STAR TREK™

DESIGNING STARSHIPS

THE ENTERPRISES AND BEYOND

eaglemoss HERO COLLECTOR

MORE THAN 30 SHIPS IN EXTRAORDINARY DETAIL

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The greatest thanks of all are due to Gene Roddenberry and Matt Jefferies, who started it all and gave us a genuinely new kind of starship that has provided an amazingly adaptable template for what has followed. They are both much missed, but their legacy lives on.

We'd like to thank in no particular order Andy Probert, Richard Taylor, Herman Zimmerman, Rick Sternbach, John Eaves, Alex Jaeger, Doug Drexler, Bill George, Nilo Rodis, Greg Jein, Adam Buckner, Ron B. Moore, Dan Curry, Ricardo Delgado, Jim Martin, Rob Bonchune, Adam 'Mojo' Lebowitz, David Lombardi, and Steve Burg, all of whom contributed to this book when they gave the original interviews for *STAR TREK The Magazine* and *STAR TREK The Official Starships Collection*. They could not have been more helpful or generous with their time.

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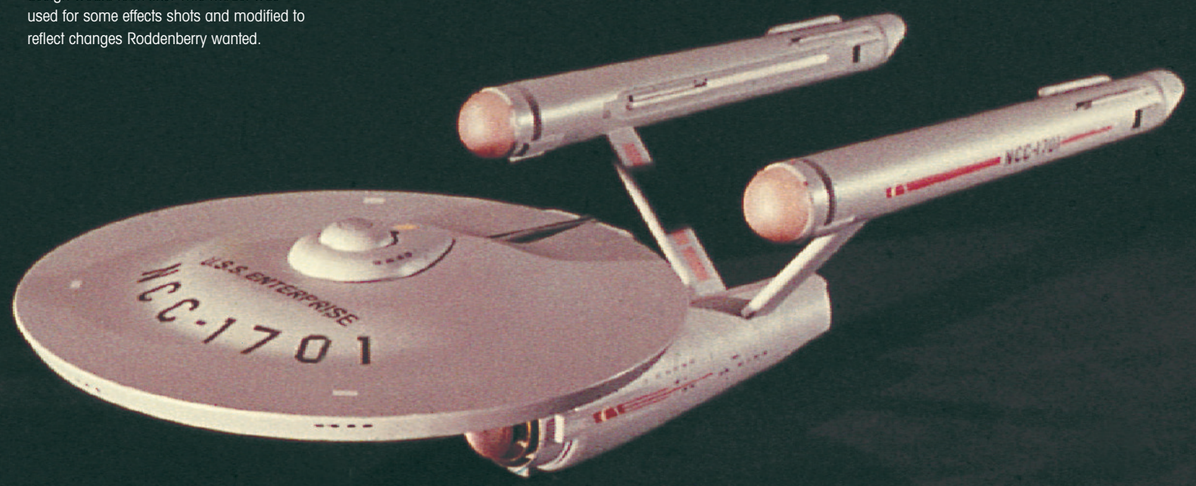
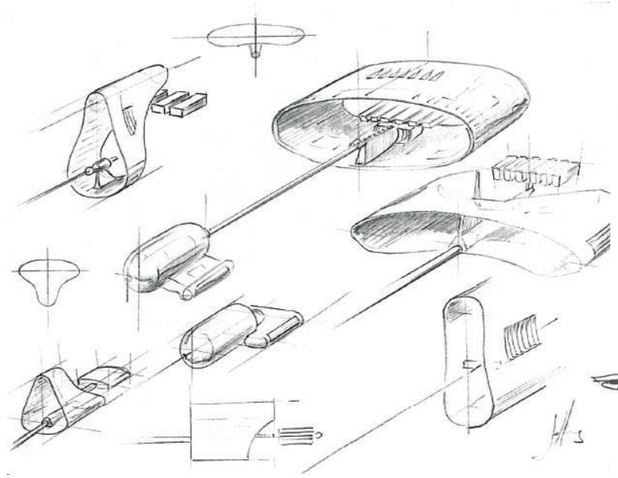
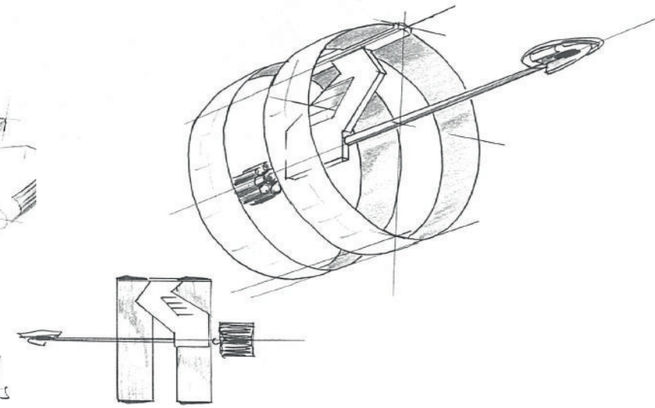
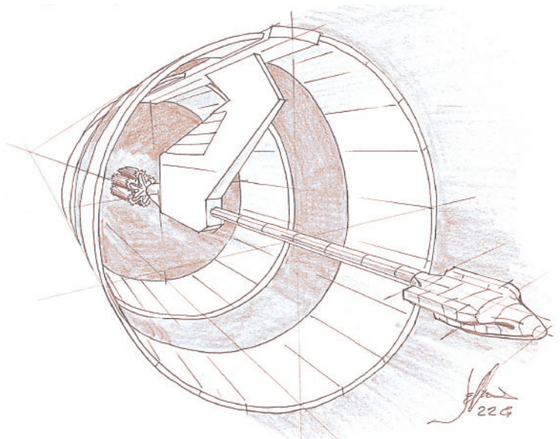


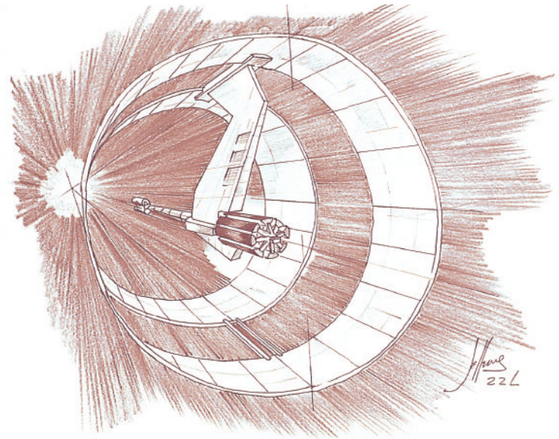
▼ Matt Jefferies' sketches were handed over to Richard Datin, who made a three-foot model showing what the finished design would look like. This model was used for some effects shots and modified to reflect changes Roddenberry wanted.





▶ Early on in the design process, Jefferies decided to separate the engines from the habitable parts of the ship. This would eventually lead to the concept of warp nacelles, but the engines started out as rings.





DESIGNING THE III ENTERPRISE

Matt Jefferies' design for the ***U.S.S. Enterprise*** set the standard for every starship that followed, but finding the design was not easy.

It was a typical Gene Roddenberry request: he wanted something no-one had ever seen before, and typically for Roddenberry, he couldn't tell you much more than that. Remarkably, Matt Jefferies, the first man to design an *Enterprise,* took that brief and created an iconic shape that would be used as a blueprint for almost every Starfleet vessel that followed. For a man who'd never even been a fan of science fiction, it was a huge challenge.

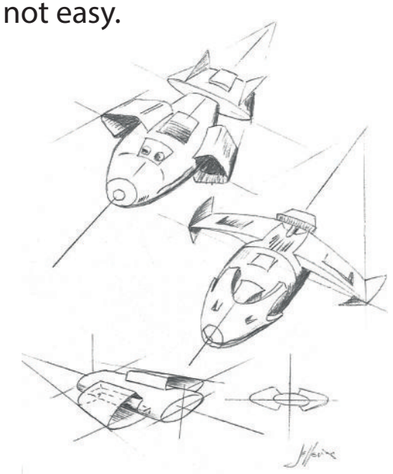
"To be honest, I didn't know quite where to start," admitted Jefferies when we met at his home in 1999. "I knew the *Enterprise* was going to be on the cutting edge of the future and that essentially Roddenberry had given me the job of deciding what shape that future was going to take, but it was hard to work out what exactly that was going to be."

Although Roddenberry couldn't give Jefferies an idea of what the ship would look like, he could provide some information to work with. He had a fairly detailed idea of how he believed the ship would function – that it would carry a 100–150 man crew, operate for the most part in outer space, and have the ability to travel at unheard of speeds. Roddenberry was also clear about what he didn't want: he told Jefferies that in no way would his ship bear even the slightest resemblance to the 1950s type of rocket ship much beloved of movie makers and TV shows alike.

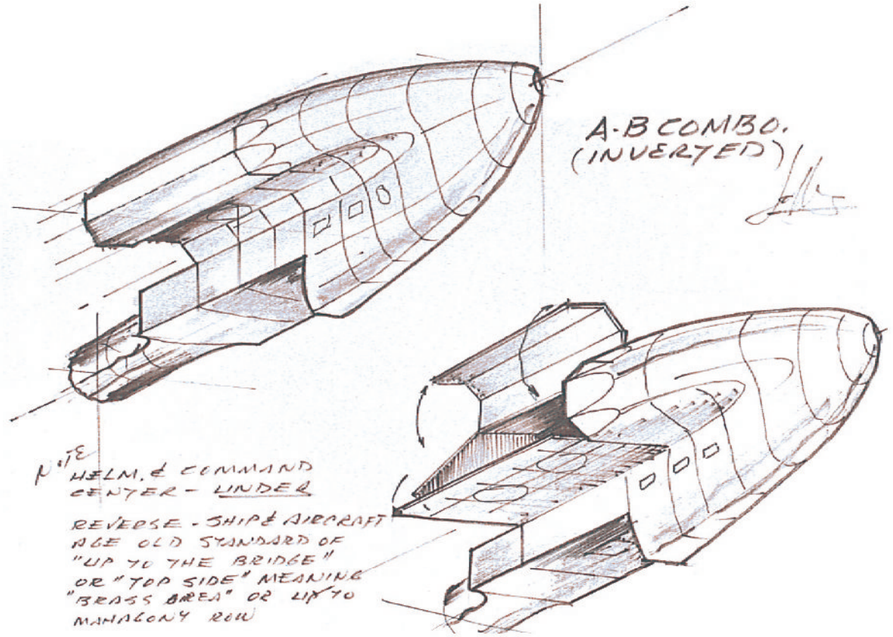
"I recall Gene emphasizing that there would be no fins, no wings, no smoke trails, no flames and most importantly of all, no rocket," said Jefferies. "That led to a lot of floundering around on my part because with all that off the table, I didn't know where the hell we were going to even start to come up something that instantly said 'spaceship'. So after some thought I decided the best thing to do was to come up with an envelope to work inside based on the snippets of information I did have."

One of those snippets was Roddenberry's determination that the ship would be capable of unearthly speeds. "To show the fantastic speeds Gene wanted I knew we were going to need flash cuts; you can't sell speed by holding a vehicle, automobile, plane whatever, and moving the background. It just doesn't work; it's going to have to come from infinity to you or the other way. So I wanted to keep it very simple, but immediately identifiable – a shape that you could instantly pick out."

With that as a starting point, Jefferies produced countless sketches of



▶ Roddenberry's initial instructions to Jefferies were to avoid any designs that looked like familiar spaceships from series such as *Flash Gordon.* Jefferies, however, needed something that looked fast.



▶ The bridge or command module wasn't always on top of the ship. This version can be seen in several different iterations of the ship. In it, Jefferies suggested that the bridge would actually be on the underside, which would have put it in a protected position.

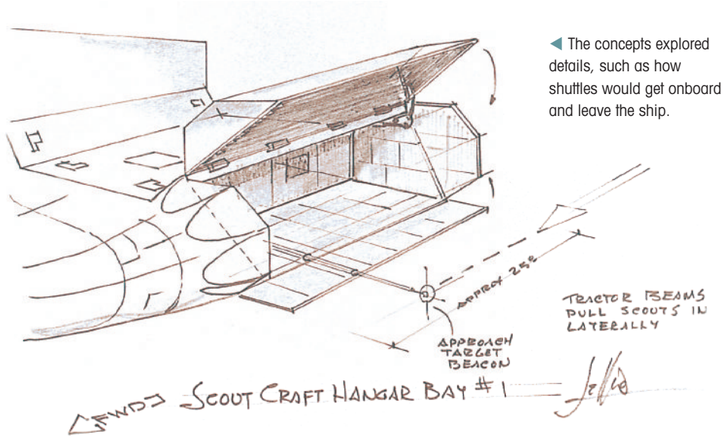
different ships in an attempt to find a general direction. Being a member of the Aviation Space Writers' Association and active as a consultant with the Air Force Museum in Dayton helped as it gave him a source for a lot of design ideas. However, many of his earliest attempts were rejected outright by Roddenberry as being too conventional, but pieces of some designs did offer promise. Jefferies then set about collecting these pieces and applying them to new designs.

"It went on like that for over three weeks," says Jefferies. "And I remember getting more and more frustrated, but I struggled on and finally I came up with something I thought had possibilities. My thinking was that because of the ship's speed there had to be terrifically powerful engines. Their size would make them dangerous to be around, so maybe we'd better put them out of the way, which in aviation circles would make them QCU – quick change units – where you could easily take one off and put another on."

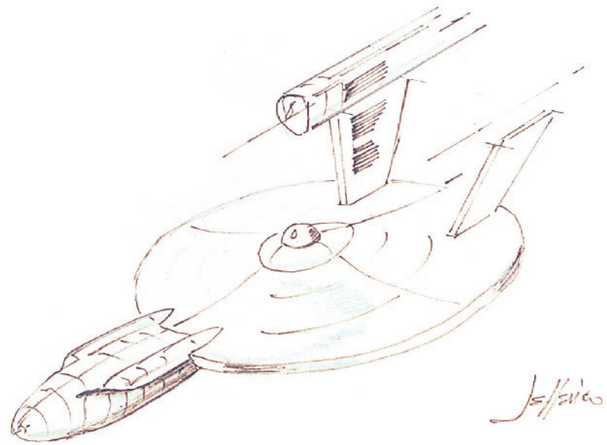
Jefferies decided that the safest place for the engines was underneath what would be the hull area. But despite that breakthrough, he struggled with a basic shape for the hull or the living area of the ship, initially rejecting the idea of a saucer.

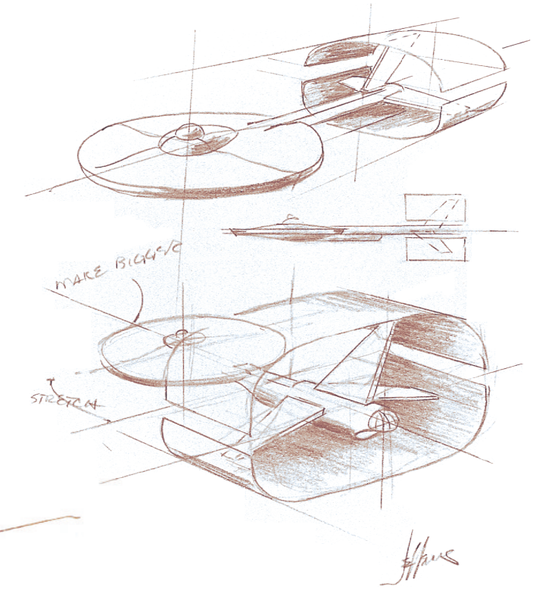
"I didn't like the idea of the flying saucer," Jefferies explains. "It was too much like the rocket ships that Roddenberry was so set against. I also thought that the best pressure vessel is a ball so I started playing that as a basic shape. But the bulk got in the way and the ball just didn't work. I flattened it out and I guess we wound up with a saucer."

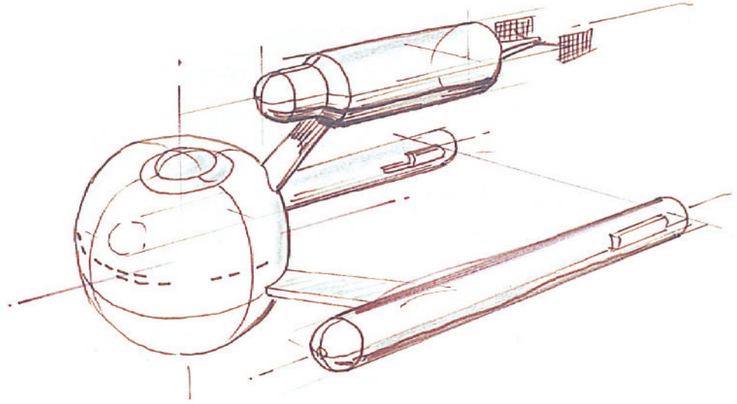
Jefferies produced a color sketch of the ship against a black matt board

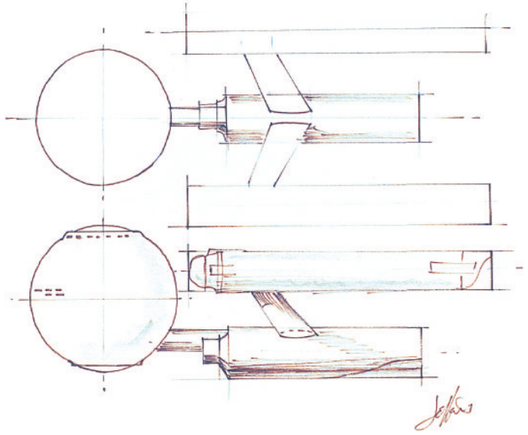


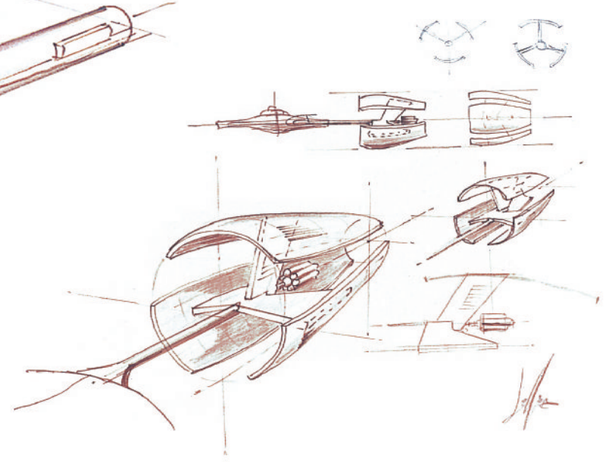
◀ The concepts explored details, such as how shuttles would get onboard and leave the ship.



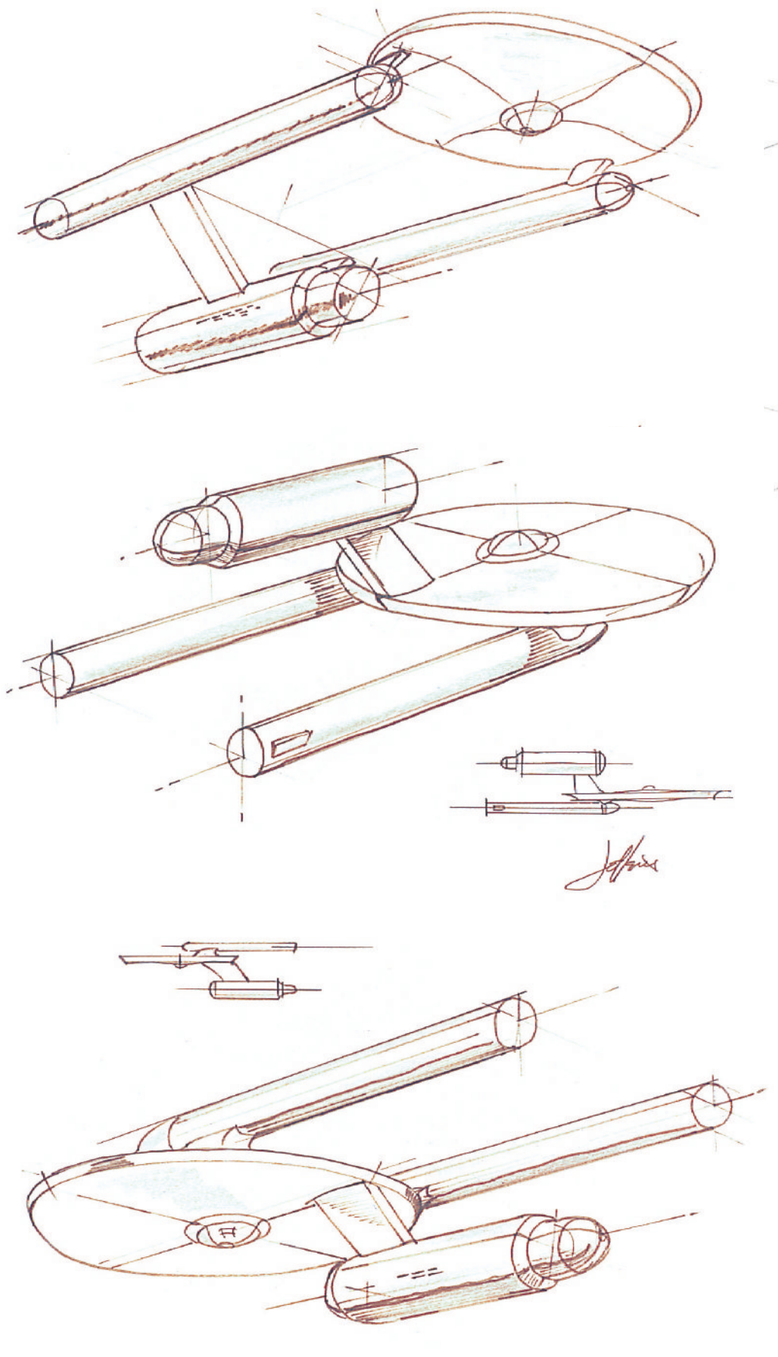


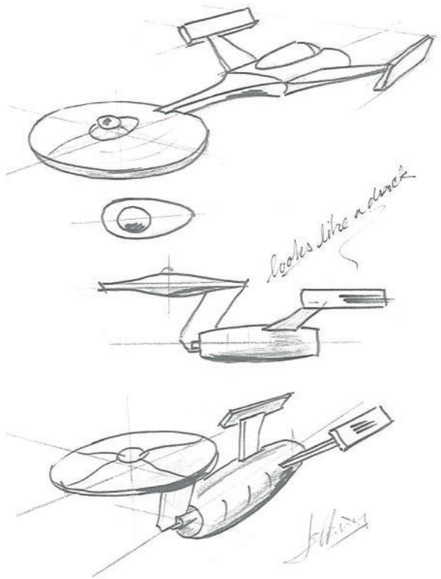






▲ Since Roddenberry had originally told Jefferies to avoid "flying saucers" it took a long time for him to arrive at the idea of using the saucer section. When Jefferies first established the basic layout, he planned to use a dome, which he figured was a logical shape for a ship that operated in the vacuum of space. However, he found working with a sphere to be awkward, and eventually decided to flatten it out, so it became a saucer.

