as long as the ship's reactors (and frame) could sustain the speed. By taking a normal hypo-fusion reaction and carefully spiking it with a controlled injection of antimatter, an enormous split-second power burst would be generated that would spin up the ship's CDP generator. This would then automatically generate a subspace field, dropping the ship into the subspace continuum and masking its normal space signature with a virtual bath of Thikhon radiation. This enabling *Leif Ericsson* (within its subspace field) to travel faster-than-light in the normal space-time continuum. This anitmatter-spiked fusion energy burst was of such magnitude that it would allow a *Leif Ericsson* to literally "coast" in subspace at two-thirds faster than the speed of light until there remained insufficient power in the ship's CDP generator to maintain the subspace field. It would then "drop" out of subspace into normal space, where it would have to resort to its ion impulse engines for propulsion and auxiliary reactors for power until the main fusion reactor could be refueled for another CDP burst. Faster FTL speeds were possible but usually impractical due to the tremendous stress they placed on both the ship's frame and its main fusion reactor; also, the extra speed gained was inversely proportional to the amount of time it could maintain its subspace field for FTL travel. The theoretical top limit for emergency speeds was a warp 2 burst for just 10 minutes, beyond which the ship would tear itself apart within seconds. Total turnaround times between successive "jumps" was usually 2-3 hours; however, there are reports of it being accomplished in as little as 53 minutes during the height of the Earth-Kzin Wars. CDP technology was the only practical form of faster-than-light propulsion available to humanity until Zefram Cochrane perfected the warp drive in 2063.

The ability of *Leif Ericsson* to land on and take off from a planetary surface under its own power was first pioneered by *Venture Star*. The major difference between the two, of course, was *Leif Ericsson's* built-in fusion reactors and ion impulse drive. This all but eliminated the need to refuel during every planetary landing, which was one of the weaknesses of its chemical propellant based predecessor.

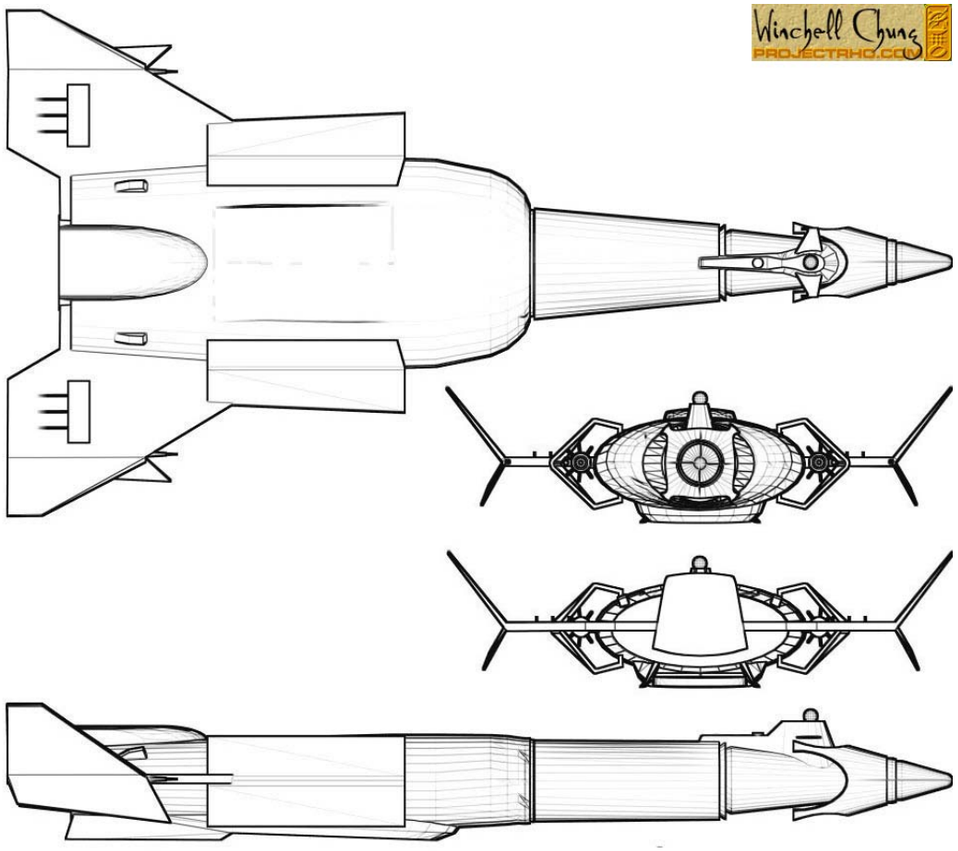
The most significant change in terms of design for Douglas-Yakovlev's latest design was the addition of its enlarged aft hull. This had been a contract requirement by the UESF, since the design was supposed to have a limited small craft capability. The extra room was also needed for *Ericsson's* massive Yoyodyne AFR-25 main fusion reactor, which would be used to power the ship's Bestel-Michelson CDP generator, as well as the two smaller Yoyodyne "Thor" auxiliary fusion reactors and its SpaceOp conventional ion impulse drive. The location and size of *Ericsson's* hangar bay dictated the internal arrangement. The hangar bay was located dead center, with the main fusion reactor and CDP generator system forward. The twin auxiliary reactors were located aft and to the rear of each side of the hangar bay in order to provide room for weaponry and additional ship's systems. The impulse drive was mounted directly aft of the hangar bay.

One feature for the DY-X was retained from its DY-series predecessors. The entire command boom of *Leif Ericsson* was capable of emergency separation in the event of an emergency. Hidden within the boom was a third Yoyodyne MFS-10 microfusion reactor and emergency engine system. This had the same thrust as the old Saturn V rocket and was capable of propelling the boom to a safe distance away from the aft hull within seconds. Douglas-Yakovlev had insisted on the inclusion of the emergency separation feature in the event any of the aft hull's fusion reactors malfunctioned and were in danger of runaway chain reactions. Its inclusion saved the lives of many an *Ericsson* crew during the Earth-Kzin Wars.

All *Leif Ericssons* were originally built in the "Ranger" armed explorer configuration. They could be quickly converted for use as "Knight" armed cruisers within an hour at any suitably equipped UESF base or facility. The most significant changes that occurred as part of this conversion was the installation of a Type II heavy laser in a gimbal mount on the bow and the addition of two more missile racks fitted with "Wasp" tactical nukes. It is reported that most *Ericsson* explorers also carried "one or two" tactical nukes for use in emergency situations, although this was never acknowledged by the UESF.