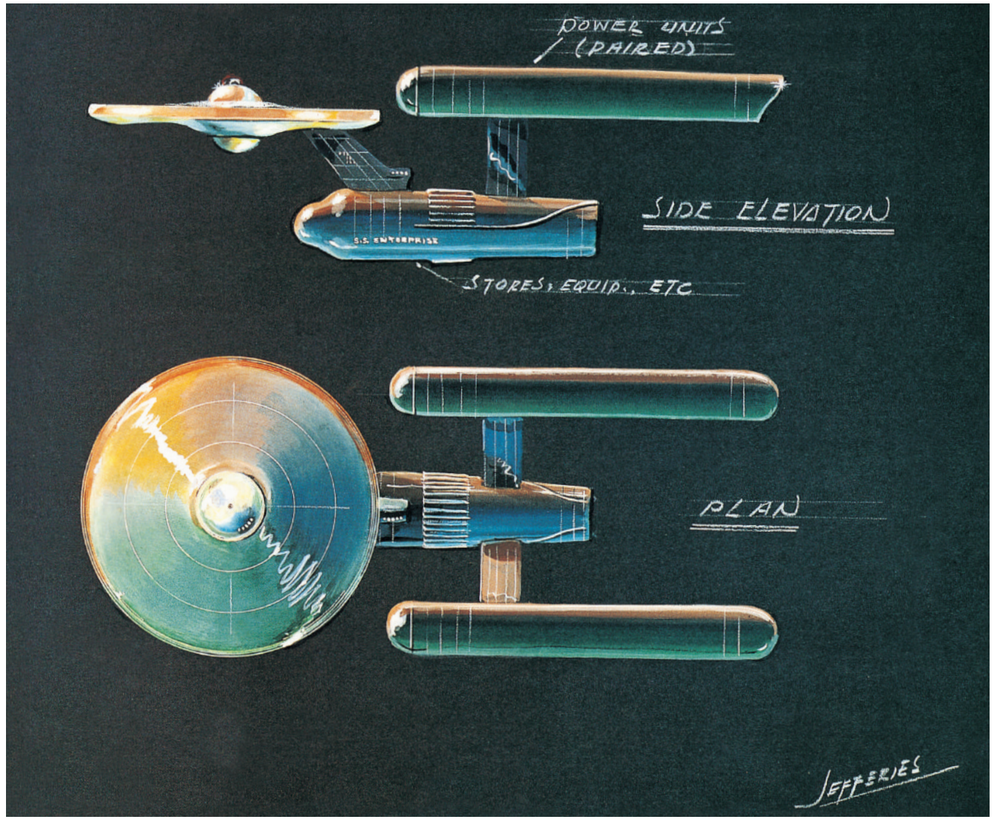




◀▲ Even after Jefferies had settled on the idea of using a saucer, a secondary hull, and warp nacelles, he continued to experiment with different ways that they could arranged.

and then handed it over to the studio mill where a model of the dish and the lower hull were fashioned out of balsa wood. As soon as the lathes were open the engine pods would be done. But in order to save time Jeffries suggested using birch dowel. As a finishing touch a hook and string were attached to the top.

"When Gene and the NBC people came to take a look, they immediately gravitated to the color sketch," recalled Jefferies. "Then I told them that if they liked that they would definitely like this and held up the model. Gene took hold of it by the string and it immediately flopped over because the birch dowels were so heavy. I had an awful time trying to 'unsell' that look and it wasn't much of a surprise that when the first show hit the air and TV guide came out, they ran a picture of the ship on the front cover upside down."



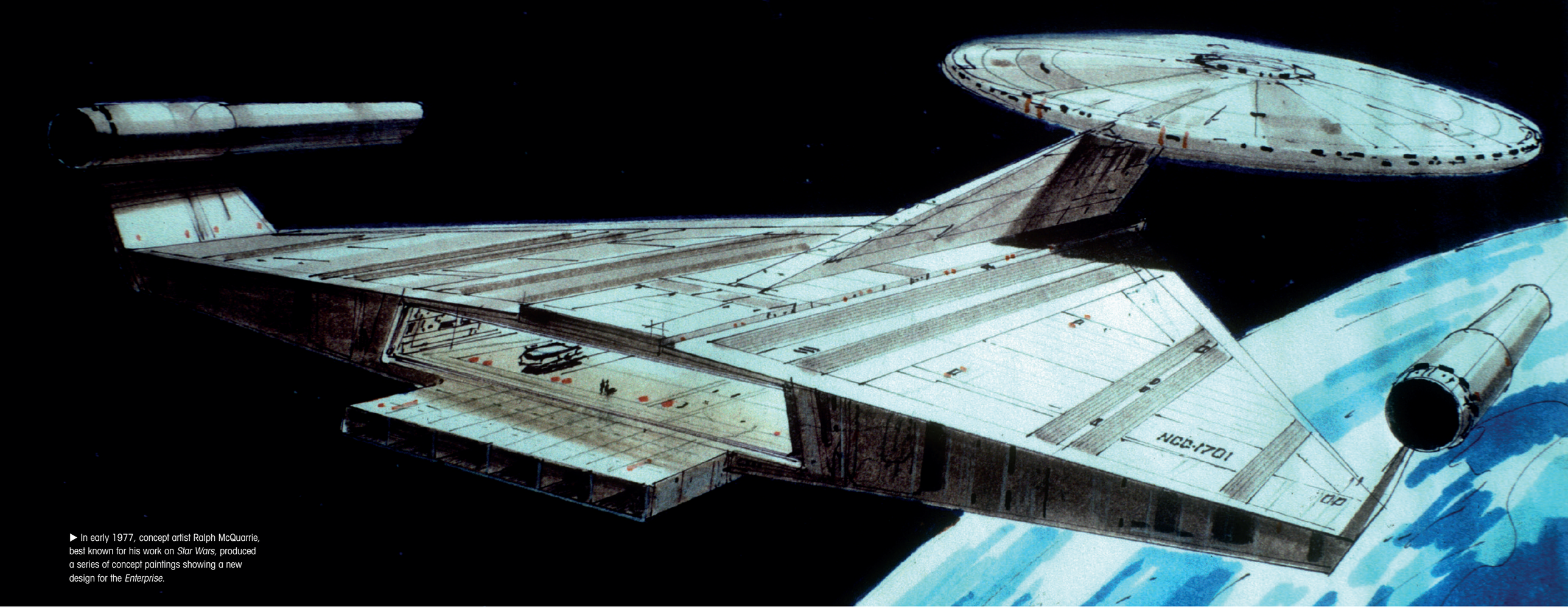
Once that misunderstanding was sorted out Jefferies found himself facing another one, this time involving the hull. Jefferies theorised that since space was after all a very dangerous place, starship engineers would naturally avoid placing any important machinery on the outside of their vessel. This meant that logically, the hull would be smooth. This didn't go down well with the powers that be, who pushed Jefferies to add details. However Jefferies stuck to his guns.

"An advantage of the smooth hull was that it would reflect light, and at this point it wasn't a foregone conclusion that the ship would be white. I thought the atmosphere or lack of it out there in space might produce different colors and this gave us a chance to be able to play light and to throw color on it."

With the design and look of the ship locked only one thing remained – to pick out a registry number. "Rumor had it that I just used the number on my airplane but the truth was I wanted a very simple number that could be spotted quickly. So I eliminated 3, 6, 8, and 9. I also thought of the ship as being the 17th starship design and that it was the first in the series."

Jefferies was left with the numbers 1701, which, incidentally, and coincidentally, just happened to be very close to the license number on his airplane, NC-17740, and a legend was born.

◀ When the basic direction for the design was finally approved, Jefferies produced a color artwork on a black background that was shown to Roddenberry and the studio executives. The design would still be refined, notably with the introduction of what would become the deflector dish, but all the important elements were in place.



▶ In early 1977, concept artist Ralph McQuarrie, best known for his work on *Star Wars,* produced a series of concept paintings showing a new design for the *Enterprise*.

REDESIGNING III

THE ENTERPRISE FOR THE PLANET OF THE TITANS

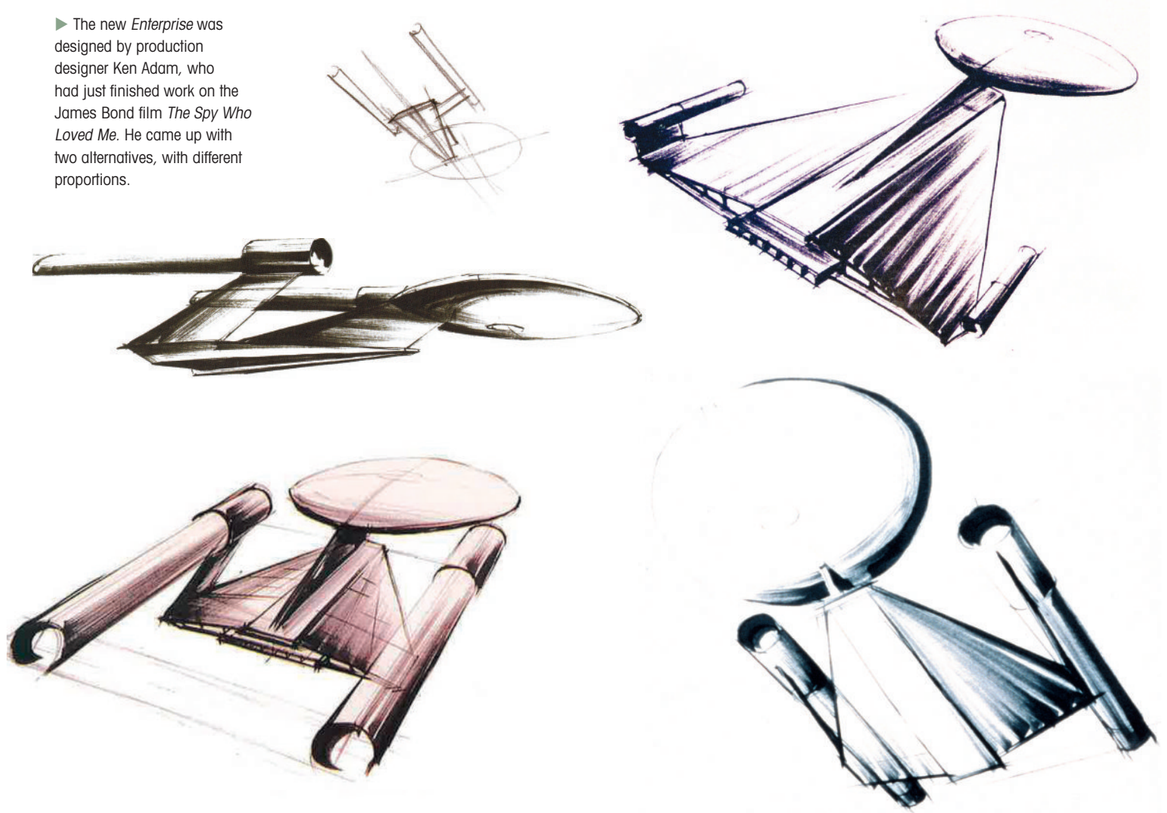
Legendary artists Ken Adam and Ralph McQuarrie designed a new *Starship Enterprise* for a movie that would never be made...

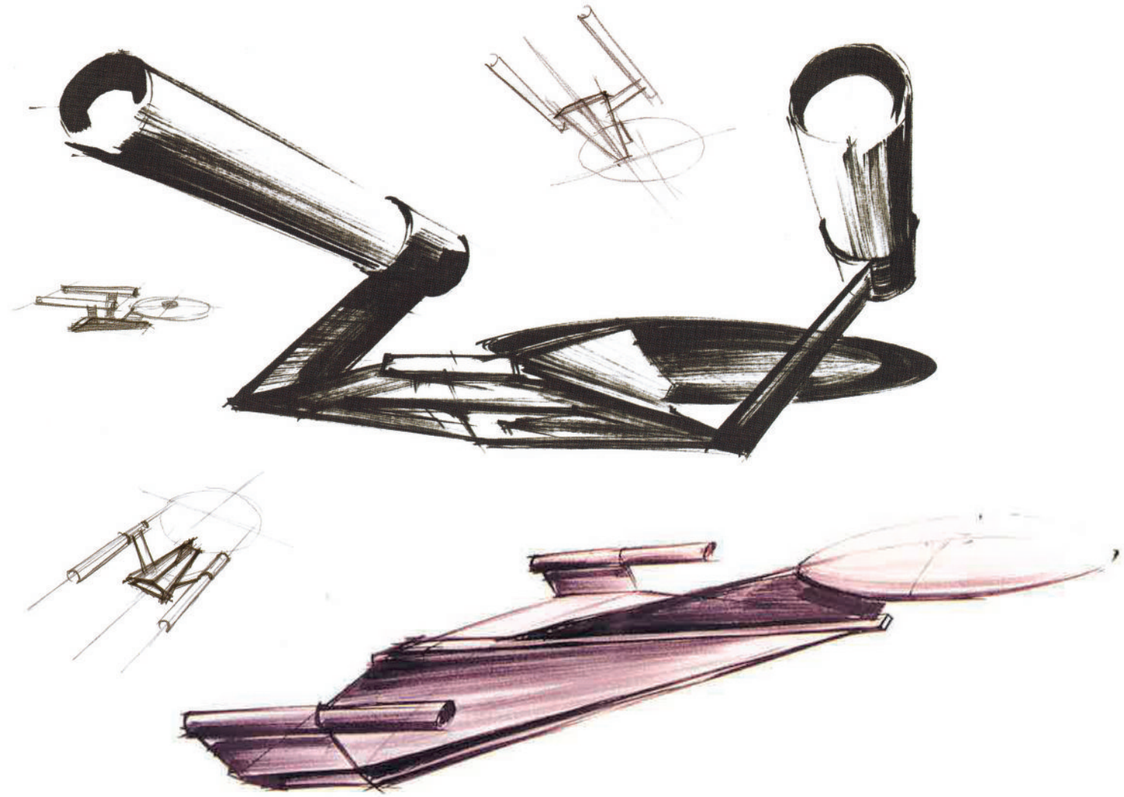
During the 1970s there were various attempts to revive *STAR TREK* as a movie. In late 1976 and early 1977 a small team was hired and pre-production work began. Ken Adam, the legendary production designer from many of the James Bond films, came onboard and worked with Roddenberry to redesign the *Enterprise*. His idea was to keep the saucer and the nacelles, but to make the engineering hull into a triangular, wedge-shape, with a large shuttlebay at the back. He developed two slightly different versions of the designs with different proportions for the saucer and the neck. Adam was joined by concept artist Ralph McQuarrie, who had just worked on *Star Wars*. McQuarrie took Adam's sketches and started to produce finished art showing the ship in a variety of situations.

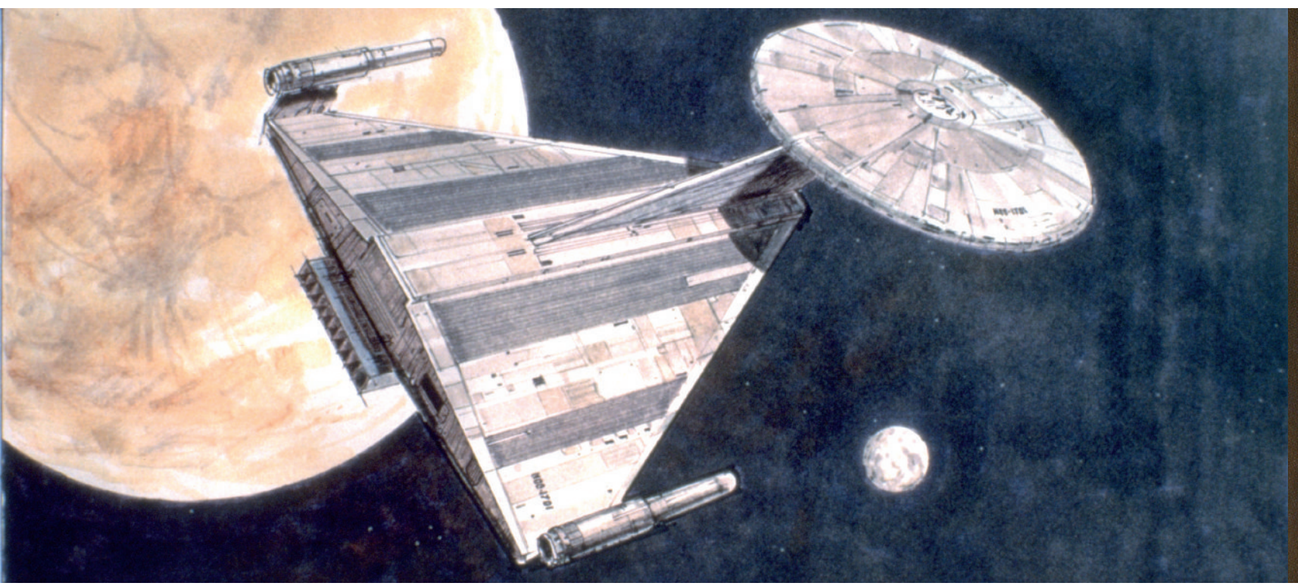
The script, called *Planet of the Titans,* was troubled, and went through many changes. As a result Adam and McQuarrie started to make suggestions of their own, with McQuarrie designing a massive asteroid space station that the *Enterprise* would dock with. The art they produced also shows that the *Enterprise*'s saucer was designed to separate from the ship so that it could land on the surface of a planet.

By mid-1977 Paramount Pictures had decided that the script wasn't working and abandoned the idea of making a movie in favor of bringing *STAR TREK* back to TV, so Adam and McQuarrie's design was abandoned. However, two study models had been made and both of them went on to make appearances on screen. One can be glimpsed in the background in Spacedock in *STAR TREK III* and the other can just be seen in the wreckage after the Battle of Wolf 359.

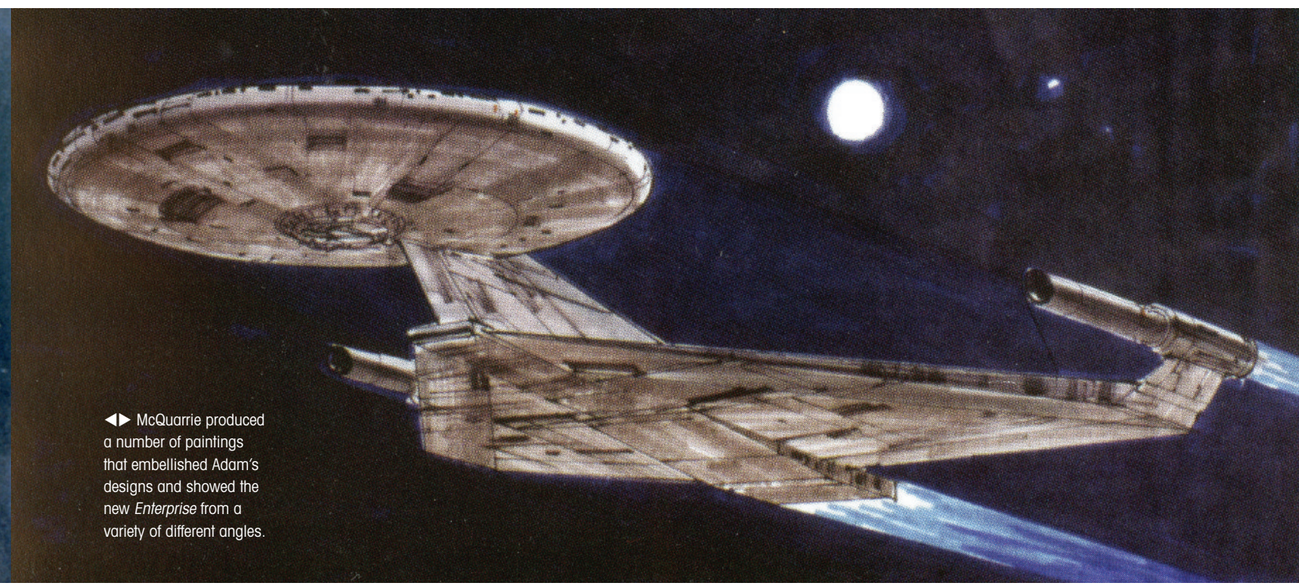
▶ The new *Enterprise* was designed by production designer Ken Adam, who had just finished work on the James Bond film *The Spy Who Loved Me*. He came up with two alternatives, with different proportions.