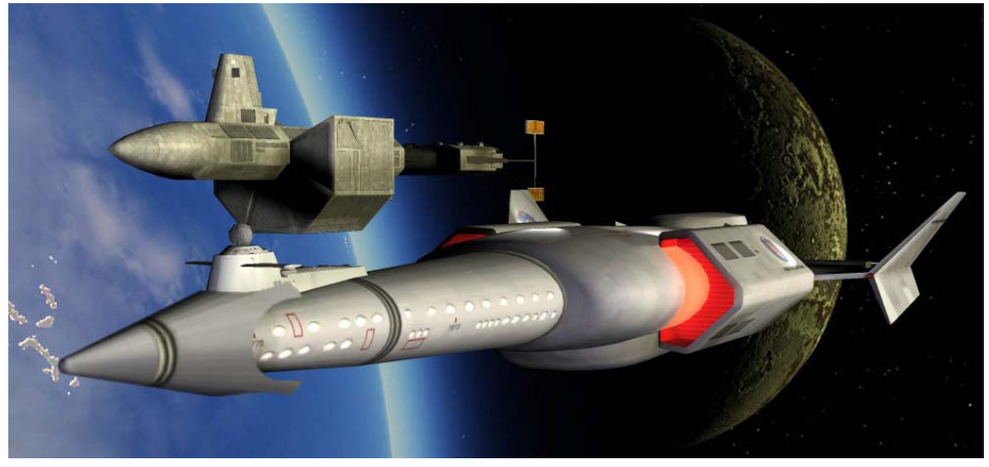
It normally took about 12-14 months to build a *Leif Ericsson* from the laying of the keel to launch. Construction time was cut in half during the peak of the Earth-Kzin Wars using an early form of today's modern component construction techniques, thanks to a joint agreement between Douglas-Yakovlev (the contractor) and Utopia Planitia (owners of the largest spaceworks in the Sol System). Work proceeded simultaneously on six hulls at a time at Utopia Planitia, with major internal and selected external components farmed out to other spaceyards and subcontractors. These finished components were brought together at Utopia Planitia for in-progress installation on the hulls under construction. This technique initially cut construction time down to just over seven months, and to just under three months by the time hostilities ended in 2069. *George Taylor* (XCV-447) was completed in only 68 days, the record for the class. It was lost in 2068, victim of a freak Hasslein curve, while enroute to the heart of the Kzinti Empire during the final offensive of the war. No evidence has yet been found to determine the ultimate fate of the ship and its crew.

Schematics



The original design drawings for the DY-X as submitted to the UESF in 2053. Certain details evident in the production model are conspicuously absent, as these drawings would have been available for public inspection under the New United Nations Freedom of Knowledge act of 2050.

Leif Ericsson, the class prototype, during its 2054 UESF evaluation flights. Despite its reduced hull form factor it had many of the features of the production model, including an operational hangar bay. It was used as a training ship during the Earth-Kzin Wars and later reconfigured as an explorer. It was also the first Terran starship to visit Tellar Prime in 2073 under the command of Captain Harlan Anders.



UES John Glenn (XCV-426) passes a DY-500 Mark I as it departs to join the fight at Alpha Centauri. This visual comparison should give you a good idea of its size. *Glenn* was destroyed covering the escape of the *Enterprise* during the Third Earth-Kzin War.

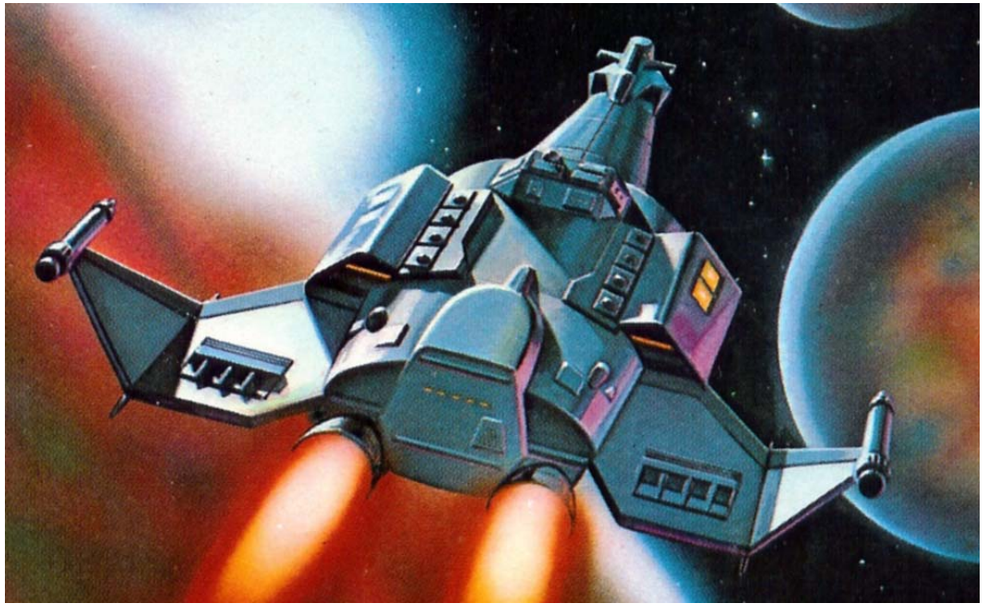
Three-quarters aft view of *Vasco de Gama* as launched, one of the few original production block *Leif Ericssons* to survive the war. Note the presence of the oversized SpaceOp "Sigma" ion impulse system mounted to the rear of the hull. This was replaced not long after the war by the more efficient O'Donnell OID Mark II, contained within a special fairing that appeared to be part of the hull itself. As for *Vasco de Gama*, veteran of the Earth-Kzin Wars, the worn-our starship never made it to the great *Ericsson* auction. It had already been scrapped five years before the auction took place.

An unknown DY-X engaged in launch operations during the Earth-Kzin War. Each DY-X normally carried four collapsible-wing SF-26 "Quail" fighters, or two ST-10 "Duck" assault craft, or a combination of two "Quails" and one "Duck" as the mission required. In civilian service the hangar often served as an oversized cargo bay. It was not unknown for an *Ericsson*-owning trader to carry along a shuttle or two in the bay as well.