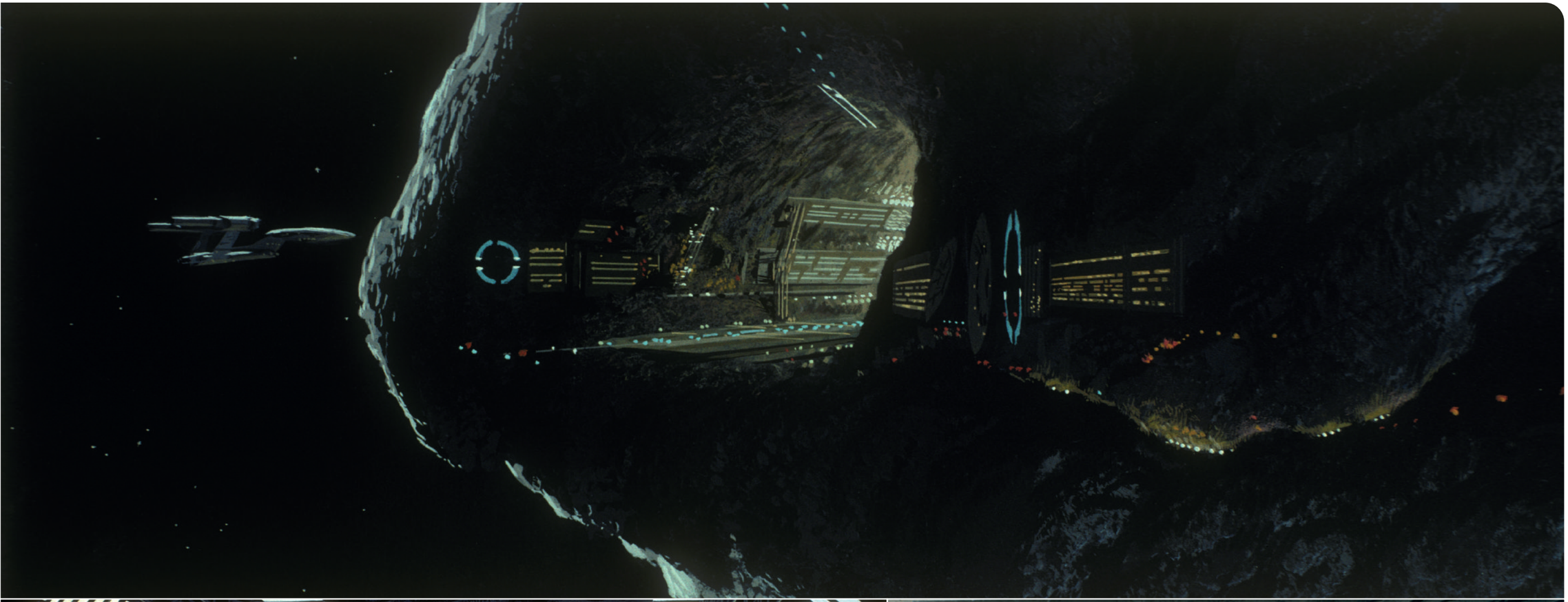


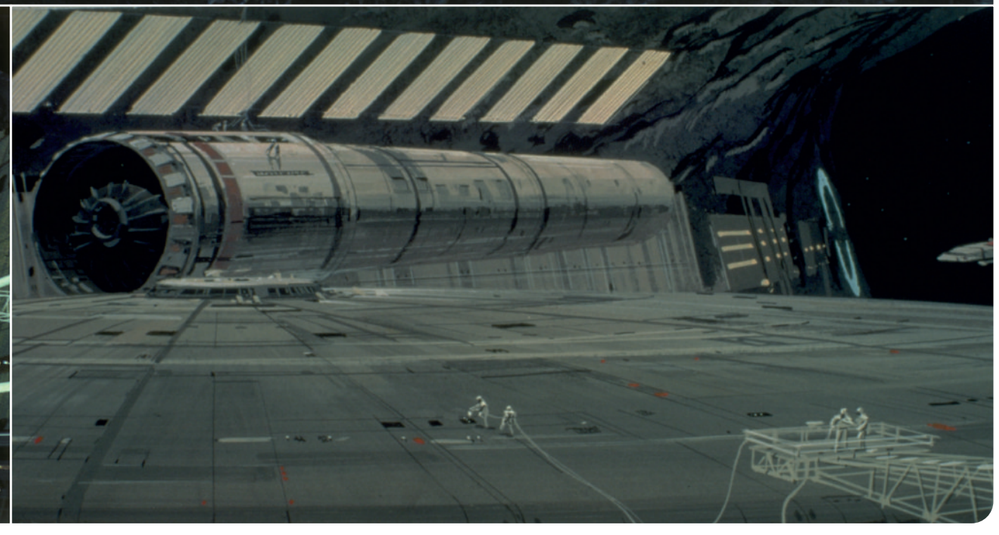




◀▶ McQuarrie produced a number of paintings that embellished Adam's designs and showed the new *Enterprise* from a variety of different angles.







◀ With the script in constant flux, McQuarrie started to produce images in the hope that it would inspire the producers. One series of these showed the *Enterprise* docking with a giant asteroid.

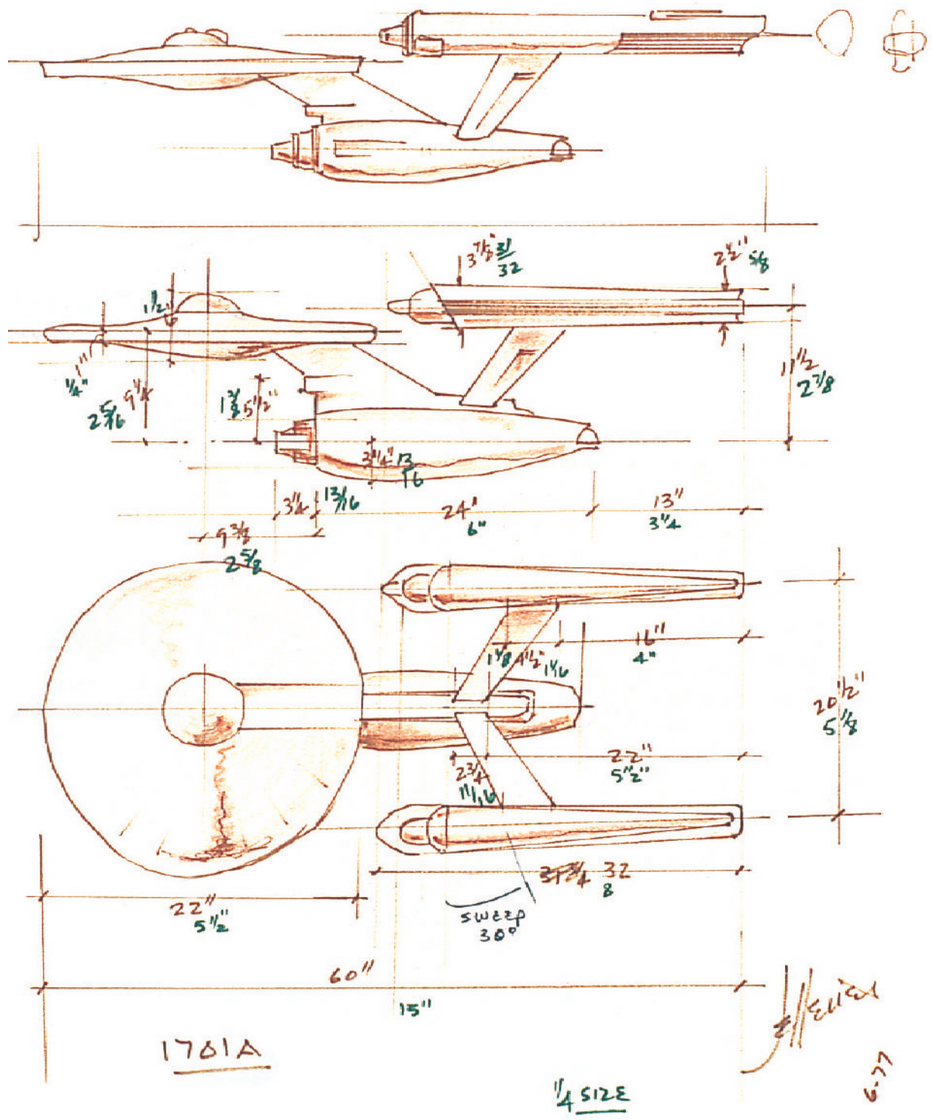
▼ Plans were well advanced for a new *STAR TREK* TV show in 1977, that would have seen Captain Kirk set out on a second five-year mission in an upgraded version of the *Enterprise*.

REDESIGNING THE ORIGINAL ENTERPRISE

In 1977, the ***Enterprise***'s original designer, Matt Jefferies, returned to his design to update it for a new television series.

In the late 1970s there were plans to bring the original *STAR TREK* cast back to television for a new series. Leonard Nimoy didn't want to return but there would have been new characters and an upgraded version of the *Enterprise*. Gene Roddenberry wanted to reunite as many members of the production team as possible, so he asked production designer Matt Jefferies to return. The thing was that Jefferies already had a job, which he loved.

"Gene wanted me to come aboard as an associate producer," Jefferies recalled. "My office was right above his; I was working on *Little House on the Prairie* and I was not about to give up that berth! It was not only too much fun, but I really felt at that point you couldn't go back." So Jefferies turned Roddenberry down. However, there was one job that Roddenberry still wanted him to do – redesign the *Enterprise*.

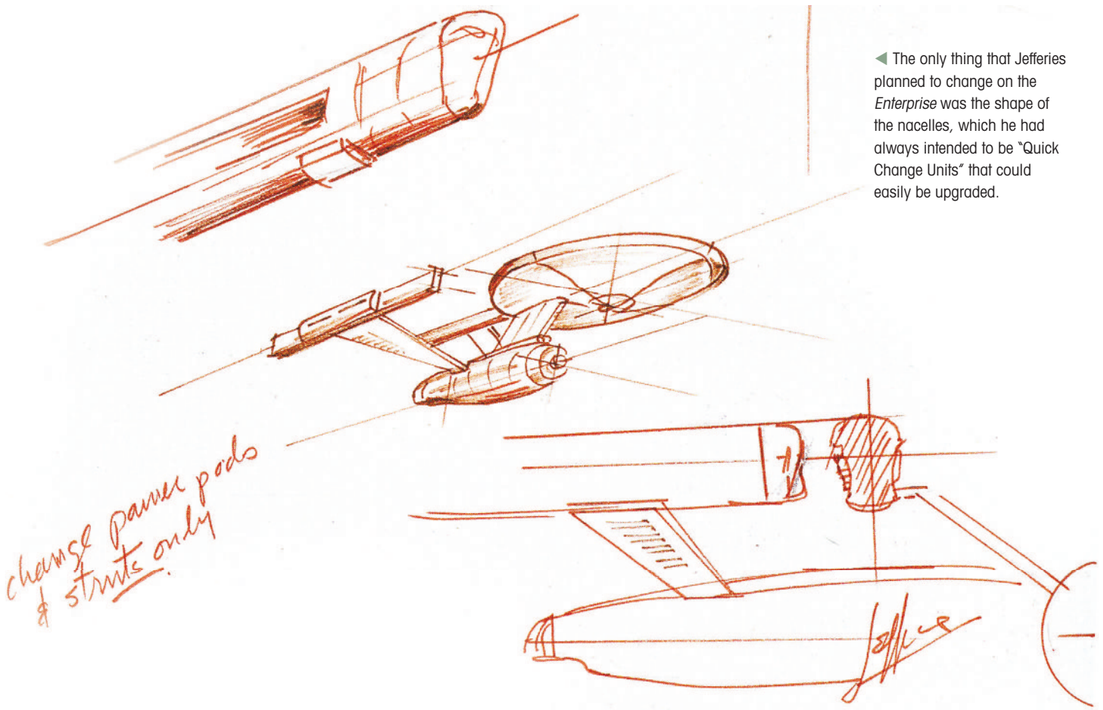


◀ Roddenberry wanted Matt Jefferies to return to work on the new TV show, but was only able to persuade him to redesign the *Enterprise,* which he did in a hotel room in Tuscon while he was working on *Little House on the Prairie.*

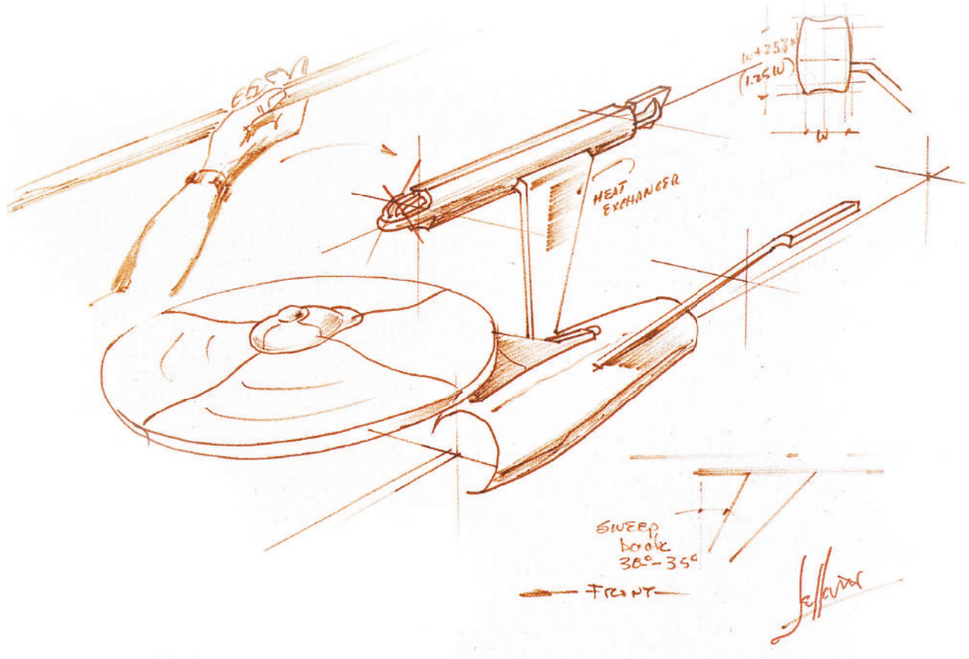
"Gene said, would you come aboard as a consultant part time? I said, 'Certainly, but I'll have to ask Mike Landon.' He said it was fine, just so it didn't get in the way of my work for him.

"Gene wanted the *Enterprise* updated. As far as I was concerned about the only thing we could update would be the engines. I changed the design of the pods and the struts. I still wanted an absolutely plain exterior. Anything that man makes is going to break down, why put him outside in the worst possible environment when you can put him on the inside?"

Jefferies even had an idea of how he was going to redesign the nacelles. A dozen years earlier when he had originally designed the ship, he had drawn up an alternative version, in case the producers rejected his design. In this version instead of being round the nacelles had a flatter, rectangular profile. "When I'd sold them on the original design I had also sketched this other version, in case that didn't work," he said. "But we didn't need it at



◀ The only thing that Jefferies planned to change on the *Enterprise* was the shape of the nacelles, which he had always intended to be "Quick Change Units" that could easily be upgraded.

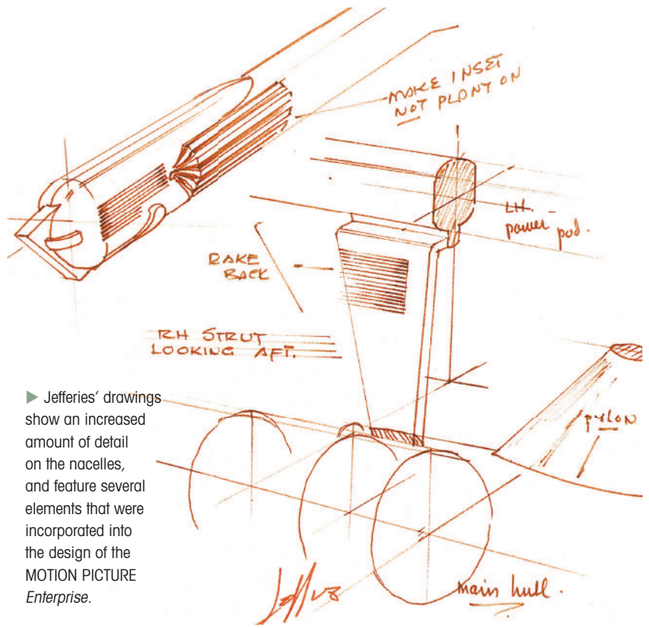


the time so I put it in the drawer."

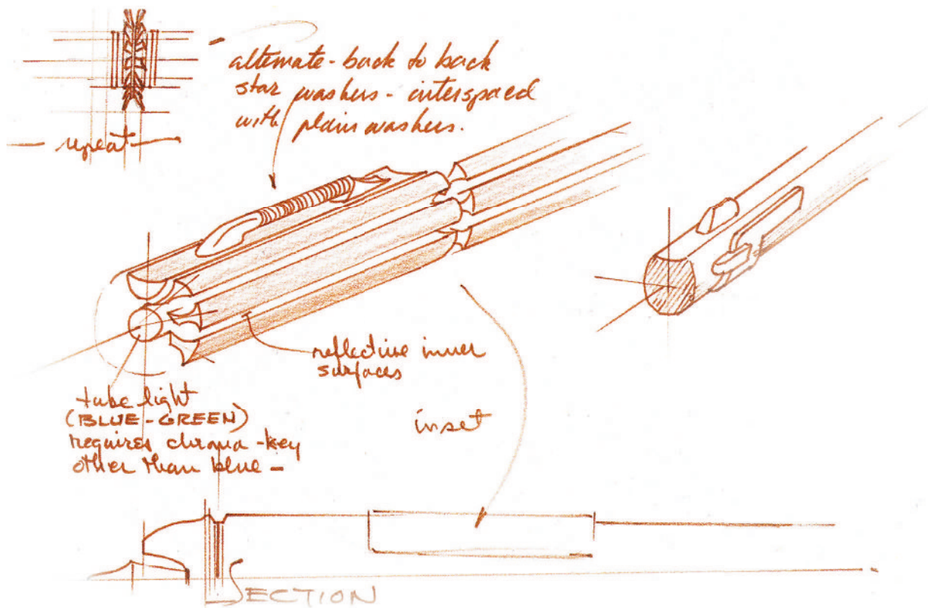
Looking back at his original artwork, Jefferies set about creating a new set of drawings that could be given to the modelmakers. And, in line with his promise to his then boss Michael Landon, he did it in his spare time.

"I did the working drawings with my board on the bed of the Hilton hotel in Tucson because we were on location with *Little House."* Jefferies laughed. "I came back and had them printed. Don Loos had the engine pods finished and was working on the struts but around that time I had to quit. They'd call up and say 'Matt, we're having a meeting, come down right away.' I said, 'Hold it, it's beginning to interfere too much.' Mike was beginning to kind of look out of the corner of his eye at me."

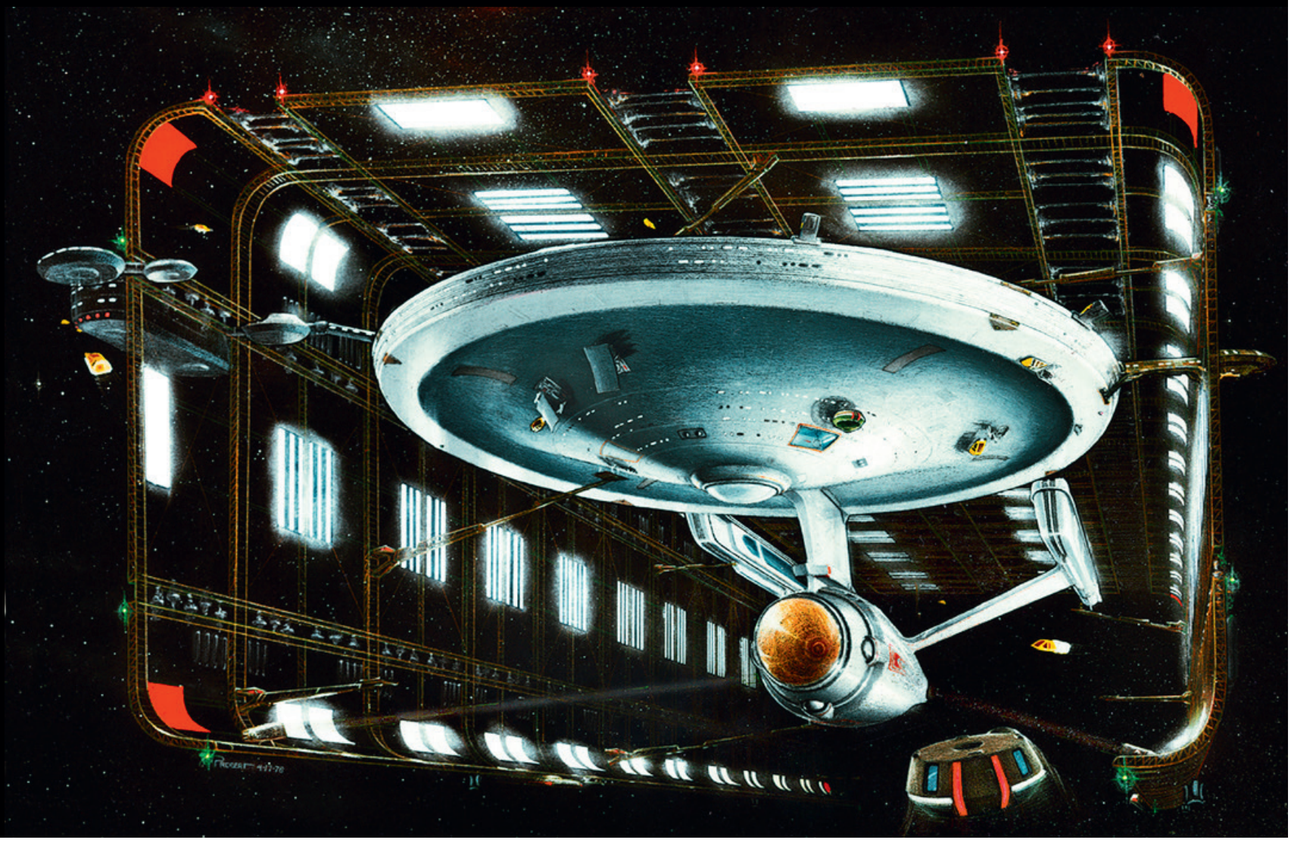
Jefferies' new *Enterprise* did, however, get built, at least pretty much. But the model was never used, because Paramount decided that instead of making a TV show, they were going to make a *STAR TREK* movie...

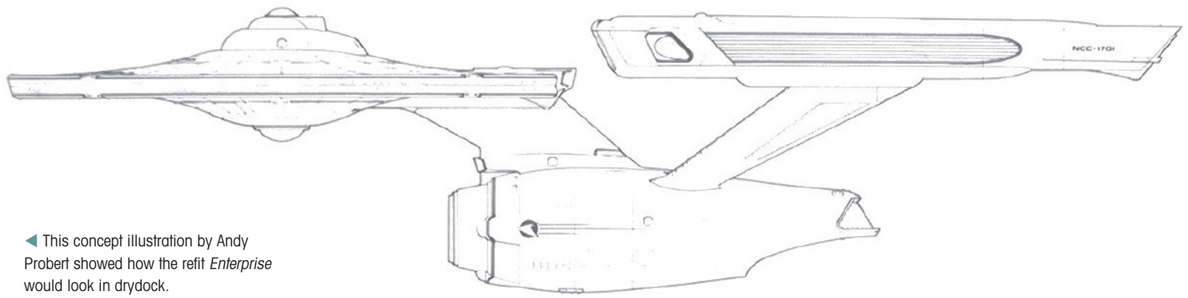


▶ Jefferies' drawings show an increased amount of detail on the nacelles, and feature several elements that were incorporated into the design of the MOTION PICTURE *Enterprise*.

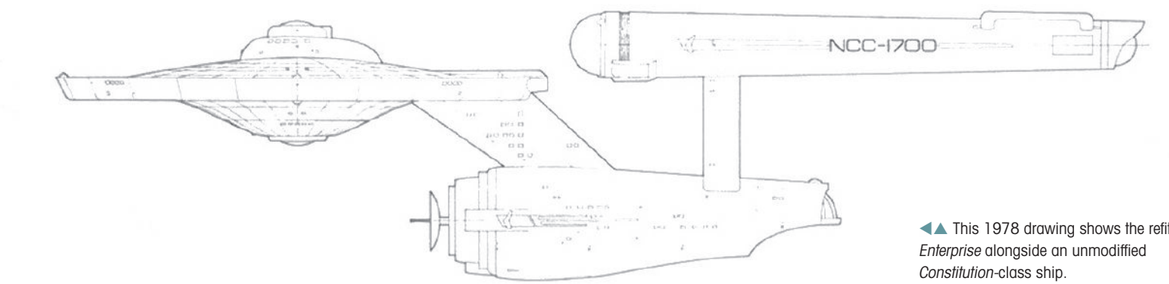


◀ There had been limits on the kind of light effects that could be featured on the original *Enterprise,* and the plan was to upgrade them for the 1970s TV show.



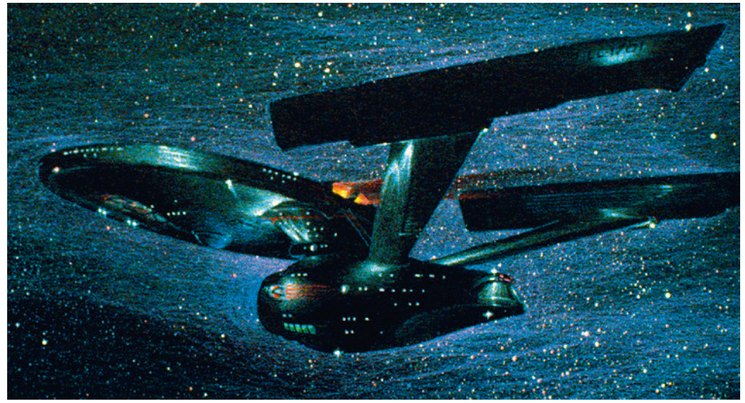


◀ This concept illustration by Andy Probert showed how the refit *Enterprise* would look in drydock.



◀▲ This 1978 drawing shows the refit *Enterprise* alongside an unmodified *Constitution*-class ship.

DESIGNING THE ENTERPRISE REFIT



▶ This illustration of the refit *Enterprise* by Andy Probert envisioned how it might look illuminated in deep space. Adding the extra windows helped give it the extra detail that would be needed to bring it to life on the big screen.

The *Starship Enterprise* was carefully updated, upgraded and thoroughly rethought for her debut on the big screen.

Back in 1964, when the *U.S.S. Enterprise* NCC-1701 was first designed, little could its creator have known that it would go on to become the most famous and iconic starship in science fiction history.

The man who came up with the original design was Matt Jefferies, and more than ten years after the series ended, he was also them man who began the process of redesigning the *Enterprise* that would eventually feature in *STAR TREK: THE MOTION PICTURE*.

Initially, *STAR TREK's* creator Gene Roddenberry asked Jefferies to update his famous starship in 1977, not for a movie, but for a proposed spin-off TV series that was to be called *STAR TREK: PHASE II*. Always a logical thinker, Jefferies decided that the best way of doing this was to follow the basic design he had come up with before, but to upgrade certain elements, such as the engines, that would have benefited from technological advancements.

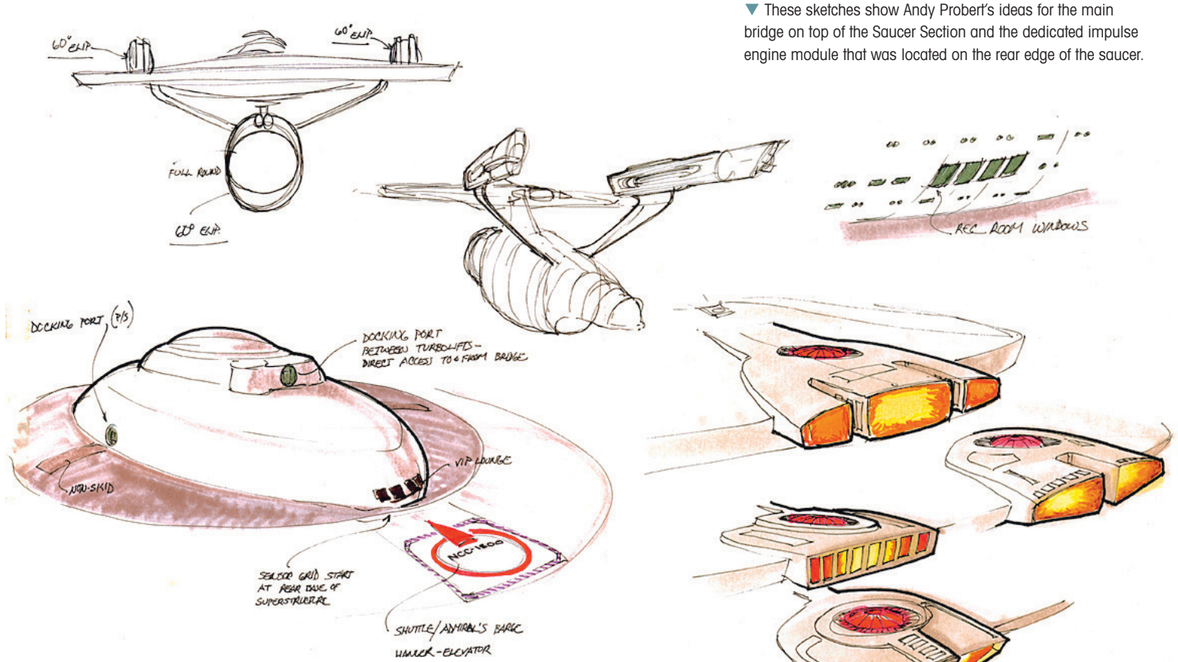
Jefferies felt that the saucer section should remain much as it had been before and that it should be smooth and plain. All components, like sensors and deflector grids, he reasoned, would not be on the hull exterior, but inside the skin of the ship where the crew could easily access them if they needed repair. This meant that the changes he could make to the *Enterprise* would largely be confined to the nacelles and the engineering section. He gave the secondary hull a taper and then changed the shape of the nacelles from cylindrical tubes to flat-sided modules and tapered their supports.

NEW DIRECTION

Art director Joe Jennings and conceptual illustrator Mike Minor then added more detail to Jefferies' redesign after he took another job. Then the proposed TV series was dropped in favour of a major *STAR TREK* film. At first, the art director on this movie, Richard Taylor, wanted to begin the design process on the *Enterprise* all over again as this starship would have to look good, not just on a small TV screen, but on huge cinema screens. Roddenberry convinced him that this was not necessary and they should continue the work Jefferies had begun.

Taylor hired conceptual artist Andy Probert (who would later go on to design the *Enterprise*-D) to take the lead with the evolution of the redesign and to add the level of detail that would be necessary for cinema screens.

"Richard (Taylor) felt we should stay with the proportions that we had inherited from Matt Jefferies and Joe Jennings," said Probert. "So with that as our starting basis, I lengthened the ship to a thousand feet, just a few feet longer than it was, and enlarged the saucer, eventually adding an updated superstructure to the top and bottom of it. I came up with new photon torpedo



▼ These sketches show Andy Probert's ideas for the main bridge on top of the Saucer Section and the dedicated impulse engine module that was located on the rear edge of the saucer.

tubes and redesigned the whole navigational deflector dish area. I updated the impulse engine, and added phaser banks around the ship, making them visible for the first time, along with a reaction control thruster system – that was there for the first time too. I designed it in a way that the ship could operate as two independent entities – the primary and secondary hulls – or as a combined starship unit." Probert also gave the saucer section something that had been hinted at in the series: landing gear.

COLLABORATIVE INPUT

Probert wasn't the only person working on the redesign of the *Enterprise*. Production designer, Harold Michelson, who worked extensively on the look of the ship's interiors also contributed to the exterior as did special effects pioneer Douglas Trumbull.

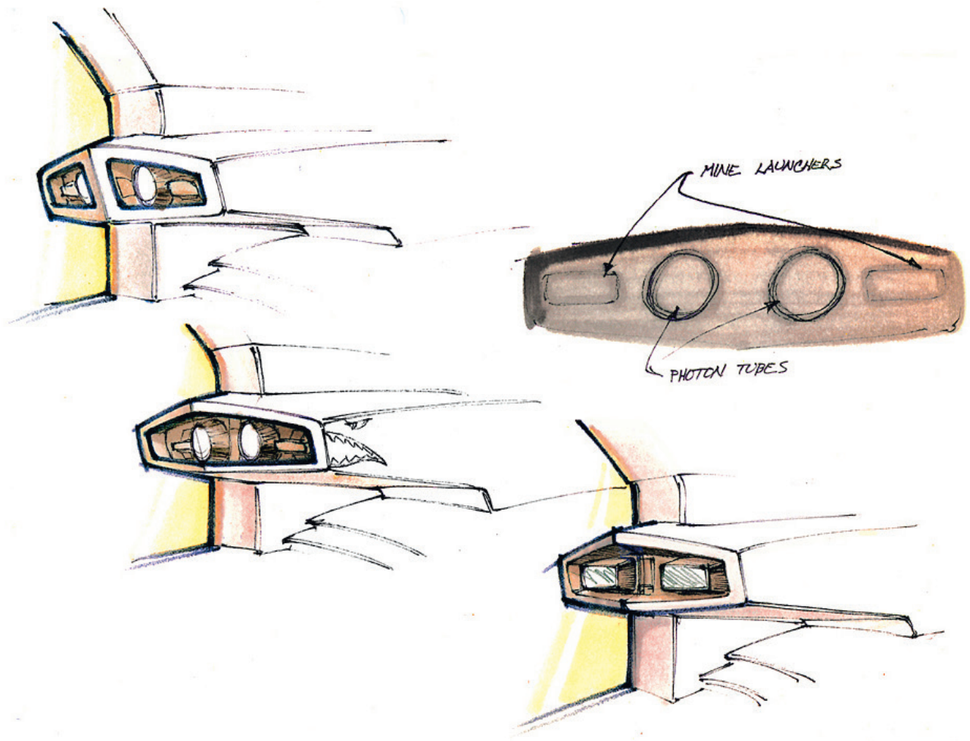
It was Probert and art director Richard Taylor, though, who had the greatest input and influence on the exterior detail of the *Enterprise*. "My approach was to give it a stylization that was almost art deco," said Taylor. "Things became more elongated and more elegant than the TV series version. I tried to give it a very art deco feel; for example, I added the parallel lines along the edge of the saucer. I spent weeks drawing and redrawing the nacelles. The front end of them is almost a 1940 Ford grille."

INSIDE JOKE

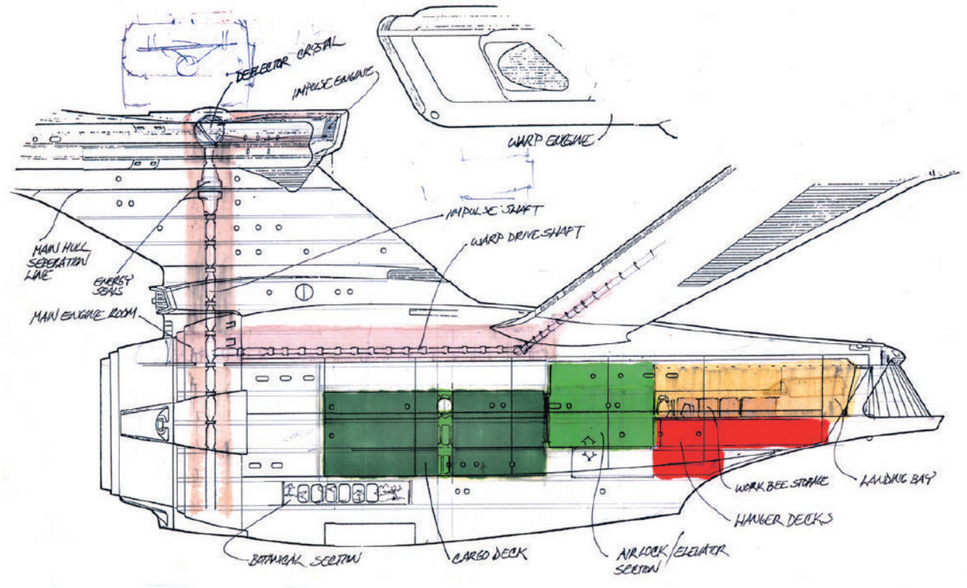
As well as these art deco design elements, Taylor and Probert added further surface details, such as the large transparent botanical windows in the lower half of the engineering hull. In fact, many more windows were added all over the exterior hull, and knowing that these small details would be seen clearly on the big cinema screen, Taylor and his colleagues took the opportunity to have a little fun.

"We used small transparent images of the sets inside the windows," said Taylor. "When the camera got close to the model it appeared that you could see something in the windows. By the way, in some of the windows you can see photos of Mickey Mouse, Andy Probert, and others as a kind of in-joke."

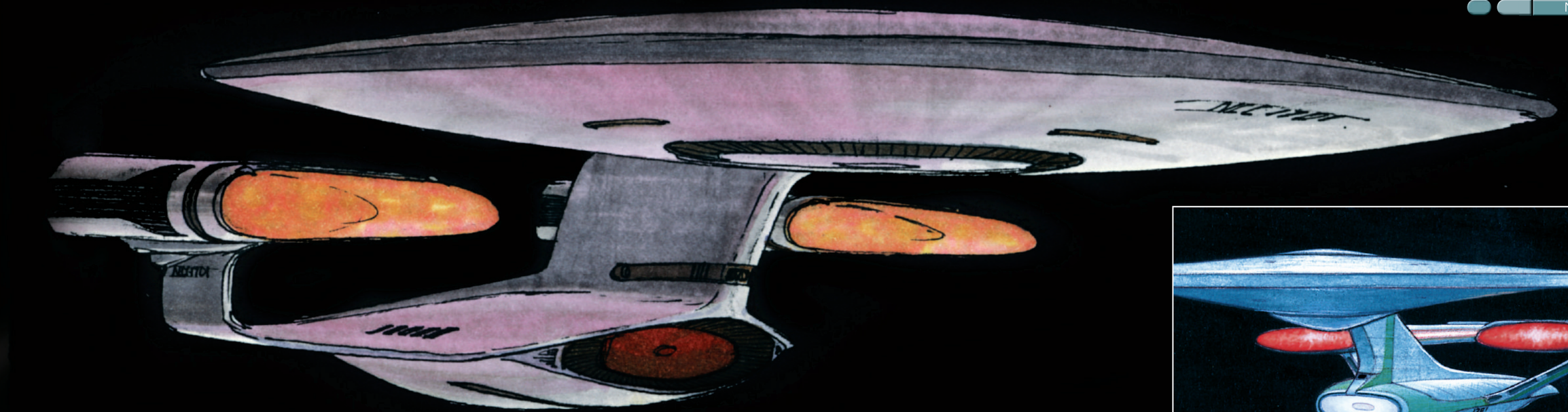
For Probert's part he made sure the design was thoroughly thought out and resolved several questions that had plagued fans of the original TV series. The redesign of the *Enterprise* was a huge responsibility. It involved the input of half a dozen designers over a period of more than year. What they achieved has rarely been equalled and for many their design is the definitive *Enterprise*.



◀ In the original TV series it had never been clear where the photon torpedoes emerged from so Probert came up with these designs for the photon launcher on the neck between the two main sections.

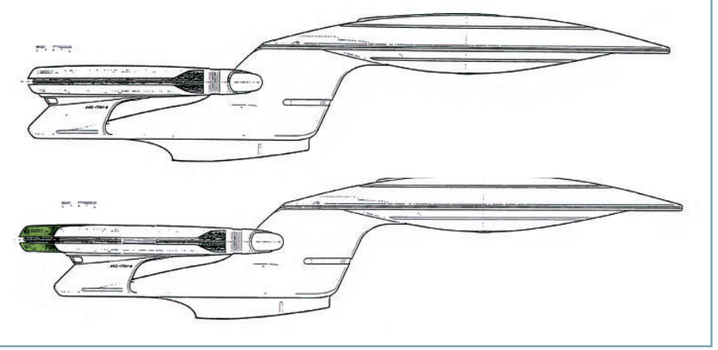


◀ This cross-section of the refit *Enterprise* shows how Andy Probert thought the interior might be laid out. In particular, it shows how the vertical warp core runs through multiple decks and how the landing bay and hanger deck link together.



▶ An early Probert drawing that provided the direction for the final design.

DESIGNING THE ENTERPRISE-D



▶ The only major changes made to Andy Probert's design involved lengthening the nacelles to give them proportions that were more like those of the original *Enterprise*.

A new ***STAR TREK*** series meant a new ***Starship Enterprise*** and a design that combined the new and the old to create something iconic.

In October 1986, it was officially announced that a new *STAR TREK* series would be hitting TV screens in September 1987. Among the huge challenges *STAR TREK* creator Gene Roddenberry faced in making the new series was the 'simple' problem of updating the technology and in particular the *Starship Enterprise*. The original ship was seen as a character that was just as important to the show as Kirk, Spock and McCoy, so it was vital that the design of the ship was right.

With this in mind, one of the first people Gene Roddenberry hired to work on the new show was concept designer Andrew Probert, who had previously worked on *STAR TREK: THE MOTION PICTURE* as a concept designer/illustrator.

The first item Probert turned his mind to designing was the Main Bridge as this would be the most-filmed area aboard the ship. He knew that the interior had to match the exterior of the ship, so he pinned up some sketches he had already made of what the *Enterprise* might look like for inspiration. These illustrations were based on an earlier painting he had come up with shortly after the first *STAR TREK* movie when, for his own amusement, he thought about what a starship might look like even further into the future.

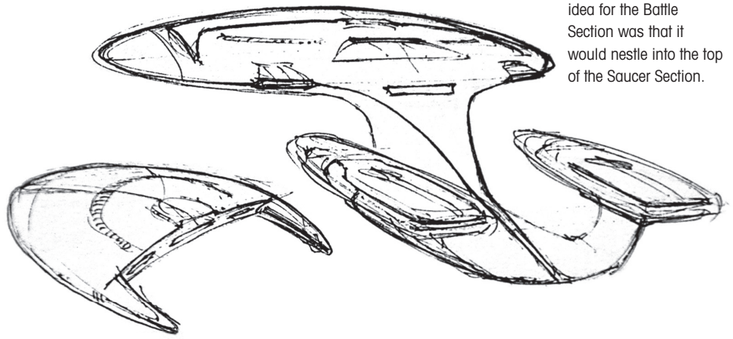
▲ The *Enterprise*-D's designer, Andy Probert, had a huge influence on the look of *STAR TREK: THE NEXT GENERATION*.

While Probert was developing his ideas, *STAR TREK* writer and producer David Gerrold stopped by, noticed these design sketches and asked if this was the new *Enterprise*. Probert replied that he had no idea at this stage, but before he knew it, Gerrold had taken the sketch and disappeared. When Gerrold reappeared a short time later, he told Probert that it was indeed going to be the new *Enterprise*.

To say Probert was taken aback at this news would be a massive understatement. "In answer to my astonished look and babbling," says Probert, "Gerrold explained that he took the sketch into a producers' meeting and they all agreed that was to be the new ship. It really sent my head spinning. From that point on, it was a matter of refining the shapes and adding the details."

Probert wanted to create an advanced version of Kirk's ship and hoped to retain the feel of its forebear to assuage the reservations some *STAR TREK* fans had about their beloved original version being "replaced".

As a result, he kept the basic layout of the ship the same, but changed its proportions, making the Saucer Section much larger in relation to the engineering hull. He also kept the warp nacelles at the rear of the ship, but unlike on the original *Enterprise* where they were positioned above the saucer rim, he moved them down to a position between the two hull sections, closer to the ship's centre of mass.