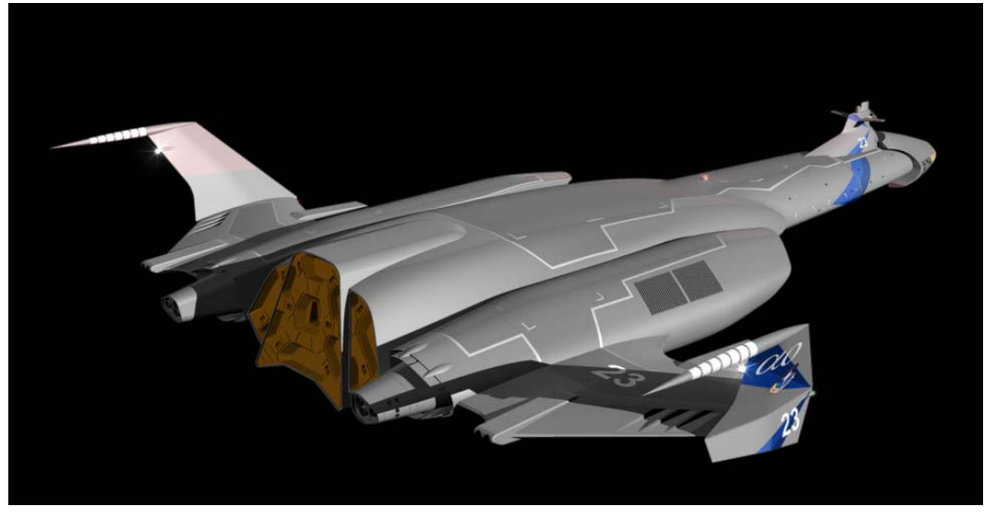
One of the few images of *MacArthur*, the intended successor to *Leif Ericsson*. While *MacArthur* never made it off the drawing board, the new shuttle designed for it eventually became the DS-10 Dreamstar, the most popular civilian starship of its era.

Another rare image – this time of the *John Paul Jones*, the lone prototype of a carrier design derived from the DY-X. The end of the war effectively killed the program, and *John Paul Jones* eventually joined the ranks of *Leif Ericssons* converted for the explorer role. It was eventually sold in the great *Ericsson* auction of 2094. Its current whereabouts are unknown.

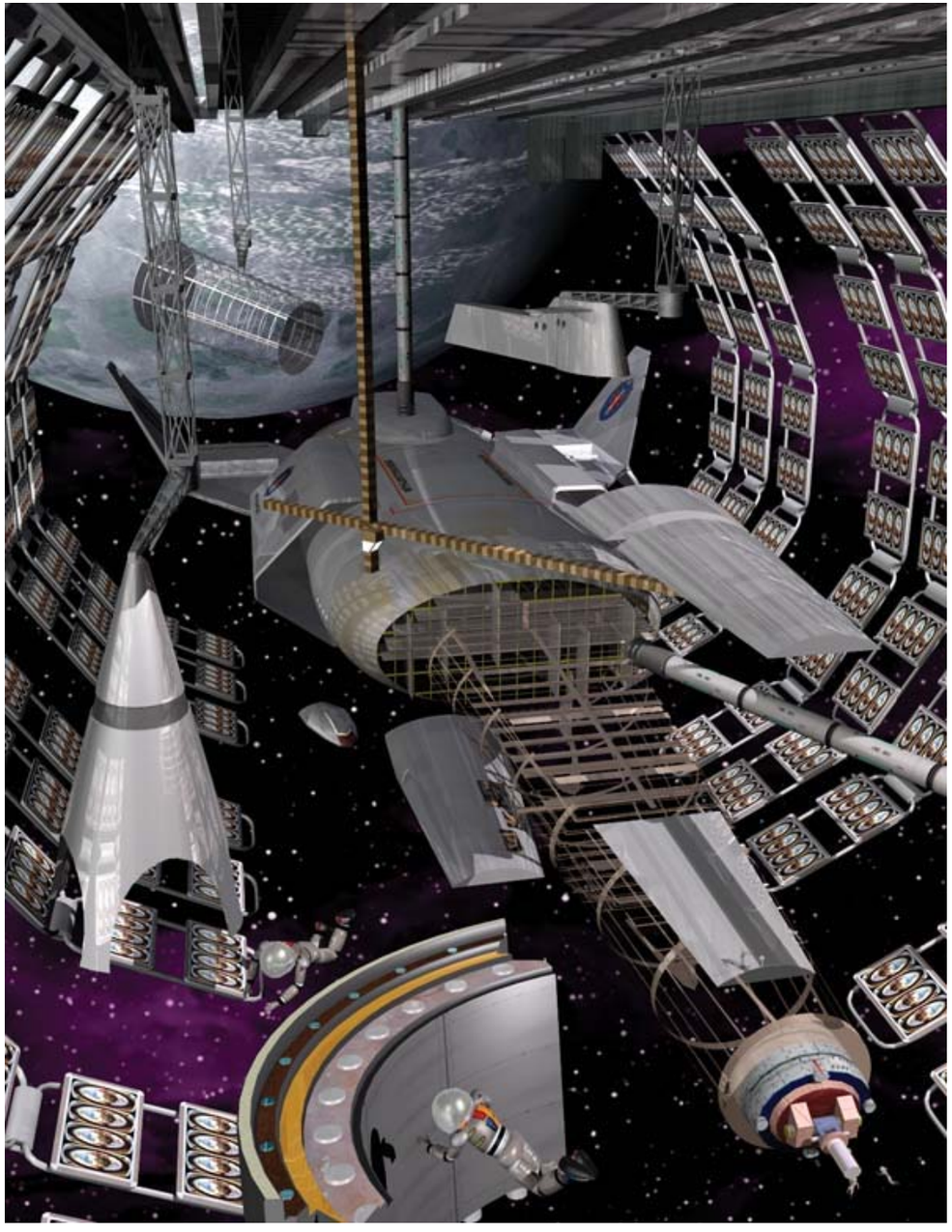
The *Pegasus* scout ship, another DY-X inspired design that never got off the drawing boards due to the end of the Earth-Kzin Wars.



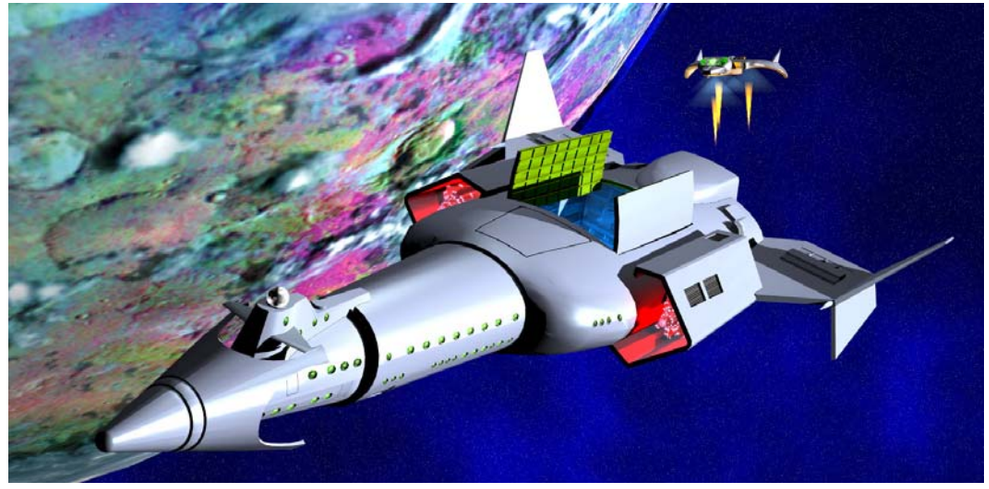
Marco Polo as it appeared in 2079 during its history-making visit to Rigel. Note the beefed-up sensor suite mounted in external hull fairings on the secondary hull. Another obvious modification are the wingtip particle cannons. There is no record of *Marco Polo* ever having to fire them in anger.