▼ Probert's original idea for the Battle Section was that it would nestle into the top of the Saucer Section.

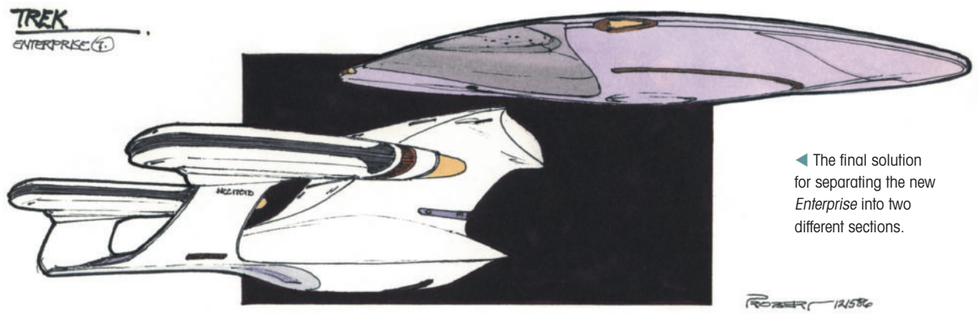
MOVING FORWARD

Another change Probert made was to slant the struts holding the saucer section and warp engines towards the front of the ship. This gave the new *Enterprise* a "feeling of aggressive forward movement, like a lunging cat," as he describes it.

Probert's initial sketch worked so successfully that Gene Roddenberry had only two changes. He wanted the Main Bridge put back on top of the Saucer Section as Probert had moved it somewhere in the middle of the ship (where it would be protected) and for the warp nacelles to be made longer.

The only part of the design that caused any real problems was that it had to separate and that the two sections had to look as good apart as they did together. Probert's initial design did not take this into account, and when he showed the producers how he envisioned this might work, it was not what they wanted. "What I came up with was a shape like the letter D," says Probert. "If you lay that down on top of the saucer with the round part toward the front and then extend the serifs, those would be two warp engines. This thing would be nestled into the top of the saucer and it would separate to go fight the battles."

The producers rejected this solution and asked for the ship to separate between the saucer and the engineering hull. At first Probert could not work out how to make the engineering hull look right as a separate vessel. After playing around with several designs, he eventually hit on the idea of leaving part of the Saucer Section on the Stardrive section, which not only acted as a broad mounting point for the saucer, but made the Stardrive section look better.

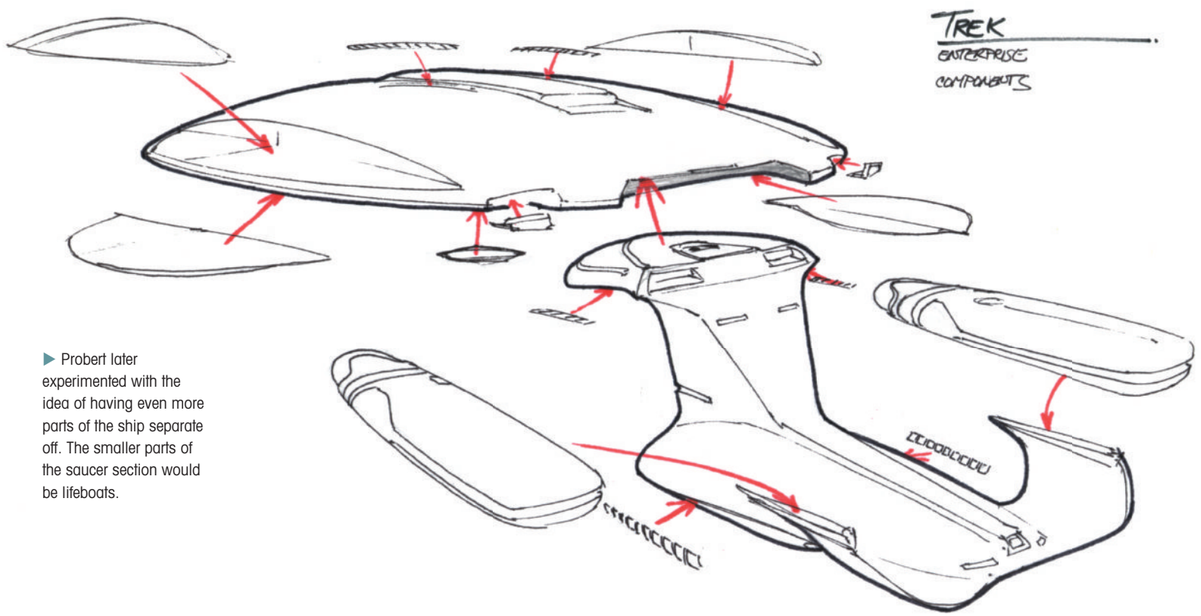


◀ The final solution for separating the new *Enterprise* into two different sections.

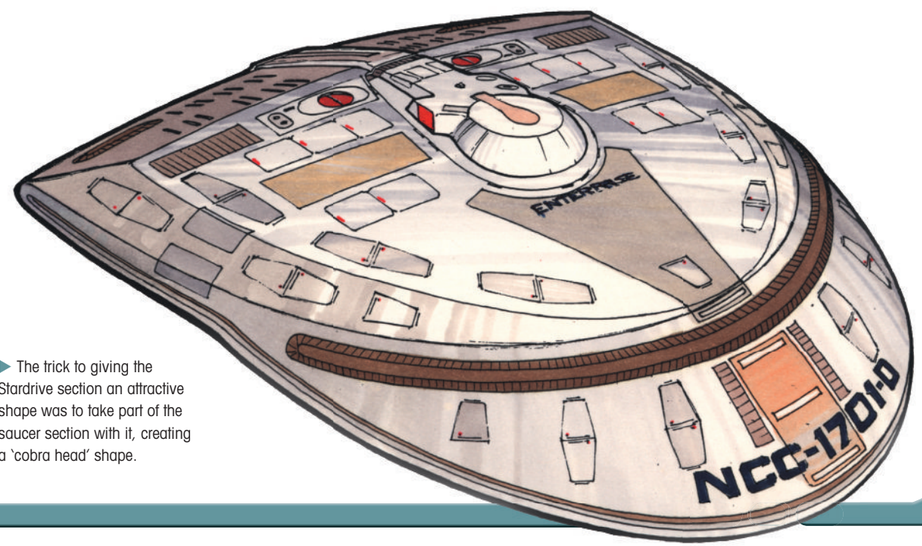
FINAL DETAILS

Once this part of the design was finalized all Probert had to do was add a few finishing touches. He placed the Captain's Yacht on the underside of the Saucer Section in the same area as what had been the dome-shaped sensor array on Kirk's ship. He also added lots of windows in various shapes and sizes all over the hull, particularly towards the front of the Saucer Section where he reasoned the crew would want to look out and keep in touch with their environment. Probert even added the ship's dedication plaque and various paintings to the walls of some of the interior sets.

One element that Probert meant to design for the *Enterprise*-D, but ended up omitting was landing gear. He had designed four landing pads on the underside of the saucer on the refit *Enterprise* for *STAR TREK: THE MOTION PICTURE*, so it was very much in his mind to do something similar for the *Enterprise*-D. "I started to do the landing gear," says Probert, "but I was distracted away from it and that poor ship eventually paid the price!"



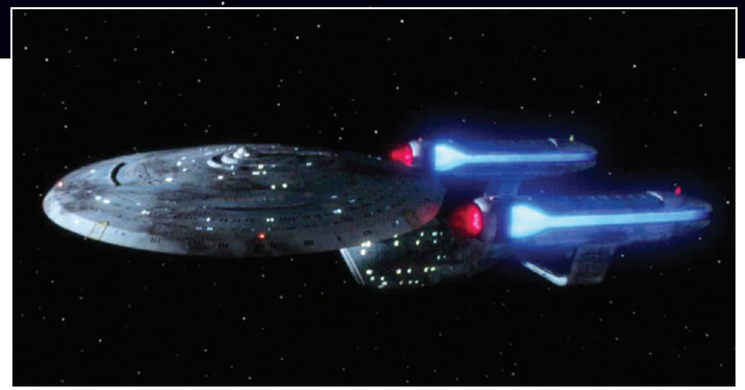
▶ Probert later experimented with the idea of having even more parts of the ship separate off. The smaller parts of the saucer section would be lifeboats.



▶ The trick to giving the Stardrive section an attractive shape was to take part of the saucer section with it, creating a 'cobra head' shape.

▶ Andy Probert produced a drawing showing what the *Enterprise*-C might look like long before the ship appeared on screen. The only part of his design that was left in the art department was this three-quarter sketch, which left a lot of unanswered questions.

DESIGNING THE ENTERPRISE-C



▶ When it appeared in 'Yesterday's Enterprise' the *Enterprise*-C was given cosmetic damage. The model was eventually redressed as the *U.S.S. Zhukov,* and give a repaint so the damage was repaired.

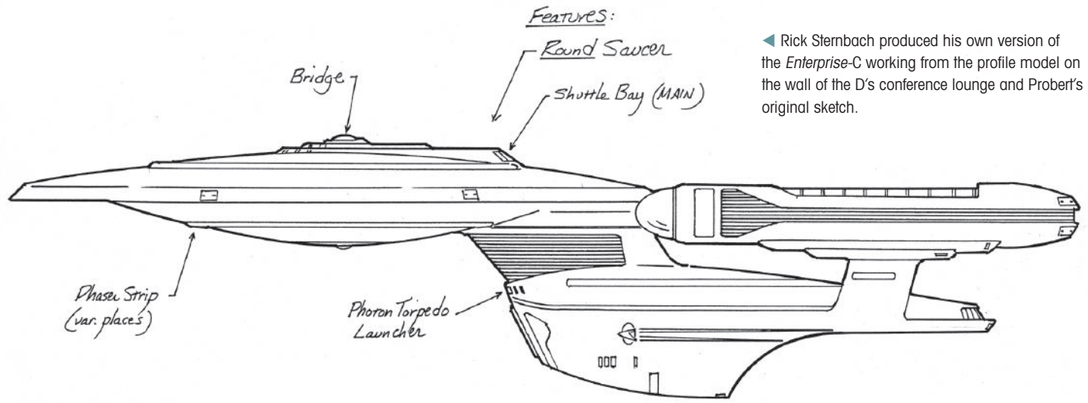
The *Enterprise*-C was the first *Enterprise* that was designed in a hurry for a single episode of television, but it still took years.

The design process for the *Enterprise*-C started more than two years before the finished ship appeared on screen. While Andrew Probert was designing the *Enterprise*-D, he'd found himself thinking about the lineage of the ship. One of the things that had struck him was the differences between Kirk's *Enterprise* and Picard's *Galaxy*-class vessel. He wondered about the look of the ship or ships that must have come in between and how much their design must have influenced the look of the D.

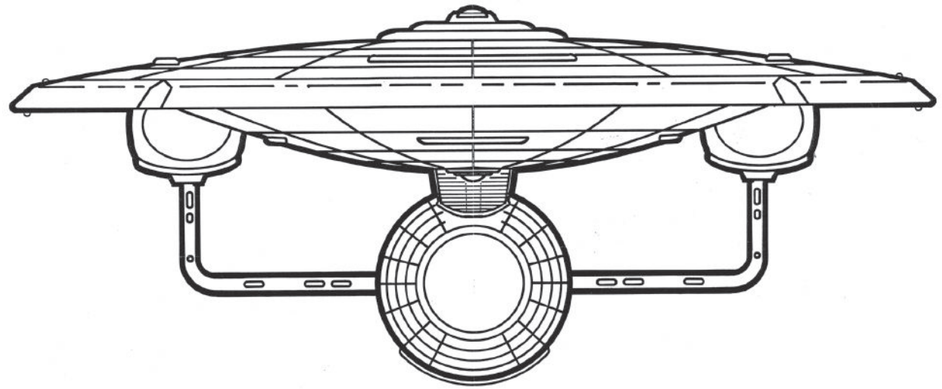
Probert agreed with the producers and production designer Herman Zimmerman that the *Enterprise*-B had been an *Excelsior*-class vessel but the C was a complete unknown. He reasoned that it was likely it would probably have had a number of design elements in common with the classes that came before and after it.

"I wanted there to be evidence that the "C" had grown from the *Excelsior* and then that the D had grown from the C," he explains. "So what I did was take a side profile of the *Excelsior* and then take a side profile of a *Galaxy* class ship. I then put them in the same scale one above the other and simply drew lines from one to the other at various important points, whether it was the saucer, the impulse engines, the bridge, the engineering hull, whatever. By doing that I eventually came up with a composite which became the *Enterprise*-C."

This design formed the basis of the model of the C that appeared on the wall in the D's conference room. But that model only showed the side view and Probert left the show before he could explore his ideas further. When 'Yesterday's Enterprise' called for us to actually see the *Enterprise*-C considerably more work was needed. Designer Rick Sternbach, who took over from Probert, had seen the sketch but had initially assumed it was a left over design for the *Enterprise*-D which had been considered by the producers but ultimately rejected. It wasn't until he was handed the script for 'Yesterday's Enterprise' that he looked at in any detail. As he recalls, his own initial thoughts on the way that the ship should look were remarkably similar to Probert's vision. "I'd always thought it



◀ Rick Sternbach produced his own version of the *Enterprise*-C working from the profile model on the wall of the D's conference lounge and Probert's original sketch.



◀ Sternbach wanted to be confident that the *Enterprise*-C could be built quickly and easily, so he gave the engineering hull a circular cross-section, which he hoped would be easier to build in the available time.

was a given that the logical step for this design was an intermediate step between the *Excelsior* class and the *Galaxy* class. That little sketch that Andy produced when he'd worked on the first season looked like it would be a really great starting point, as it definitely had some very interesting design elements. I remember that my first thoughts were that the nacelles on Andy's design could be a bit different and that while his sketch showed more of a round saucer than an *Excelsior*-class ship, it also had a very *Excelsior*-looking neck."

Sternbach felt that Probert's sketch simply wasn't detailed enough to catch the attention of producers and, as it only showed a three-quarter view of the ship, it meant that many aspects of the design left too much open to interpretation. What was needed was a set of drawings, which gave the shapes Probert had come up with and his overall idea far more clarity.

FILLING IN THE DETAILS

"I took some of the ideas and some of the design elements of Andy's that were in the sketch, and threw up a top view and a side in ortho," says Sternbach. "I showed those to the producers and at the same time made the case that this would be an intermediate step between the *Constitution* and *Galaxy* classes and could very well be the *Ambassador* class that they were looking for."

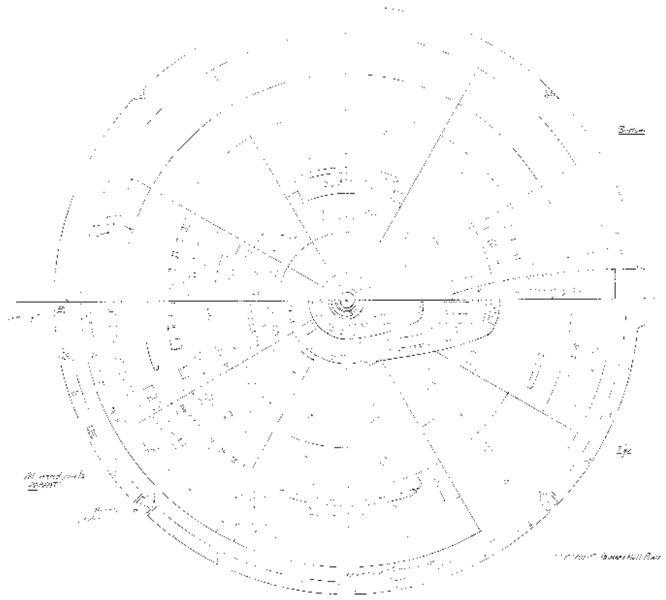
While waiting to get the thumbs up from the producers, Sternbach continued modifying the design, mainly to make it easier to work with. Probert had made no secret of the fact that he favored compound curves and this was reflected in his decision to give his version of the ship a very bowed engineering hull reminiscent of a sailing ship. However it was those very compound curves that Sternbach felt would ultimately make the ship difficult to build, especially in the available time.

SOMETHING YOU CAN BUILD

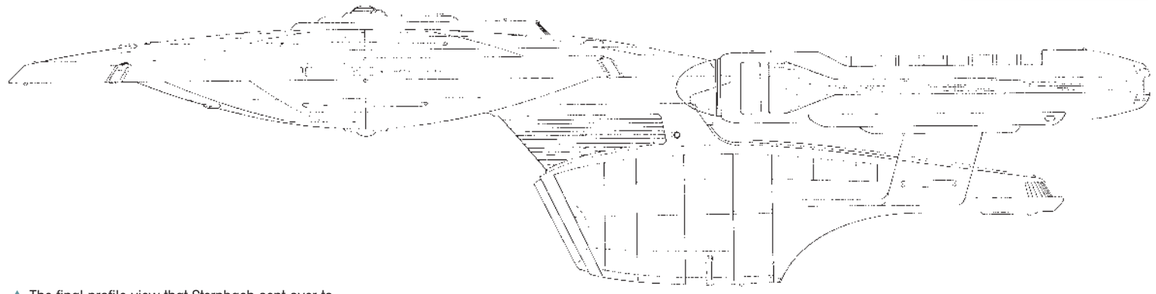
"I remember making the cross section of the engineering hull more circular, simply because I felt it would make fabrication of a model go faster," says Sternbach. "After three seasons of the show, I'd come to the conclusion that given the pressure we were under, if we couldn't actually build the things we were designing then they might just write them out altogether. In this case we were pushing hard to get it done."

When the producers had finally signed off on Sternbach's designs, he was able to immediately incorporate those modifications just in time before it was then passed on to modeler, Greg Jein.

"Greg just really knows his stuff," says Sternbach. "He could be given freehand drawings and he'd still come back with a workable model. So I knew I didn't have to draw in everything. Greg would immediately understand the shapes and the details. It was the reason that he was able to create such a wonderful blend of the *Galaxy* class and *Excelsior* class that both myself and Andy Probert had originally envisioned for the *Enterprise*-C."

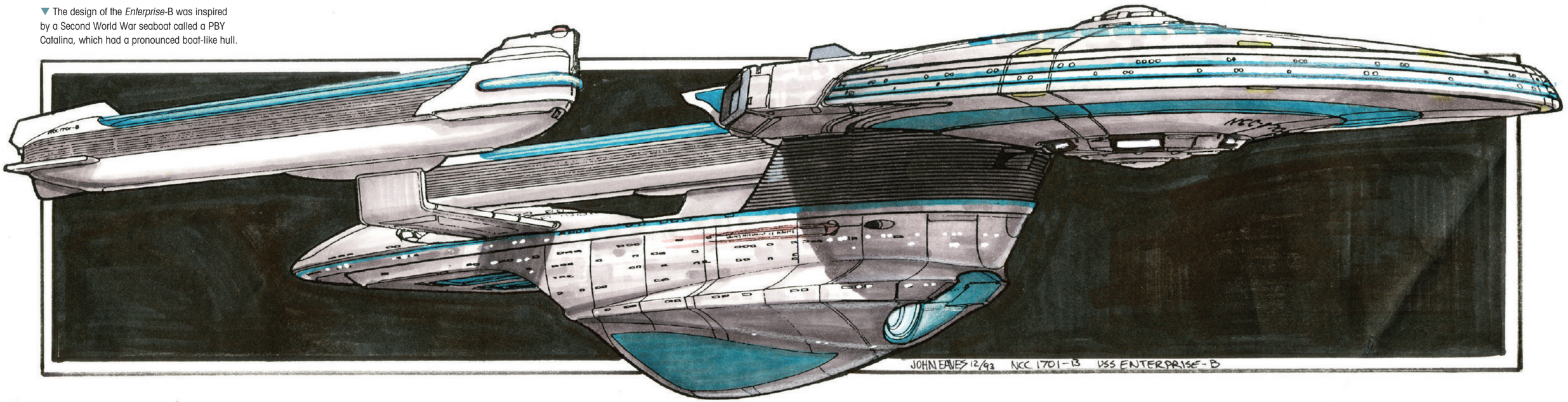


◀ Probert's sketch didn't make it clear whether the saucer was round or elliptical, and Sternbach decided to keep it closer to the *Excelsior* than the *Galaxy*-class D.



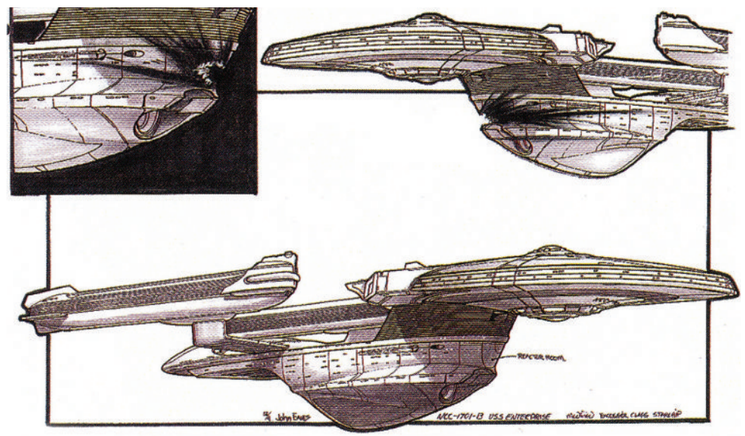
▲ The final profile view that Sternbach sent over to modelmaker Greg Jein, pulled the design a little closer to Kirk's *Enterprise* and a little further away from Picard's.

▼ The design of the *Enterprise*-B was inspired by a Second World War seaboat called a PBY Catalina, which had a pronounced boat-like hull.