Christopher Columbus (XCV-480) was the last of the *Leif Ericssons*. It was named both after the famed Terran explorer and the first Terran starship to make contact with a non-Terran civilization. It was built to a modified configuration because it was intended to serve as a technology testbed for *MacArthur*, the planned successor to *Leif Ericsson*. When *MacArthur* was cancelled (at the insistence of the Vulcans) it left *Columbus* an orphan, the lone ship of its type. Because of this, and despite its obvious external and interior differences, it is usually classified as a *Leif Ericsson* for most historical and reference purposes. It stayed in service longer than its fellows due to its unusual configuration but was eventually sold to private ownership in 2105. At present it is owned by Sonora Shipyards, a firm specializing in custom-built spacecraft.



A DY-X under construction in a Terran spaceyard during the Second Earth-Kzin War.



Significant achievements during normal service life

- First Terran purpose-built military starship.
- First Terran starship capable of extended faster-than-light travel using continuum distortion propulsion (CDP) technology, aka "jump drive."
- Pioneered modular construction techniques used for today's starships.

Leif Ericsson **class starships created by Walter Matthew Jeffries as an unused design from *STAR TREK – The Animated Series* (per Mike Okuda) that was later marked by AMT Models as part of its failed Strategic Space Command line**

DY-750 extrapoliation by Atrahasis and the Stress Puppy
Additional information adapted from the musings of Larry Niven, Timo Saloniemi, James Dixon, Aridas Sofia, and Jason Boguess and the Starship Modeler SSC Forums

schematics by Winchell Chung

Leif Ericsson **visuals by Paul Lloyd, Atrahasis, OrbiterMods, and Winchell Chung**
MacArthur **and "Dreamstar" visuals by Paul Lloyd**
John Paul Jones **visual by Christopher Doll**
Columbus **visual by Steven D. Wilson**
Pegasus **visual by Walter Matthew Jeffries**

Defiant

UESPA interstellar explorer
(2065 – 2067)

Specifications as built

Dimensions
- Length: 92.4 meters
- Beam: 41.1 meters
- Height: 17.0 meters

Mass
- Unloaded: 16,300 GMT
- Standard: 16,900 GMT

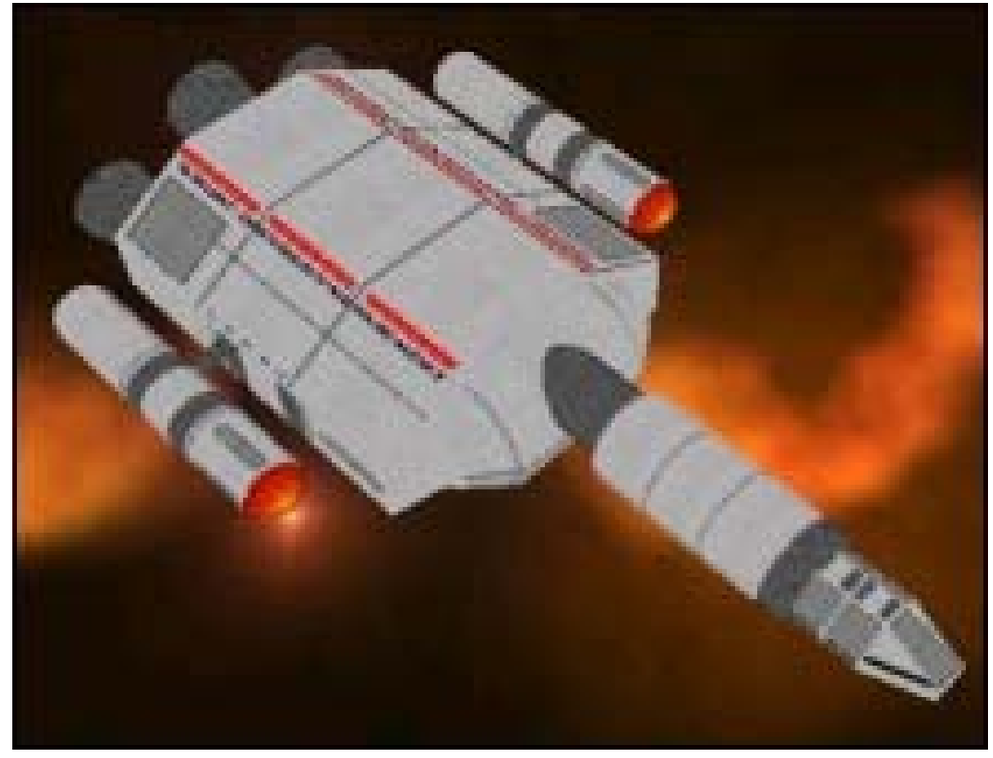
Crew complement
- Officers: 4
- Enlisted: 26

Top velocity
- Cruising speed: warp 2.5
- Rated maximum speed: warp 2.8
- Rated emergency speed: N/A

Endurance
- Standard range: 1.8 years at L.Y.V.
- Maximum range: 10 years at L.Y.V.

Expected service lifetime: 20 years

Armament as built
- Primary weapons: 2 RMHL type 3 medium laser banks
- Secondary weapons: 26 MIM-15 “Goblin II” anti-ship missiles
  4 SIS-23 “Wasp” tactical nukes



Class listing

Starship name	Hull number	Hull laid down	Commissioned	Status
Defiant	UESPA-5/XCV-443	2058	2065	lost
Valiant	UESPA-6/XCV-444	2058	2065	lost

Development history

2049 — The *Akademik Mstislav Keldysh* class battlecruisers are first proposed as part of a UESF discussion forum on how to best fight the Kzinti.

2058 — Approval is finally granted for a modified version of the *Keldysh* to be constructed. This modified version will feature both conventional fusion propulsion and CDP generator technology.

2059 — The first two *Keldysh* class battlecruisers are under construction at Terra when a Kzinti invasion armada attacks the Sol System. Both ships, along with many others, are badly damaged in the subsequent Battle of the Line, which is fought in defense of Terra itself. Hundreds other vessels are destroyed or wrecked beyond repair. The debris from the battle will continue to drift around Terra and other locaions within the Sol System for almost two decades.

5 April 2063 — Zefram Cochrane perfects warp drive. First contact is made with the Vulcans.

mid-2063 — UESPA representatives meet with the UESF to raise the possibility of salvaging the two *Seneca* hulls for use as warp drive starships. To their surprise, the UESF is open to the idea – provided that UESPA provides all of the funding for the conversion and full data on the new Cochrane-designed warp engines that will be fitted to them. UESPA agrees only after the UESF relinquishes all claim on the hulls and any right to appropriate them for military service. Both sides feel they are getting the best of the deal.

2065 — *Defiant*, first of the converted *Keldysh* class cruisers, is launched.

Valiant, second of the converted *Keldysh* class cruisers, is launched.

2066 — *Defiant* and *Valiant* are both sent on long-range exploratory missions "to the edge of the galaxy." *Defiant* will be traveling to the lower "edge," while *Valiant's* destination is the upper "edge." These are the first deep-space missions launched since the beginning of the Earth-Kzin Wars.

Among the first of *Valiant's* discoveries is the planet Terra Nova, a habitable world only 20 light-years from Earth. It is immediately targeted for colonization. This is an action that the UESF encourages, albeit for reasons of its own.

2067 — By this year the Combined Forces had driven the Kzinti out of Local Group systems and are threatening the outer colonies of the Kzinti Empire itself. The fighting is now far enough away for things to return to "normal" within Local Group space. Colonization efforts by various Terran groups begin a sudden upsurge, all with the blessing of UESPA.

Valiant is caught in a magnetic storm and swept millions of light-years off course. The damaged ship is eventually deposited near the Galactic Barrier, its warp engines wrecked. It takes the ship's crew eleven months to repair them.

All contact with the *Valiant* is lost.

Defiant is destroyed by the previously unknown Barrier Alliance. There are no survivors.

2068 — *Valiant* is destroyed by its own commander, Captain Carlos Tarasco, after a fateful encounter with the Galactic Barrier and its psionic effects.

2071 — News of the *Defiant's* loss reaches UESPA, thanks to a passing colony ship that has picked up its distress signal. UESPA can only presume that a similar fate has befallen the *Valiant.*

UESPA records the *Valiant* as "missing, presumed lost."

UESPA makes the decision not to attempt any more explorations of the edge of the galaxy. It will be almost two centuries before another starship crewed by humans attempts a similar mission.

NOTE: The flight data recorder of the *Valiant* was recovered some two centuries later by the starship *Enterprise* on 24 June 2265. This has provided historians and researchers with a fairly detailed account of the doomed starship's journey and what really happened to it and its crew at the Galactic Barrier.

Factoids

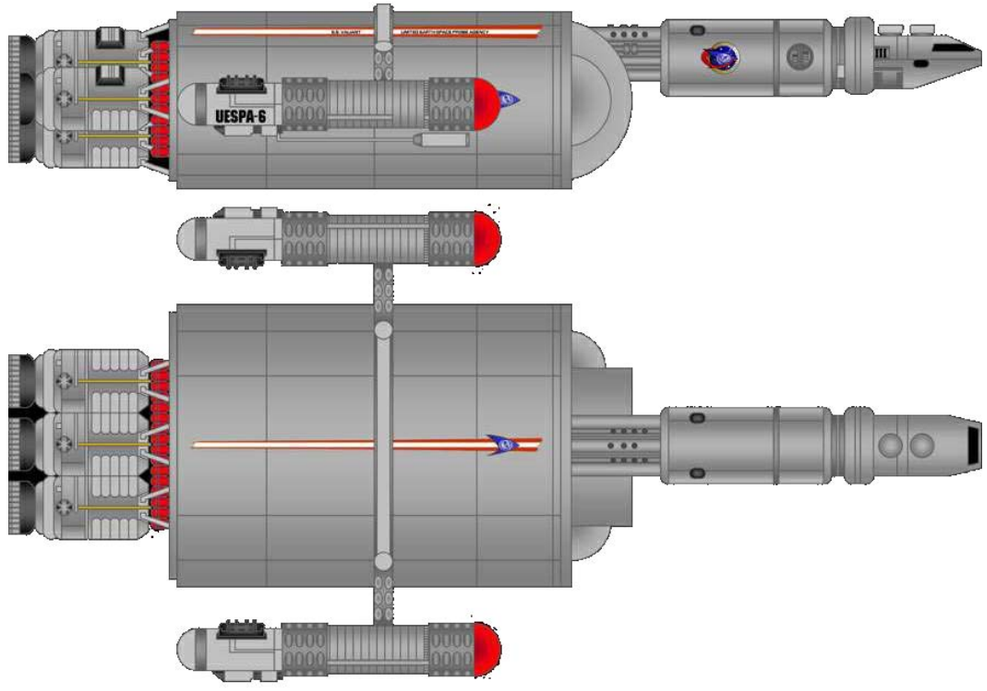
One might think that the UESF would have been opposed to the launches of *Defiant* and *Valiant*, given the state of the Earth-Kzin Wars at the time. Far from it. They had both been built from surplus hulls, converted from two unfinished *Keldysh* class battlecruisers that had been extensively damaged in their spacedocks during the Battle of the Sol System in 2059. When UESPA raised the possibility of repairing the hulks for use as warp drive explorers, the UESF was all for it – especially after UESPA agreed to 100% funding of the effort. The UESF saw these missions as practical demonstrations of warp drive technology without having to expend any of its own resources. In short, they were getting something for nothing – proof that warp drive technology work with next to no effort on their part. The UESF would move quickly to build (and convert) its own warp drive starships once long-range communications from both ships proved the effectiveness of Cochrane's new propulsion system.

The missile batteries, in particular the tactical nukes, were installed at the insistence of the UESF over the objections of UESPA. They pointed out (correctly, as later events would show) that interstellar space was full of plenty of dangers, aside from stray Kzinti vessels, and it would be best for the commanders of *Defiant* and *Valiant* to have a full range of options available in such situations. UESPA soon found another use for the boom-mounted MIM-type rotary missile launcher. They developed for *Defiant* and *Valiant* the first Terran "probe" missiles. These were little more than surplus older UESF "Ghola" type missiles fitted with a limited sensor package instead of a warhead. They were natural outgrowths of remote sensor drone technology already in use by the UESF during the Earth-Kzin Wars, and were not all that different in principle from the early sounding rockets of the 1940s and '50s or the RPVs of the late 20th and early 21st century. These "probes" greatly expanded the range of sensor capabilities of these vessels. It was a probe launched from the *Valiant* in 2066 that first detected the planet Terra Nova and found it habitable, thus making possible its subsequent colonization. Probes quickly became standard issue on all Terran starships.