DESIGNING THE III ENTERPRISE-B

▶ John Eaves's first task as a concept illustrator on *STAR TREK* was to envisage the look of the *Enterprise*-B based on the existing *Excelsior*-class design. Eaves knew from an early script that he had to bulk out a section of the hull that would be torn out by the Nexus energy ribbon, but not destroy the ship.

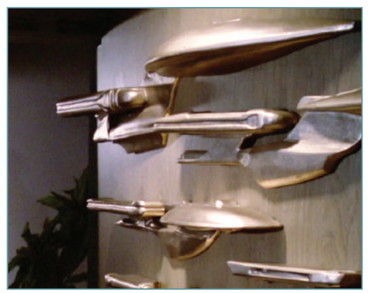


A desire to create something new while maintaining continuity meant designing the ***U.S.S. Enterprise*** NCC-1701-B was far from straightforward.

In working out how the *U.S.S. Enterprise* NCC-1701-B should look, the makers of *STAR TREK GENERATIONS* faced a dilemma. The cost of designing and building a brand-new studio model was prohibitive. In addition, a new design would present problems in terms of continuity. The relief sculpture of previous *Enterprise* ships on the wall of the Observation Lounge of the *U.S.S. Enterprise* NCC-1701-D had already established the *Enterprise*-B as an *Excelsior*-class vessel. On the other hand, the producers did not just want to use the existing *Excelsior* studio model, as it had been seen many times before, and they wanted to give the film audience a new ship.

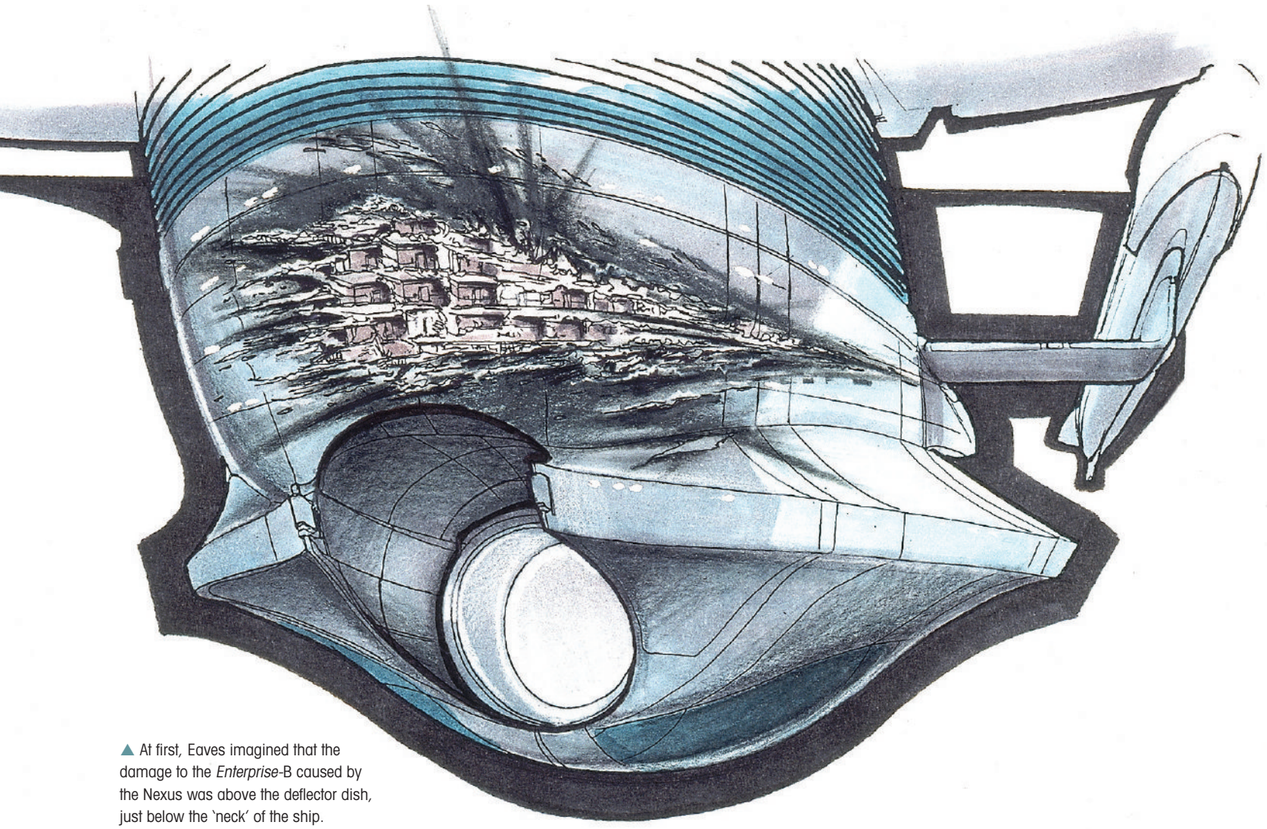
SATISFYING SOLUTION

After much deliberation, a compromise was reached, and it was decided that the *Enterprise*-B should be a modified version of the existing *Excelsior* studio model. Scenic art supervisor Mike Okuda explained, "We had said for years that the *Excelsior* sculpture in *THE NEXT GENERATION* Observation Lounge represented the *Enterprise*-B, and I felt that some fans would have felt let down if we had failed to follow through with that idea. That's why I enlisted the talented (illustrator) John Eaves, who fortunately jumped right on board to help out. Our producers saw the value in this approach, both from a fan-expectation viewpoint, as well as the sheer financial practicality. If we can't do these things on budget, eventually the studio (and its investors) will figure out they can't make a profit, and they'll stop investing in new productions. They already take a huge financial risk on every new production, and the only reason they're willing and able to do so is if there's a reasonable chance that they'll make a profit."



▲ The *Enterprise*-B had been depicted as an *Excelsior*-class ship in a sculpture aboard the *Enterprise*-D.

At this time, John Eaves had previously only worked as a model builder on *STAR TREK V: THE FINAL FRONTIER*, but he would go on to have a long association with *STAR TREK* as a concept illustrator and designer on the future movies, as well as on *STAR TREK: DEEP SPACE NINE* and *STAR TREK: ENTERPRISE*. He was



▲ At first, Eaves imagined that the damage to the *Enterprise*-B caused by the Nexus was above the deflector dish, just below the 'neck' of the ship.

thrilled to be asked to come up with design modifications for the *Enterprise*-B. "This was my first art assignment on *STAR TREK*," said Eaves, "and what a fun one to say the least. I was one huge fan of the *Excelsior*, and despite all the changes we were asked to do, it was important to maintain the overall design as much as possible."

Working out which areas of the original *Excelsior* design should be modified was partly dictated by the script for *GENERATIONS*. As Eaves explained, "First I took a photo that showed the *Excelsior* in spacedock, did a rendering, and started adding bits to the ship. Mike (Okuda) then pointed out that we needed to design an area that protruded from the ship, so that the energy ribbon could whip out a section, while leaving most of the ship intact."

As a result, Eaves, who had originally imagined the damage higher up near the neck of the ship, subsequently moved the damaged area further down, in front of the defector dish.

"To seek out inspiration, the PBY Catalina (a flying boat from the 1930s and 1940s) came to mind," said Eaves. "Its built-in boat-like belly detail made for the perfect reference to translate into the starship's new hull lines."

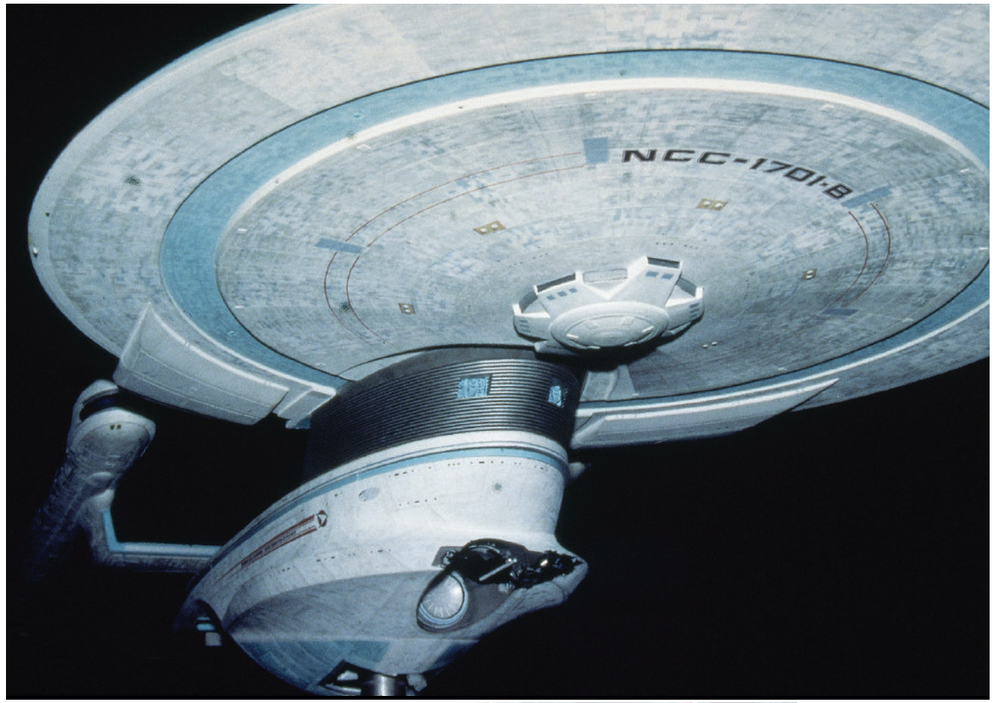
The Catalina, with its wing-top mounted twin propellers, also inspired the extra two impulse engines he added to the back of the main saucer section.

FURTHER TWEAKS

Additional modifications to the design included giving the nacelles U-shaped Bussard collectors and extra fins along the top and side, while the two fins that were on top of the saucer section on the *Excelsior* were removed.

Once Eaves's changes had been approved, his artwork was passed along to Industrial Light & Magic's model ship. Here, the existing *Excelsior* model was turned into the *Enterprise-B* under the supervision of lead modeler John Goodson. "The end result looked beautiful on film," said Eaves. "The folks up at ILM again made movie magic."

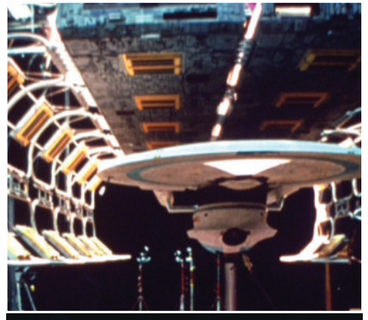
The *Enterprise*-B's most memorable moment involved the scene where the tendril of energy from the Nexus rips a gaping hole in the front of the ship. The shot involved being so close to the model that ILM made an entirely separate model of an enlarged section of the forward secondary hull.



◀ In addition to creating a damaged section of the regular model [left], ILM built a separate lager scale model of just the damaged section around the deflector dish, because even the studio model wasn't detailed enough for an extreme closeup.

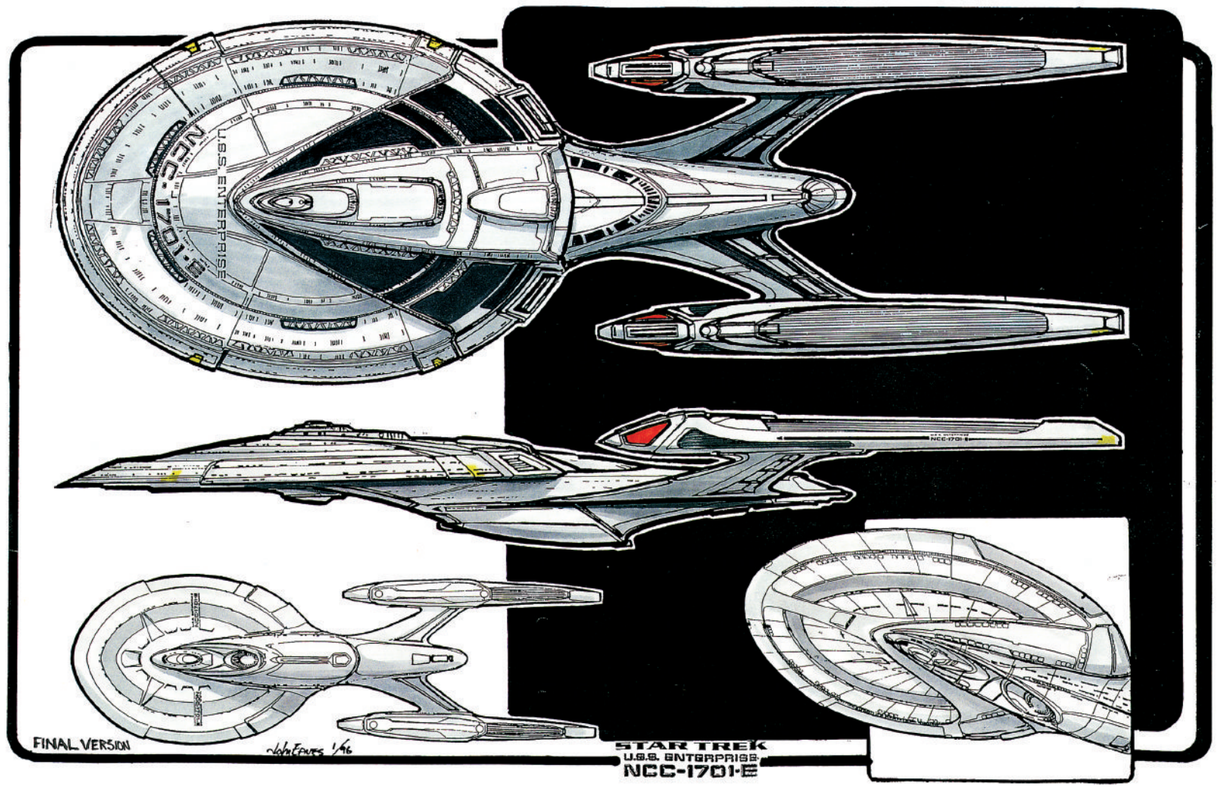
The model of this one section turned out to be as large as the studio model of the whole ship, and was able to show the damage in great detail. As Okuda explained, "This model was built for an extreme close-up shot of the ship's hull, revealing the dramatic extent of the damage, telling the audience that Kirk had no chance of survival."

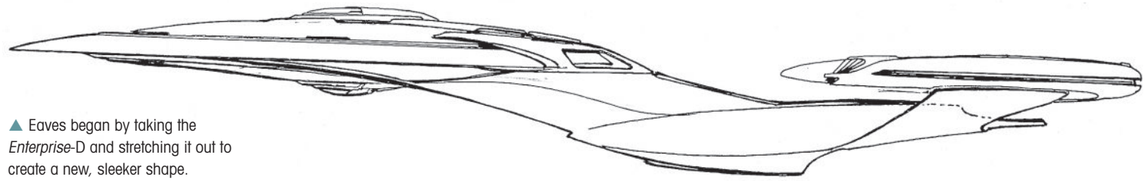
After its appearance in *STAR TREK GENERATIONS*, the *Enterprise-B* studio model made one further screen appearance as the *U.S.S. Lakota* NCC-42768 in the *STAR TREK: DEEP SPACE NINE* episode 'Paradise Lost.' The model, still with its *Lakota* markings, was sold at Christie's '40 Years of *STAR TREK*: The Collection' auction in 2006 for $132,000.



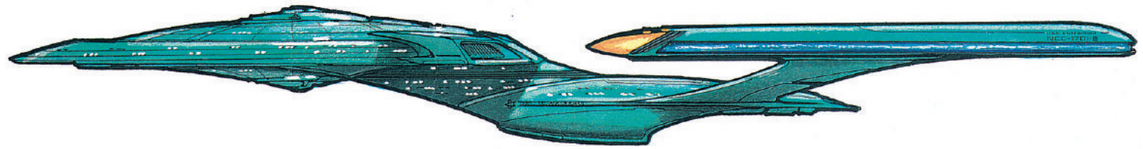
◀ The *Enterprise*-B model was filmed inside the spacedock that had first appeared in *STAR TREK: THE MOTION PICTURE*. Like the ship model, the spacedock model was also heavily modified and relabeled.

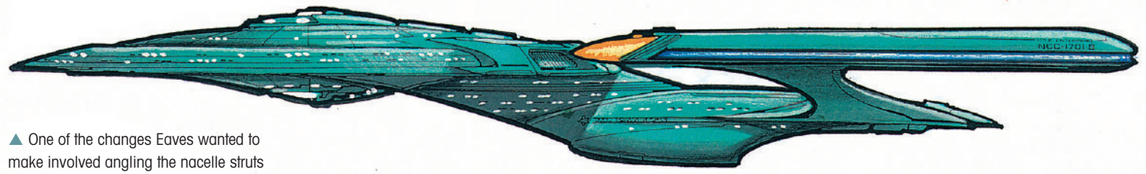
◀ Some of the most obvious changes to the model included adding extra impulse engines to the back of the saucer section and fins to the top and along the sides of the nacelles.





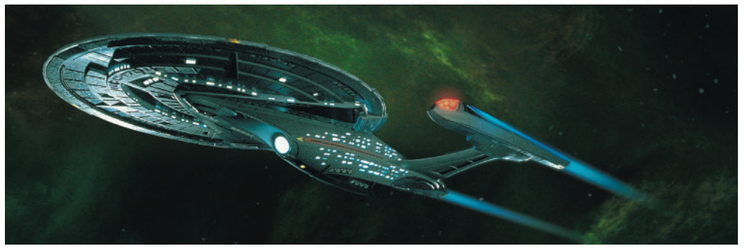
▲ Eaves began by taking the *Enterprise*-D and stretching it out to create a new, sleeker shape.





▲ One of the changes Eaves wanted to make involved angling the nacelle struts forward. He produced these two drawings to show the difference it would make.

DESIGNING THE III ENTERPRISE-E



▶ The finished model created by ILM followed John Eaves' designs but embellished them. Eaves had been a modelmaker himself and not only valued, but planned for, their contributions.

The second ***STAR TREK: THE NEXT GENERATION*** movie called for a new, tougher ***Starship Enterprise*** that was fit to fight the Borg.

When work started on *STAR TREK: FIRST CONTACT*, production designer Herman Zimmerman handed John Eaves the biggest challenge of his career: he asked him to design a new *Starship Enterprise*. It was only when Eaves got home and started sketching that the enormity of the task sunk in. As he says, "Designing the *Enterprise* is every school kid's dream."

At this point the film hadn't actually been greenlit so there was no script and Eaves had very little in the way of a brief. He started by thinking about how this new *Enterprise* would differ from its predecessor. He'd been involved with building the shooting model of the *Enterprise*-D, and he admits to having reservations about its design. "It was so different to what I was used to thinking an *Enterprise* would be," he explains. "I remember thinking 'I don't know if I like this or not.' And, after building that model I realized that there were only a few angles it could be filmed from."

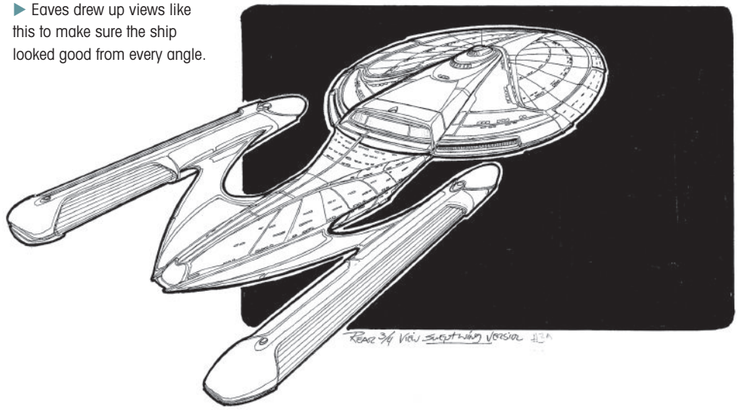
So one of Eaves' guiding principles was that the new ship should look good from as many angles as possible. He was also determined not to deviate too far from Matt Jefferies' original design. "I knew that the primary shapes had to be used – the body, the nacelles and, of course, the saucer. So it came down to how to configure those into some kind of new architecture."

Eaves' initial approach was to take the *Enterprise*-D and stretch it out. At this point the script for *FIRST CONTACT* became available. It described the E as a more advanced, faster ship that – most importantly – was designed to fight the Borg. "To me the shapes on the *Enterprise*-D looked as if they couldn't handle the type of speed needed for the E," explains Eaves. "So I thought that it definitely needed to be sleeker looking and I definitely wanted it to be faster looking at the same time."

Eaves got to work stretching the engineering hull to give it a more extended shape, drawing inspiration from his own work modifying the *Excelsior* class to create the *Enterprise*-B. However he was still puzzling over what to do with the saucer. "I went through the whole gamut of shapes. I thought I'd start with the round saucer just to see how it would look on a sleeker kind of body frame. But that was almost going too far back in time with the design. The oval had been established and I thought at least that shape should carry on, so I rotated it around to give the impression of speed and power."

Although Zimmerman needed sketches as soon as possible, Eaves refused to submit any work until he was comfortable with the direction he was taking. When he did put his designs in, they met with a positive response. Until that point he admits that he had been cautious. Now he began to explore more radical changes such as extending the nacelles. "I'd loved the older look with the long nacelles and I thought that, with the new technology behind it, a longer and sleeker nacelle would balance the craft better."

▶ Eaves drew up views like this to make sure the ship looked good from every angle.