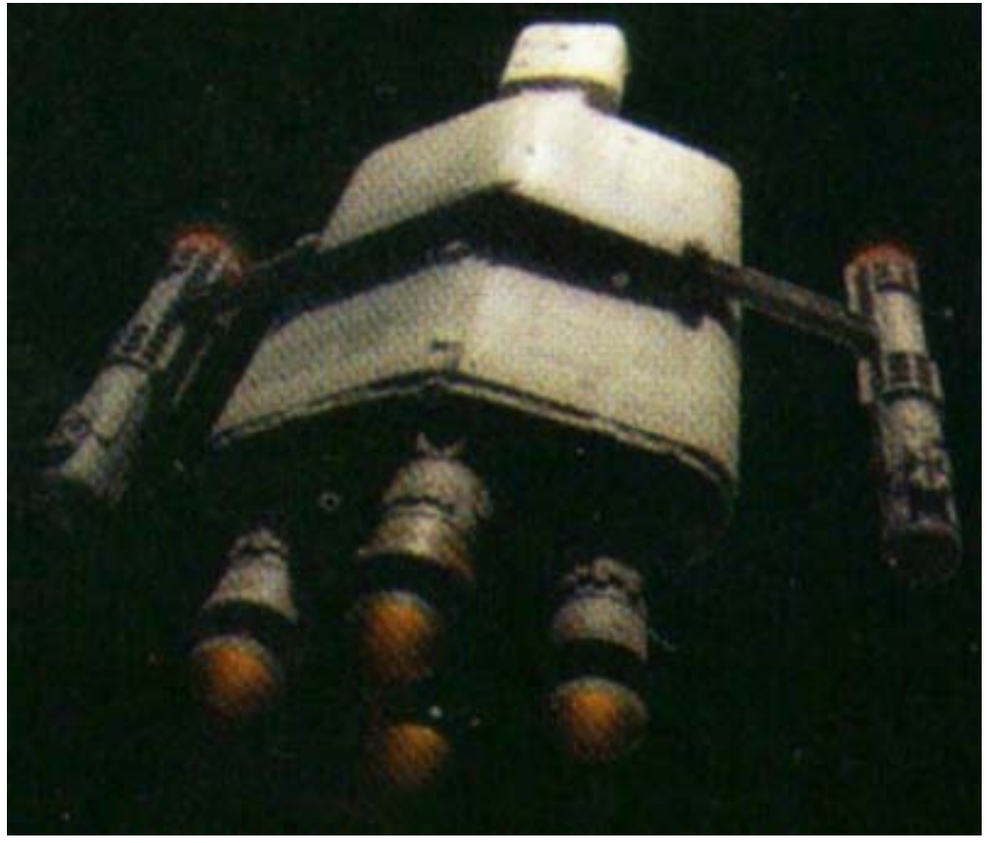
As originally designed the large central section of these ships would have been a slush tank fueling the fusion-based impulse drives on the ship's aft quarter. By the time *Defiant* and *Valiant* was actually built such an extensive fuel store was no longer necessary, given their new warp engines. Only the back quarter remained impulse fuel storage. The room gained was used to house the ship's new warp core, a fully equipped science lab, a small medbay, spacious crew quarters (by the standards of the time), gear and supplies storage, and even a small recreation room complete with mini-gym.

Attempts to improve on *Valiant* and *Defiant* would quickly evolve into the *Conestoga* class "colonizer" of 2067

Schematics



Valiant as launched, c. 2065. *Defiant* was almost identical save for an enlarged command boom, which added 600 GMT to its mass. Experienced students of starship history will quickly note the obvious "add-on" configuration of the warp engines, with both being mounted on clamp-type supports instead of dedicated support pylons. The main disadvantage of this configuration was that both warp engines had to be jettisoned in the event of failure, leaving the ship with no FTL capability whatsoever.



Defiant, class ship and sister vessel of the ill-fated *Valiant*, propels itself on its own journey to the southern “edge” of the galaxy ... and into the pages of history.

Significant achievements during normal service life

- First Terran interstellar exploration craft equipped with Cochrane warp drive.
- First Terran starships to use survey probes (conventional missiles fitted with sensor packages instead of warheads).

Defiant class starships created by Greg Jein and Michael Okuda as first published in Michael and Denise Okuda’s _Star Trek Encyclopedia_

Additional background details courtesy of Greg Jein, Michael Jan Friedman, Timo Saloniemei, the Daystrom Technical Institute, and James Dixon

Schematics courtesy of the Daystrom Technical Institute

Mesh source unknown, model by Greg Jein

Pioneer

UESPA interstellar colonizer
(2066 – 2098)

Specifications as built

Dimensions
- Length: 197.2 meters
- Beam: 71.0 meters
- Height: 34.9 meters

Mass
- Unloaded: 59,850 GMT
- Standard: 80,000 GMT (including 20,000 GMT of cargo)
- Full load: 81,375 GMT (including 20,000 GMT of cargo)

Crew complement
- Officers: 5
- Enlisted: 20
- Passengers: 200 (colonists in cryosleep capsules)

Top velocity (*)
- Cruising speed: warp 1.0 (1.6)
- Rated maximum speed: warp 1.3 (2.0)
- Rated emergency speed: warp 1.5 (2.3)

(*) Numbers in parenthesis reflect second build group authorized in 2074

Endurance
- Standard range: 3 years at L.Y.V. (non-colony missions)
- Maximum range: 10 years at L.Y.V.

Expected service lifetime: 10 years

Armament as built
- Primary weapons: none
- Secondary weapons: none

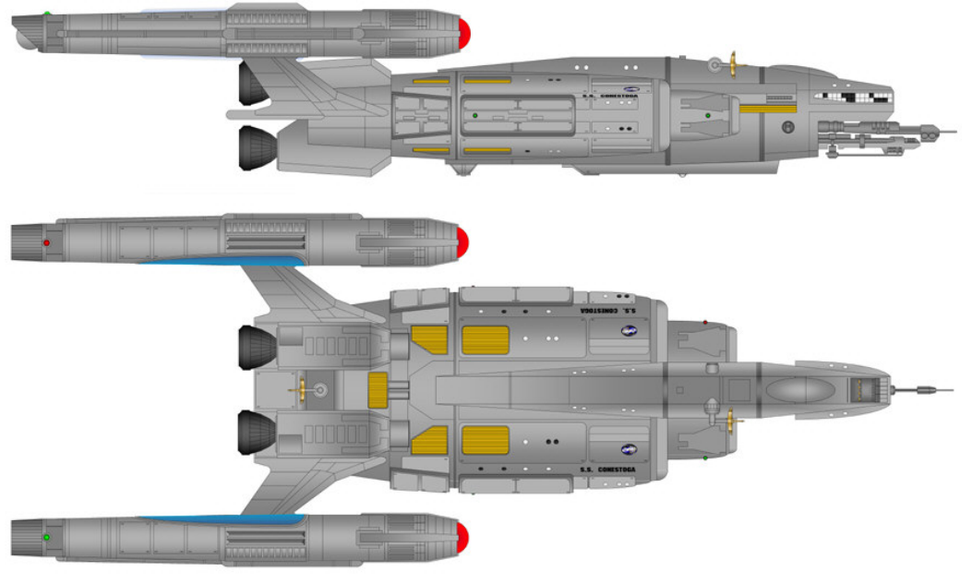
Class listing (first build group only)

Starship name	Hull number	Hull laid down	Commissioned	Status
Pioneer	XCV-450	19 July 2064	27 February 2066	dismantled
Conestoga	XCV-451	22 August 2065	8 March 2067	dismantled
Netychanka	XCV-452	---	2068	dismantled
Overland	XCV-453	---	2069	---
Concord	XCV-454	---	2070	---
Surrey	XCV-455	---	2071	---
Carryall	XCV-456	---	2072	---
Buckboard	XCV-457	---	2072	---
Caravan	XCV-458	---	2073	---
Phaeton	XCV-459	---	2073	---
Troika	XCV-460	---	2074	---
Dray	XCV-461	---	2074	---

Development history

2063	A UESPA development team begins looking at ways of building a long range, warp capable colonization ship.
	The *Pioneer* design is finalized. It follows the same general design lines as a modified *Keldysh* (*Defiant* and *Valiant*) but is roughly twice the size.
	Utopia Planitia is awarded an initial contract for twelve *Pioneers*, to be completed at the "leisurely" rate of one per year so as not to interefere with the war effort. After the war this rate will double, and later triple (later build groups)
19 July 2064	*Pioneer's* keel is laid.
2065	Both *Defiant* and *Valiant*, the ships that inspired the *Pioneer* design, are launched.
22 August 2065	*Conestoga's* keel is laid.
27 February 2066	*Pioneer,* lead ship of its class, is launched.
8 March 2067	*Conestoga*, second ship of its class, is launched.
2068	*Netychanka* is launched.
2069	*Conestoga* leaves the Sol System on a colonization mission to the Eta Cassiopeiae system.
2071	The construction rate for *Pioneer* doubles due to the end of the Earth-Kzin Wars.
2074	A second build group of eighteen *Pioneers* is authorized in order to keep up with demand.
23 June 2078	*Conestoga* lands on Eta Cassiopeiae III. It is subsequently disassembled as part of the founding of the Terra Nova colony.
2083	UESPA announces its intention to the Terra Nova colonists of sending a second colonization ship in their direction. Led by former *Conestoga* first officer Mark Logan, the Terra Nova colony transmits its opposition to UESPA's plans back to the Sol System and threatens violence against anyone else who sets foot on their new home.
	A radioactive asteroid slams into Eta Cassiopeiae III, blanketing the planet in radioactive dust and haze. All contact with the Terra Nova colony is subsequently lost. Its fate will remain unknown until 2151.
2086	*Netychanka* arrives in the Ophiucus star system, where a habitable planet is soon located. This will become known as the Ophiucus Colony, one of mankind's oldest and most profitable extra-solar settlements in Local Group space.

Schematics



Pioneer as launched, c. 2066. The design heritage owed to the *Keldysh*-derived *Defiant* is almost immediately obvious. This time around, though, a dedicated dual-engine warp drive system replaces the cobbled clamp design of its predecessor. The design is also more streamlined, as it was built from the keel up as opposed to being a conversion of an existing hull. It should be noted that, despite the design similarities, *Pioneer* was over twice as large as *Defiant*.

Factoids

Pioneer was the right ship at exactly the right time. People lined up in droves for *Pioneer* colonization missions to new worlds because they were sick and tired of war. Most of them had grown up on a Terra ravaged by World War III or had escaped from those parts of the planet still controlled by post-war despots who cared little about life. The rest were from Sol System colonies ravaged by the Kzinti or Centaurean refugees who had lost both home and loved ones in the battle over their homeworld. They wanted as little to do with war and fighting as they could manage, and the prospect of setting up a new home far from any possibility of war had instant appeal.

A *Pioneer's* multiple holds held 20,000 tons of cargo -- practically everything needed to set up a basic site for a colony of 200 humans. The ship would land at a suitable site, the colonists would disembark and set up their colony, then strip the ship for whatever other resources they needed, such as power generation and recycling systems. There was no question of going back home; "home" was now the new world upon which the colonists had now set foot. To make their *Pioneer* spaceworthy again would require dismantling the colony, thus endangering the lives of those who wanted to remain in their new "home" – and, to be honest, only a few of the colonists *might* have the skill necessary to rebuild their ship given enough time. Also, there was only enough food in the ship's stores to feed the whole colony for 18 months, possibly 22 at the most. It was not enough for a return trip in most cases, which meant that the new colony had to become self-sustaining within two years or face the prospect of death by starvation. There was no going back because the ship had already been dismantled and the next that *might* arrive was years away. This conundrum served as the basis for a popular saying from era: "Flying a *Pioneer* is strictly a one-way trip."

Pioneer was the first Terran starship class built with a duranium alloy hull.

All ships in the *Pioneer* class were named after horse-drawn vehicles from Terra's 18th and 19th centuries. For example, *Pioneer* is short for "pioneer wagon." It also happens to serve as an apt description of the ship's main mission profile; hence its choice as the class name. *Overland* is short for "overland coach," *Buckboard* was named after the most common type of wagon found on the American Western frontier, *Carryall* was named after a sport carriage designed to hold four passengers, and so on.

The most famous member of the *Pioneer* class, of course, is *Conestoga*. This was the ship used to found the ill-fated Terra Nova colony on Eta Cassiopeiae III. The colony was opposed to UESPA's plans to send a second colonization vessel, the *Surrey*, once the news was transmitted to them. Terra Nova broke contact with Earth in 2083 after threatening violence against any the crew of any Earth vessel that attempted a landing. After consulting with the UESF, the authorities decided to leave them to their fate. It was only after a "casual" visit by a passing Star Fleet vessel in 2151 that it was learned a radioactive asteroid had struck the planet, devastating Terra Nova.

Significant achievements during normal service life

- First warp-capable Terran colonization craft.
- First Terran starship with a duranium alloy hull.
- *Conestoga* was used to found Terra Nova, the first self-sustaining human space colony outside the Sol System.