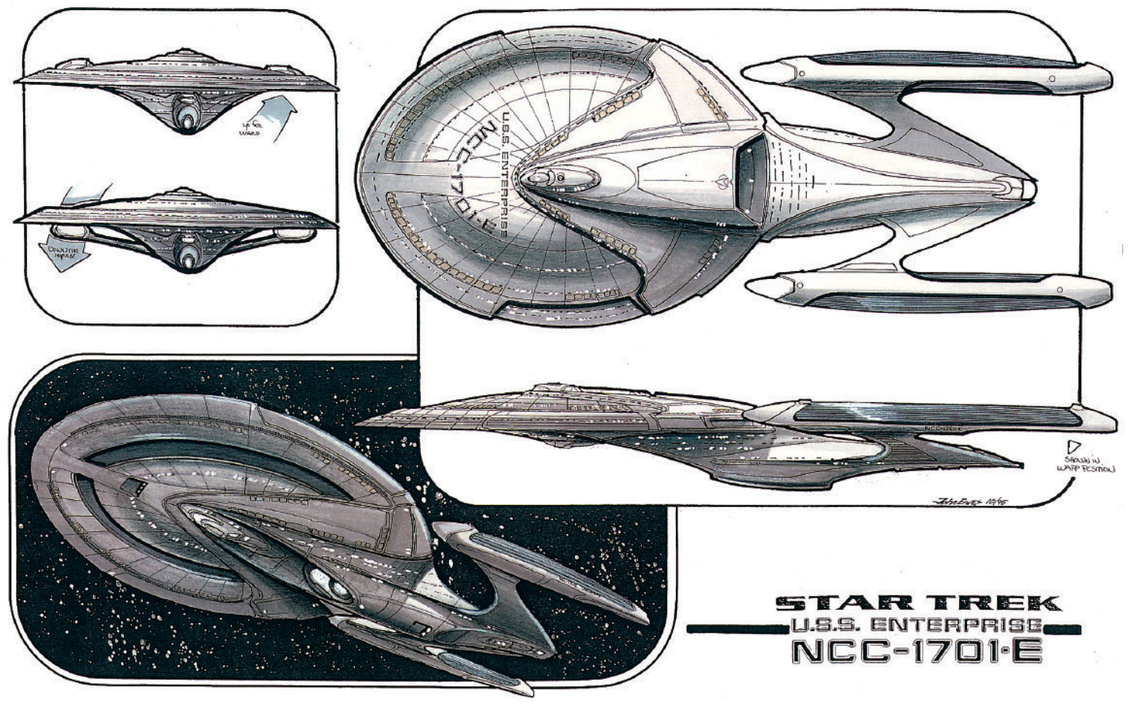


Eaves' original concepts show the nacelle struts swept back. Now he tried sweeping them forward, feeling that it implied a sense of lunging that gave the ship an impression of forward motion. He produced drawings showing the difference between the two approaches which were submitted to producer Rick Berman, who immediately approved Eaves' new approach. "Basically, Mr. Berman was looking for something that was new and very, very different, together with a nice shape and a cutting edge design."

TOUGHENING UP

Eaves was now able to focus on other areas that he felt could benefit from a new look. The most obvious change involved the neck section, which connected the engineering and saucer section. He worked to blend this into the body of the ship in order to create a more compact shape.

"This was a special *Enterprise*, one that had been specifically designed for fighting the Borg, so it was important to take away any vulnerabilities," Eaves recalls. "I'd always thought that the neck was a prime target. When the *Enterprise* was attacked in *THE WRATH OF KHAN* I remember thinking 'Man, if they had hit it for a few more seconds it would have snapped right off and that would have been the end of the ship.' On the D I'd thought that the neck was too heavy and I was determined to find a way to get it to blend. In the end, it turned out that eliminating the neck altogether and tapering the scoop of the deflector dish all the way up to the torpedo launcher worked best."



◀ The 'almost final' design, complete with moving nacelles, and 'turkey leg' nacelle struts. By this point the basic shapes were in place but there was still work to be done refining the details. Berman even had Eaves produce another round of drawings showing more alternatives before signing off on the design.

Eaves also suggested making the nacelles move when the ship went to warp as they do on the *U.S.S. Voyager*. But Berman was keen for the *Enterprise*-E to have a distinct identity, so any similarities to *Voyager* or other Starfleet ships was off the agenda.

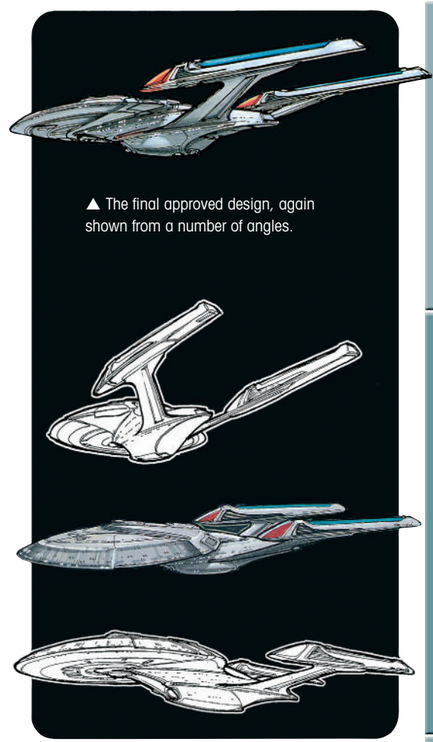
Next, Eaves turned his attention to the surface textures, drawing inspiration from the *STAR TREK: THE MOTION PICTURE Enterprise*. "If you look at old boats or airplanes, the heavier the paneling, the slower they would go. The (TMP) *Enterprise* was beautiful and I wanted that same smooth look for the E."

SENSE OF MOTION

Eaves did add some surface detail – triangular wedge shapes on the top and bottom of the saucer. "I was thinking about warp technology – that at high speeds it would act sort of like a warp flow. It's also an old art school thing. As an artist you're determining where the viewer's eye goes and the shape gives you a sense of speed. I was trying to demonstrate speed no matter where you looked."

As the design evolved, Fritz Zimmerman, one of the set designers, pointed out that the forward sweep on the nacelle struts made the ship look like 'a turkey sitting in a pan'. After that no-one could look at the ship without having the same thought and, as a result, the nacelles were soon swept back.

When Rick Sternbach's blueprints were sent to ILM, Eaves held off on giving too much information wanting to leave the ILM team room to be creative. "In the version I sent them the whole front end of the nacelle was a big Bussard collector," says Eaves. "It was this open ended glowing orb. Then the blue light went all the way to the back uninterrupted.



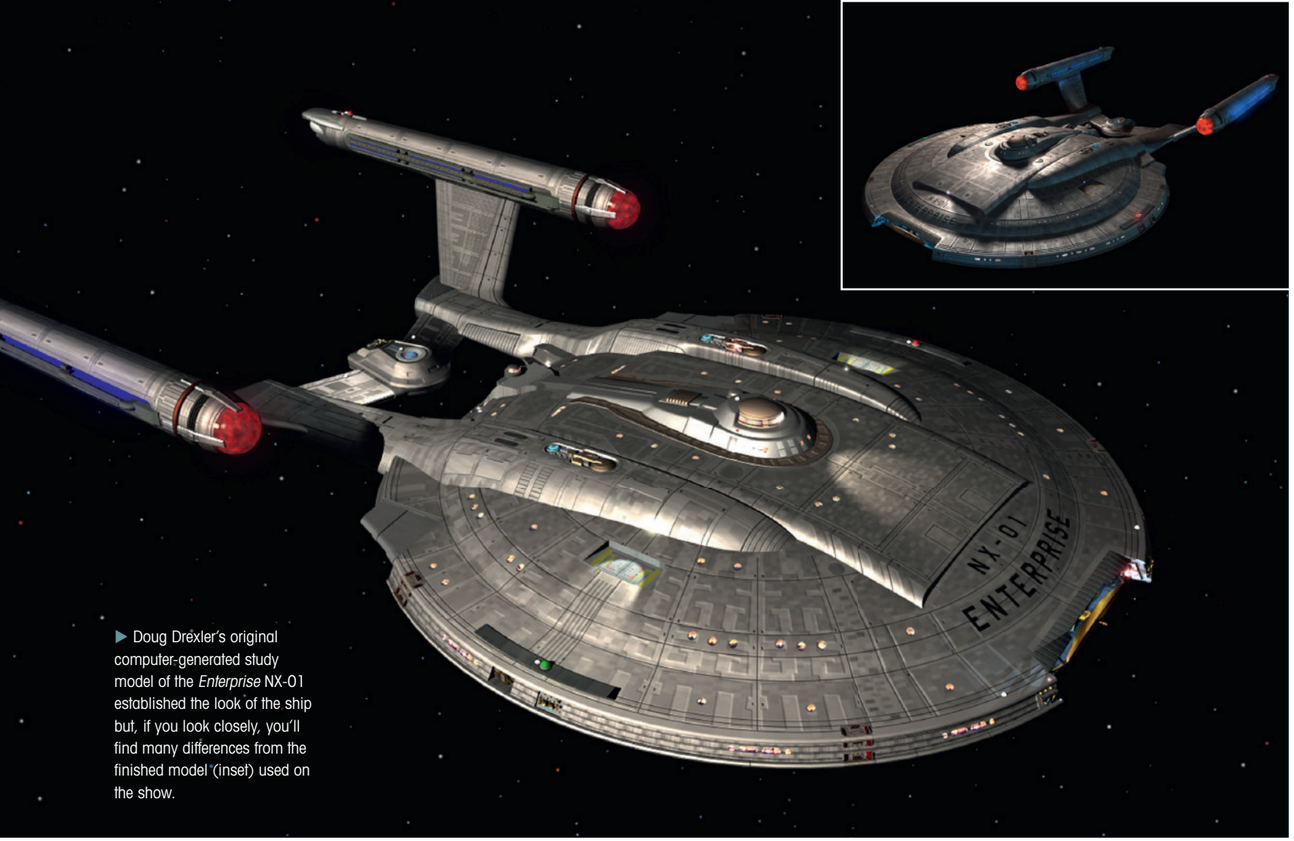
▲ The final approved design, again shown from a number of angles.

ILM suggested they build a framework around the front end of the Bussard, which I thought was fantastic. "

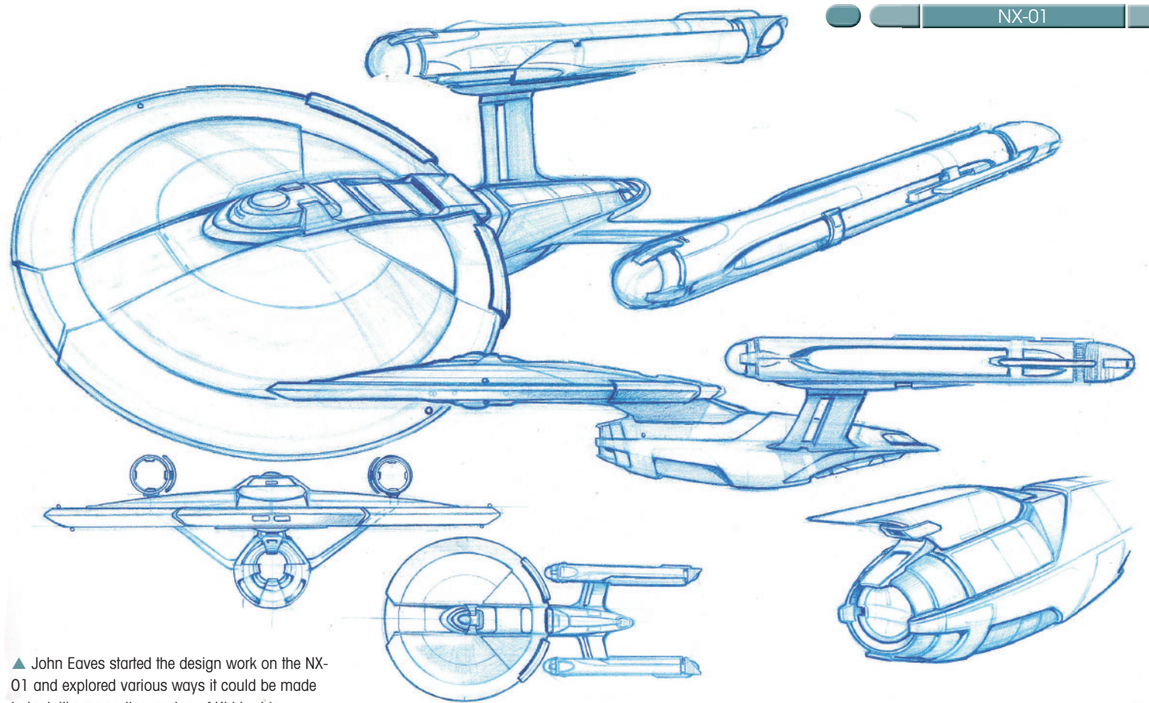
ILM also suggested changes to the way the struts connected to the nacelles, having them taper to the body on a parallel line with a more graceful angle.

For Eaves the best thing about the design for his *Enterprise* is that although it is new and different it still has many traces of Matt Jefferies' original design.

"It looks more like the original *Enterprise* than originally intended. I think what they did for *THE MOTION PICTURE* was a perfect kind of modification on an existing design. That's what I wanted to do – not change it completely but modify it. The basic lines of the original *Enterprise* were perfect and getting close to that is all you could want."



▶ Doug Drexler's original computer-generated study model of the *Enterprise* NX-01 established the look of the ship but, if you look closely, you'll find many differences from the finished model (inset) used on the show.



▲ John Eaves started the design work on the NX-01 and explored various ways it could be made to look like an earlier version of Kirk's ship.

ENTERPRISE NX-01

> *"(Designing the NX-01) was scary and fantastic all at the same time. Hair raising and wonderful."*
> Doug Drexler

▼ Alex Jaeger's design for the *Akira* class provided some early inspiration and a design direction for the NX-01, although Drexler and Zimmerman made significant changes so that their ship would have more in common with the original series.

The latest ***Enterprise*** would be the 'oldest' that fans had seen, and this mix of old and new gave the designers headaches.

Designing Captain Archer's *Enterprise* presented the *STAR TREK* art department with one of the greatest challenges it had faced. The new *Enterprise*, the NX-01, had to be a very old *Enterprise*. In fact, it had to be Earth's first true starship.

Production designer Herman Zimmerman and the producers began by having concept artist John Eaves produce some drawings but, while his designs were beautiful, the feeling was that they were too close to Matt Jefferies' design for Kirk's original ship. It was also clear that 21st-century viewers expected the ship to look rather more detailed than the version that had become famous in the 1960s.

Eaves produced dozens of drawings but nobody could settle on the best approach for the new ship. There was also a lot of work for him to do helping to conceptualize the ship's interiors. So Zimmerman turned to a former member of his team, Doug Drexler, who was working as a computer modeler at one of *STAR TREK*'s visual effects houses, Foundation Imaging.

Drexler couldn't leave Foundation at once so, every evening, Zimmerman would come to Drexler's house and they would fire up his computer. Together they would throw ideas around, with Drexler creating 3D models while Zimmerman looked over his shoulder and made suggestions.

BACK TO THE BEGINNING

Drexler, who is an expert on *STAR TREK*'s history, initially suggested they revisit Matt Jefferies' original rejected designs and make the ship spherical, but no one was willing to lose the familiar saucer, so he and Zimmerman kept looking at different ways of handling the familiar elements. Eventually they had an approach they thought might work but ultimately it was decided that it just looked too much like Kirk's *Enterprise*.

The producers decided that this earliest version *Enterprise* should be smaller and more primitive. In fact, they wanted to base it on a background

DOUG DREXLER'S CONCEPTS

▼ The idea was to produce a ship that looked as if it could be a precursor of Kirk's *Enterprise* so Drexler experimented with the different arrangements of the familiar shapes and ways of adding new elements.

▼ Drexler often returned to Matt Jefferies' early concepts for inspiration. One of the ideas Jefferies abandoned was that the engines would form a ring behind the ship.

▼ This version of the ship almost got made: it was approved by the producers and was about to be handed over to the VFX team when the producers decided that it was too similar to Kirk's ship.

▼ Alex Jaeger's design for the *Akira* class provided some early inspiration and a design direction for the NX-01, although Drexler and Zimmerman made significant changes so that their ship would have more in common with the original series.

▶ The NX-01 had all the important details you'd find on any *Enterprise*. The deflector dish is the original version from Kirk's ship, which has been distorted to fit in the saucer section.

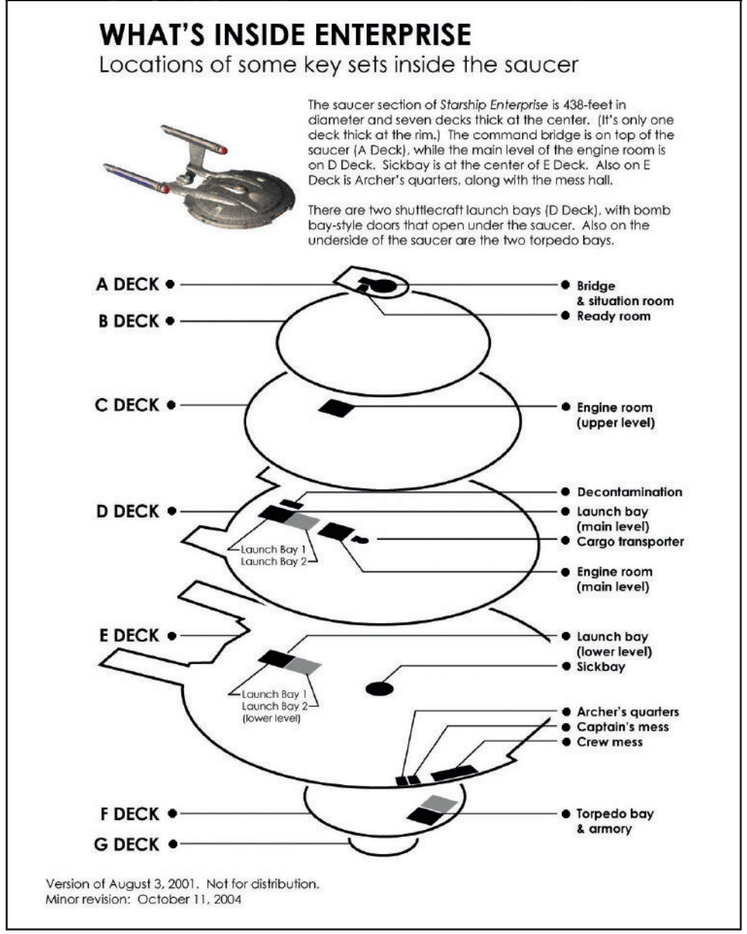
ship, the *Akira*, which ILM's Alex Jaeger, had designed for *STAR TREK: FIRST CONTACT*. This ship had the familiar saucer and warp nacelles but barely any engineering hull.

Drexler says that taking the *Akira* and somehow twisting it into Matt Jefferies' original design was a frustrating but ultimately exhilarating process. He drew inspiration from industrial designer Raymond Lovey who specialised in taking long-standing designs and restyling them. Drexler's CG model went through enormous changes as he worked on it, he describes it as being "pulled, stretched, cut and pounded" before the shape was finally approved.

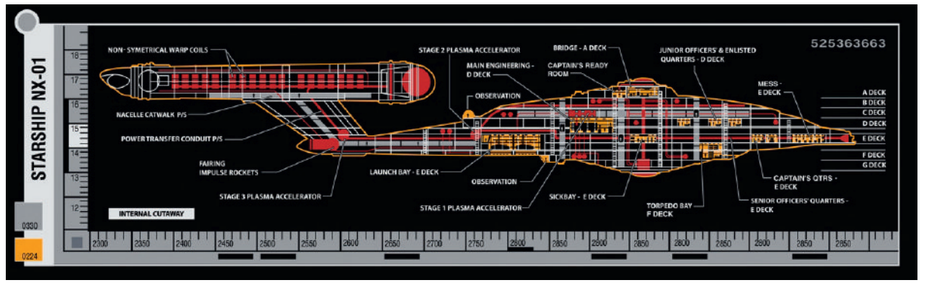
FILLING IN THE DETAILS

Once the NX-01 reached this stage, Drexler started to really enjoy himself, going over the surface of the ship adding details and deciding exactly how everything would work. No detail was too small for him. There was, however, one problem – the producers didn't want to tie the writers hands by establishing too much at this early stage. They wanted to leave lots of details vague in case they needed them for a story point some time in the future. Drexler's solution was ingenious – he hid everything behind doors and hatches and wrote up notes 'suggesting' what was behind them.

He covered the surface of the ship with these hatches so equipment could appear from almost anywhere. His idea was that behind each hatch there was a rotating drum with cylinders like a revolver. Each cylinder housed



▶ Doug Drexler and Mike Okuda prepared documents for the writers showing where important parts of the ship such as the engine room and crew quarters were located.



a different piece of equipment – phase cannons, antennas, communication relays, probes, in short, anything the writers might come up with. When it was needed, the cylinder would rotate allowing the suitable piece of kit to appear wherever it was required.

The exterior has features that are a tip of the hat to the original TV series. For example, the sensor bars and navigation beacons are a deliberate echo of the ones the ship has in the first TV pilot, 'The Cage', when a subtly different version of the *Enterprise* was commanded by Captain Pike, rather than Captain Kirk.

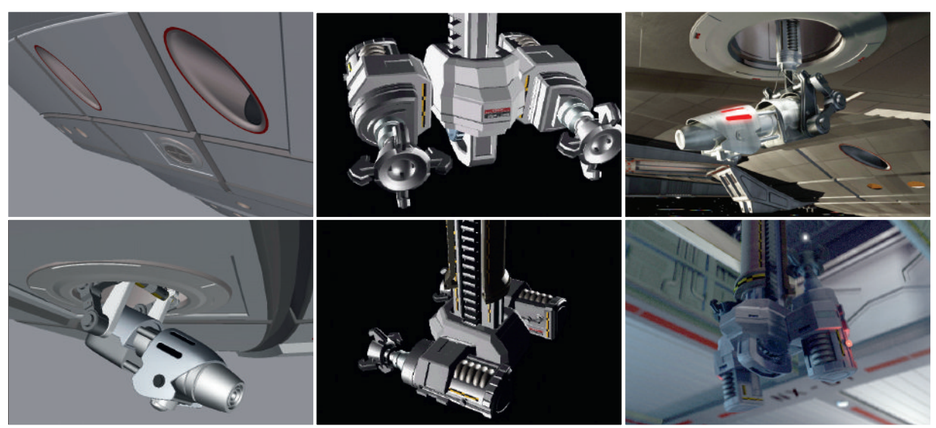
OLD AND NEW

The NX-01 also took inspiration from the real-world space programme. *STAR TREK* scenic artist Mike Okuda chipped in with the design of the airlocks which were closely modelled on the ones used on the International Space Station.