Conestoga class starships created by John Eaves and Doug Drexler as depicted in the _STAR TREK – Enterprise_ episode "Terra Nova"

Additional background material based on the efforts of Timo Saloniemi

Schematics by Sven Lindeman, courtesy of Ex Astris Scientia

Visuals courtesy of CBS Paramout

TO BE CONTINUED ….

DEVELOPMENT NOTES FOR HARDCORE FANS

I start where I do in this edition with Terran spacecraft designs that were actually capable of breaking orbit. This includes those that could have if necessary, such as the various space shuttles. The Saturn V was obviously the first of these to achieve this accomplishment; hence it is the first to be featured in this work.

Buran

The names *Baikal* and *Burya* were put up by the Soviet Union at various times, complete with doctored photographs, in order to confuse intelligence concerning the *Buran* program. I am using these as names for the third and fourth shuttles in the program since these were never named in reality. The name *Kutuzov* for the fifth *Buran* comes from the novel *Winter Hawk* by Craig Thomas, which features a similarly named Russian space shuttle.

DY-series classes

Similar to the contemporary submarines of the day. Fandom commonly lists displacements in the 15,000-45,000 DWT range. This is way too high given the fact that real-world materials, such as naval grade steel, would have been used in their construction. Contemporary submarines of comparable size only have displacements in the 2,000 to 6000 DWT range. I go with the original SFC figures for DY-series gross mass since they appear to be the more accurate.

Venture Star

I am deliberately giving the name as two words to mark one of many differences between the TREK timeline and our own that begin happening in the early 21st century. Remember, in our reality the *VentureStar* program (one word in reality) was cancelled because of high cost and the inability to work out the problems with its engine design. This document assumes that fusion power developed early in the TREK timeline and was thus available to effectively bail out the program. I am open to suggestions on construction dates. The ones I have tentatively listed are inspired by those of the OV-100 program but they "seem" too long, if you get my drift.

Aventeur

I went with a four-year period of construction since this is the average time for building a space station core (or Salyut, which was launched in one piece). IMHO this is the *minimum* amount of time it would take to build an early 21st century spacecraft, presuming ground assembly of its main components and then several ferry-trips into orbit. It will remain like this you get significant infrastructure in space, such as bases on Luna and Mars for low-gee construction facilities.

Gailieo

The name of the primary designer, the British Rocket Group, is taken from Nigel Kneale's *Quartermass* series of stories. This is my homage both to British science fiction and British efforts in the development of Terran spaceflight. It's also a nod of sorts to *Doctor Who*, the most successful and longest-running television series in science fiction history. The British Rocket Group was credited with the development of the Guinevere One space probe as featured in the Ninth Doctor episode "Aliens of London."

"Space pool" and the Prospector War were some things I had originally developed for the *FSC* First Edition but had to cut due to lack of space. They were largely inspired by the range wars of the American Wild West and the lengths the involved parties would go to in order to win their cause. The Prospector War is alluded to, if not expressly mentioned, in the *FSC* Volume 3 introduction.

Declaration

Removed Zefram Cochrane's presence aboard the *Enterprise* during the flight from Alpha Centauri, which is where I put him in the *FSC* first edition. Per the official canon timeline this means he wouldn't have made it back to Earth in time to "invent" warp drive per *First Contact*. Had to bump all the dates for the Earth-Kzin Wars to make them fit with canon (urgh!); hence the change in Cochrane's means of transport to Earth. Utter balderdash – he had already invented it in 2048 and just needed to work the bugs out, but hey! This is supposed to be a canon-ish work, right? (sheepish grin) Lost some of the backstory I had originally developed for the ringship *Enterprise*, but that's the way the ball bounces.

Oh, and in case you haven't figured it out by now, I still refuse to accept the canon premise that "of Alpha Centauri" (TOS "Metamorphosis") only meant that was the last place Cochrane lived prior to his presumed death. No more than Napoleon was "of St. Helena" or the Shah of Iran was "of the United States." This is the first time, but by no means the last, that I will refuse to toe the canon line in this work whenever its reckoning of *TREK* history is obviously at fault.

Some of my original FSC sources say it took the ringship *Enterprise* 11 years to reach Alpha Centauri. That means it had a normal cruising speed of 0.40c per lightspeed conversion tables. In comparison, it only took *Icarus* 6 years to get there at 0.75 per the SFC. That jives with the conversion table figures. The hypothetical "emergency speed" for *Enterprise* is there to allow for them having a bit of troubling getting their newly installed CDP generator on line while they were being pursued by the Kzinti in their flight from Alpha Centauri. It was either keep on accelerating or else. Kinda what we saw on screen a few times (TOS "That Which Survives," TAS "The Counter-Clock Incident.")

I only have one beef with Cary Brown's excellent ringship *Enterprise* mesh. He depicts only one wide ring instead of two smaller ones per the original Jeffries sketchs. Still, save for that one fault his is currently the most faithful mesh out there for the "early" Jeffries ringship concept. I threw in a pic Atra's excellent "later" mesh for comparison purposes (as well as sheer eye candy).

Leif Ericsson

I'm using the *Star Blazers* concept of the "jump drive" to explain *Ericsson's* CDP generator technology and limitations. *Ericsson* can no more maintain a constant "jump" than can the *Yamato (Argo)* maintain a constant "space warp," especially in the earlier *Star Blazers* shows. I've also limited just how far it can go to Local Group space, as opposed to the intergalactic voyaging as depicted in *Star Blazers.*

If you think the burst-and-coast concept of CDP "jump drive" sounds silly, just visit a drag racing strip sometime, or better yet watch some skateboarding. I think you'll get the idea pretty quickly.

Yeah, I know I went ape on the images of *Ericsson* and its spinoffs. So I like the ship, okay?! It won't be the first time that happens in this book.

Conestoga

This ship is soooooooo messed up mission-wise … aaaaarrrghh!!! Like before with the *FSC*, I finally wound up keying off of Timo's notes out of sheer desperation. It looks more like a military cruiser, not a colony ship! Even so, I can't overlook the *Valiant-to-NX* lines that it has. Make a great "'tween" starship class, if nothing else.

I scaled back Timo's mass figures by roughly one-quarter to account for the fact that most of the ship was comprised of cargo holds. I also threw in the bit about its duranium construction for two reasons: first, to explain the dramatic upsurge in mass; second, because it's about "right" in the canon timeline for duranium-hulled starships to begin appearing per *ENTERPRISE.* That was probably one of the few technological tricks that the Vulcans shared at that time regarding the building of warp-capable starships.

From this point forward starships will take about two years to build, mainly due to fabrication of their duranium alloy hulls (*ENTERPRISE*).