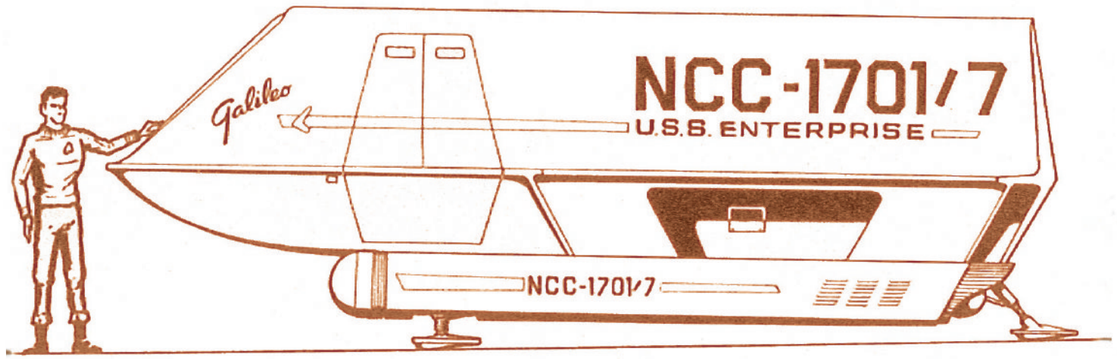
When it came to the overall look of the ship, Drexler figured that it would need constant maintenance. Again, he took inspiration from Matt Jefferies' original designs, but made them heavier and added access hatches. Jefferies had been clear that in Kirk's era maintenance would be done inside the ship, but Drexler reasoned that this would be a refinement that came later. At this point in time he says, "The NX was maintenance intensive, and took a hardy breed of engineers to run." So he left the nacelles open so you could see the warp field grilles and there were tracks that ran between the hull panels, which were designed for repair cars to run along.

Although Drexler describes the design process as "painful and hair raising" he was delighted with the finished ship. "There isn't a frivolous line on it," he says, "Every bit of it has a purpose and is thought out."

▲ Almost every vessel has a Master Systems Display graphic that shows the internal layout of the ship. This one prepared for the NX-01 reveals some fascinating details. Note the human figures inside the nacelle and the observation room.



◀ Drexler's initial lo-res computer designs for various hatches and some of the equipment behind them, and the final versions that were created at Foundation Imaging and Eden FX.



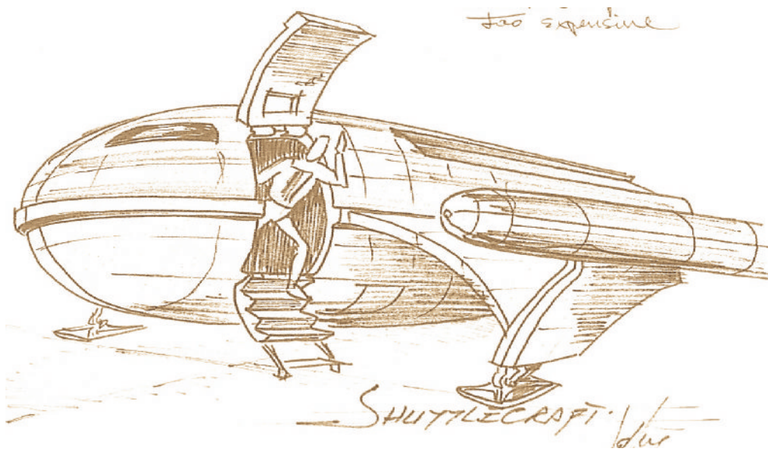
DESIGNING THE III GALILEO SHUTTLE

The original ***Enterprise*** shuttle was made as part of a deal with a model company so wasn't as ambitious as Matt Jefferies planned.

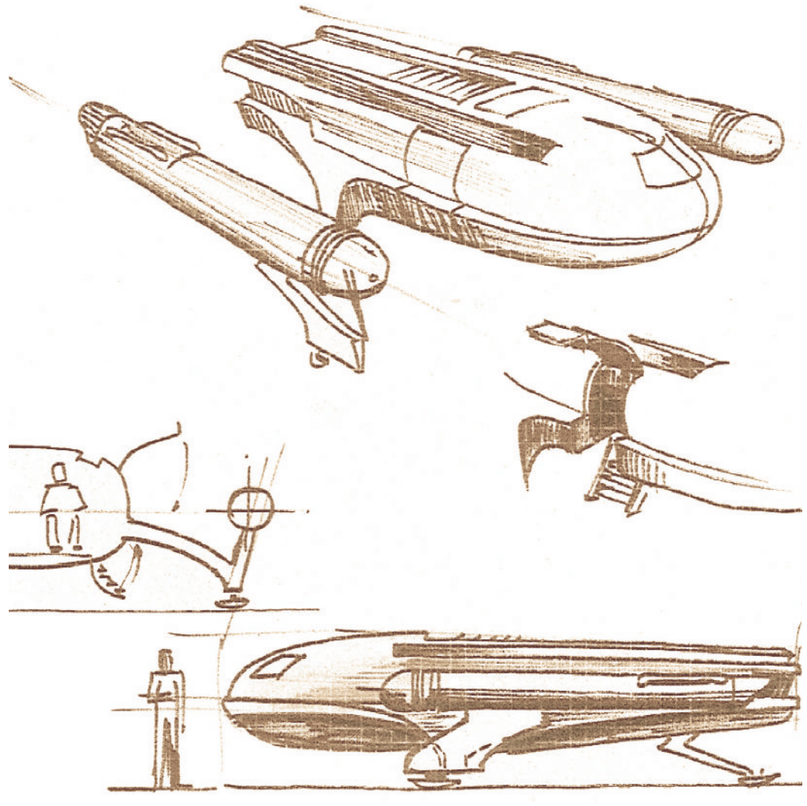
The U.S.S. Enterprise's shuttlecraft, the *Galileo,* wasn't designed at the same time as the rest of the ship. The reason is simple – shuttlecraft don't get built until a storyline calls for one, because they're just too expensive. So production designer Matt Jefferies wasn't asked to produce one of these small, short-range vessels until 'The Galileo Seven' was written. "The *Enterprise* was never supposed to sit on a planet's surface," he explained, "so we needed something other than the transporter room. I think, looking at it in later years, it should probably have been a shuttle like a city bus, because several times a script came up that called for more people than we had seats for!"

"I worked up sketches for it. But AMT, who were going to build the model in their shops in Phoenix in exchange for being able to market the kit of the *Enterprise,* felt it was beyond their capabilities, so it was designed by Gene Winfield, an automotive designer who had a custom body shop that primarily serviced the automotive industry through AMT. The *Galileo* as everybody knows it today was not my design. Overall I was a little disappointed, but I think within their capabilities it was a good solution. And it did work, obviously; people did accept it."

Jefferies' original design for the shuttle was for a less boxy spacecraft. "Basically it was a teardrop thing," he said, "and the whole side panel, the outside door, would slide back, and you could just step right off on the ground. The seats were like bicycle seats mounted on each side of the keel."



▲▼ Jefferies had his own ideas about what the shuttle should look like. He wanted to mimic the overall layout of the *Enterprise,* with twin warp nacelles, but to give the body a 'teardrop' shape. The idea was that the bottom part of the door would have folded down to form a ramp, while the top of it opened upwards.

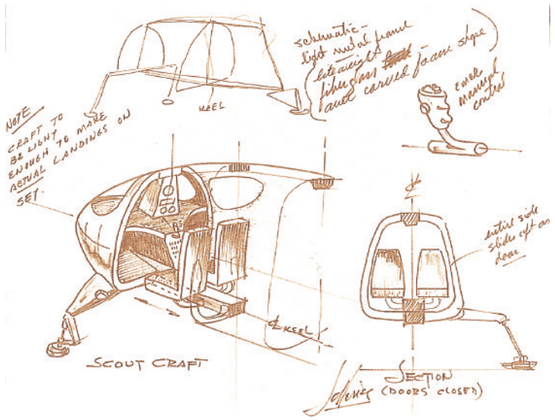


MATCHING INTERIOR

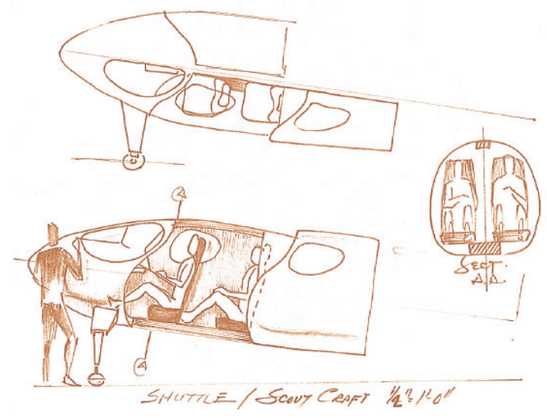
AMT duly produced a miniature of their version of the shuttle. The design did not lend itself to Matt's bicycle-seat scheme, so he had to come up with an interior that worked with the exterior shape. "That (the exterior) was a separate set," he remembered. "A certain percentage of that had to be done in the studio shops. They brought it all over in a big truck. It was on a steel frame; it was bulky, and it was heavy. I think if it had been lighter and easier to move, and of course if we'd had the time or the equipment, we would have probably got much more use out of it. We could have lowered it to the surface and had the doors open and the people get out or get in. But it would have taken a lot of engineering and probably beefing up the stage structure to be able to lower the thing as it was."

The producers used the *Galileo* miniature for photography alongside the interior set, which was designed to accommodate the seven personnel the script called for.

▲ The *Galileo* consisted of several different elements: a miniature used for VFX, a full-sized exterior (above) and a life-sized set that the actors could work in.



▲ Jefferies version of the shuttle would have been much lighter and narrower and would have had what he described as "bicycle seats" inside.



▲ In Jefferies' concept the side wall of the shuttle (or scout craft) was designed to slide away revealing the actors sitting inside.

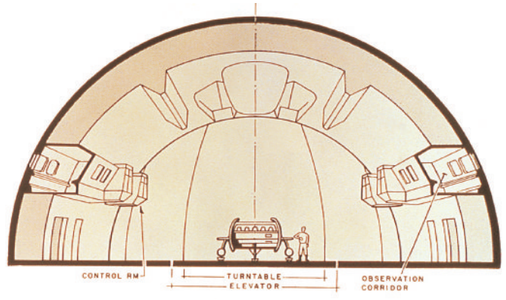
It was never specified how many shuttlecraft the *Enterprise* possessed, but Jefferies assumed there were several, and gave the *Galileo* the number '7,' tacked on to the main starship's registration number.

The vessel was 'destroyed' during that episode, but was later seen in other shows – an inconsistency the producers and the fans have been happy to live with. Jefferies also noticed that within a single script the description of the shuttle varied. "In one of (writer-producer) Gene Coon's stories (*Metamorphosis*) a description said there were no doors or openings in evidence, and then once we got inside there were four or five entrances and people kept coming into the thing. I went to Gene and said, 'Mr. Coon, what am I going to do?' He said, 'That's your worry!'"

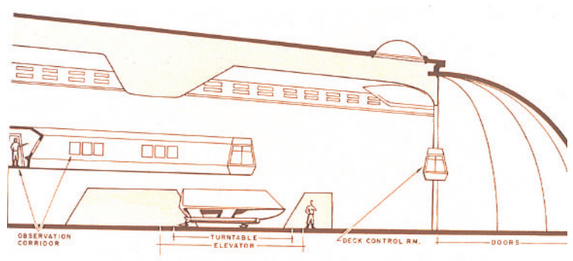
Jefferies also designed a control console, but didn't consider this to be a major item. "We just tried to come up with something that looked sensible; some instrumentation they would have to have, compared to what could be done automatically on the *Enterprise.* Unless you had a story that involved a shuttlecraft entirely then it would have been such a quick, transitory thing that it would have been wasted effort."

SHUTTLEBAY

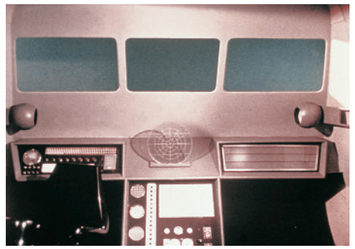
The *Enterprise*'s shuttlebay was deemed to have room for several shuttles. Matt said, "We had the large curved clamshell doors at the back, and it didn't look too much different from a lot of today's modern hangars on the inside. The shuttlebay itself was only in miniature." The view of the shuttlebay in 'Journey to Babel' was created by shooting through a set of sliding doors toward sections of interior wall placed eight or 10 feet further back. 'All of our interior walls were of the same finish, which would have included the shuttlebay."



▲ Jefferies created a series of drawings showing how the shuttle would sit inside the *Enterprise*'s shuttlebay.



▲ The shuttlebay was never shown in its entirety. A miniature was made to show the shuttle taking off, but it only showed one view.



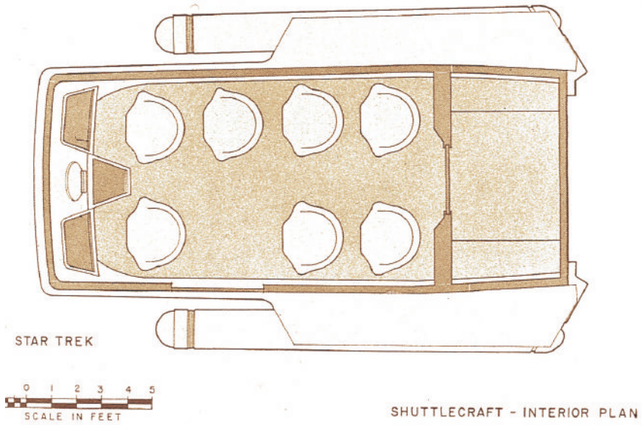
▲ The control console for the shuttle was incredibly simple, with Jefferies reasoning that it would barely get any screen time and just needed to be functional.

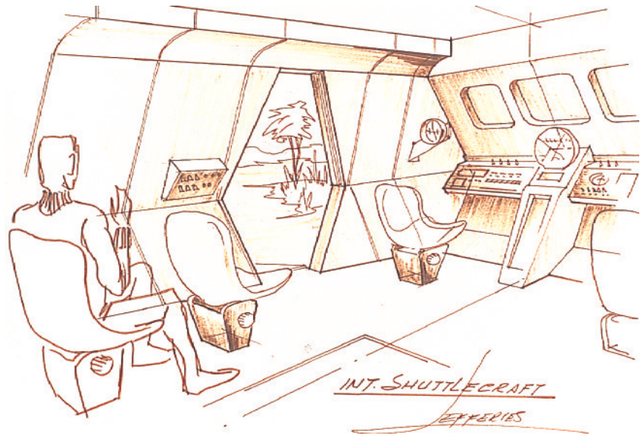
NEW SHUTTLES

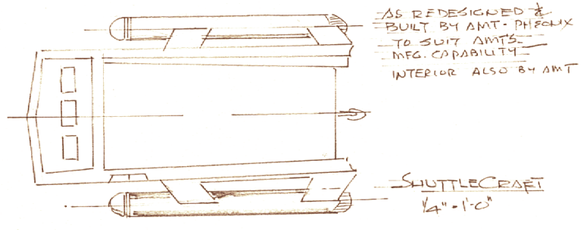
The *Galileo* was reincarnated as the *Galileo II* for 'The Way to Eden' in Season Three, after the writers had conceded that the original one no longer existed; the same model was used for photography. Matt came up with a range of other designs for potential shuttles and small vehicles, one of which he labeled the 'space tug.' "They were just noodling; daydreaming on my part," he explained. "But of course the writers were as hard up for ideas as I was, and sometimes we could spread a seed if they were looking for something different.

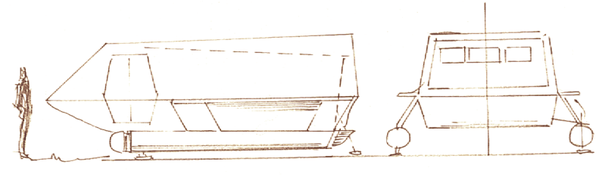
"There's one with a man sitting in a bubble, and then there was another one with a hook on the back as though it would be for towing. They'd be service vehicles around a space port or a navy yard kind of thing. We would have been able to work from the top of the stage on wires and float them or move them around. They would have been fun to do."

▶ Because Jefferies was responsible for the sets he drew up plans for the producers and directors, showing what the interior of the shuttle would look like and where the seats would be placed.

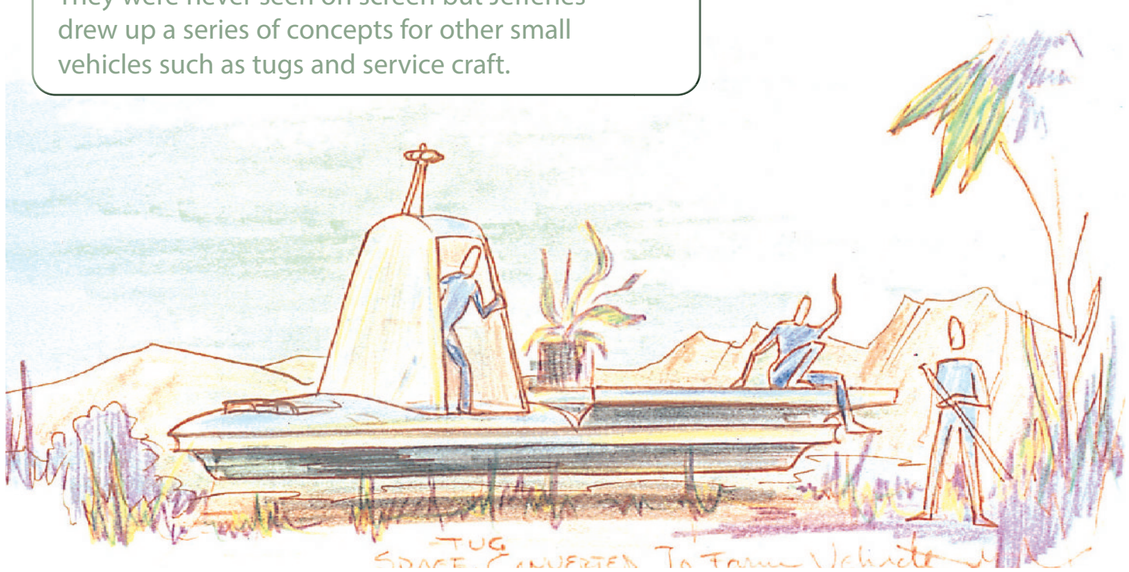


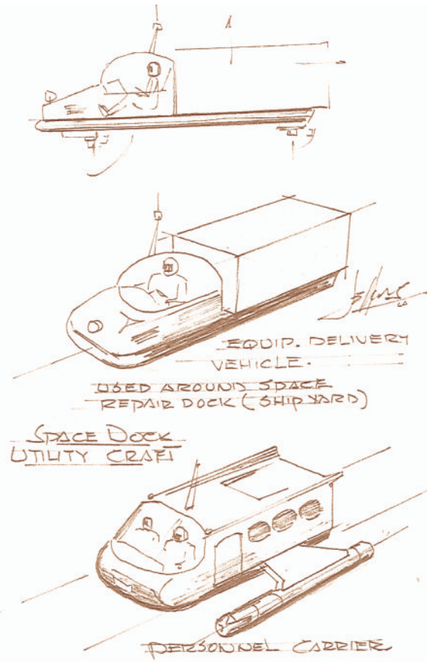


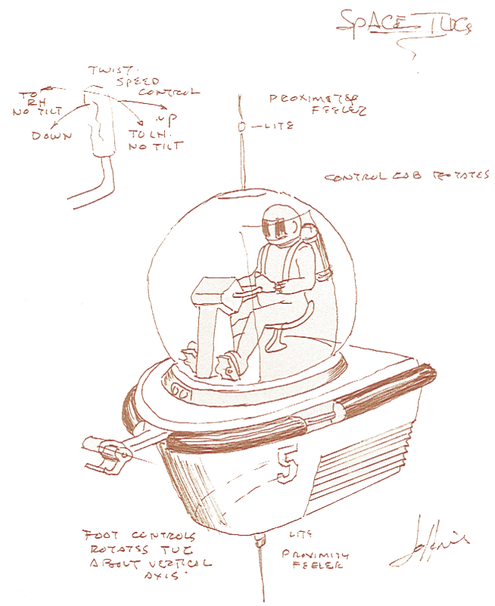


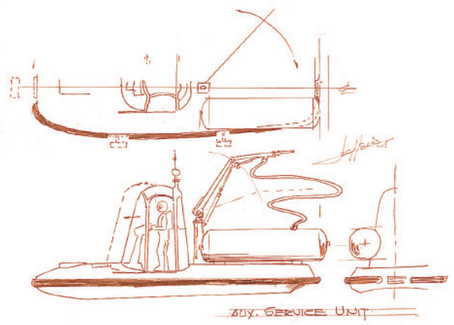


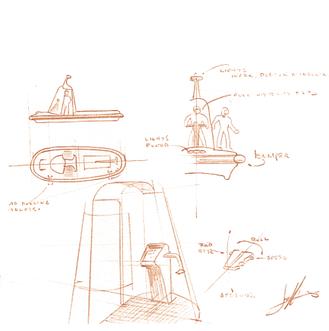
They were never seen on screen but Jefferies drew up a series of concepts for other small vehicles such as tugs and service craft.

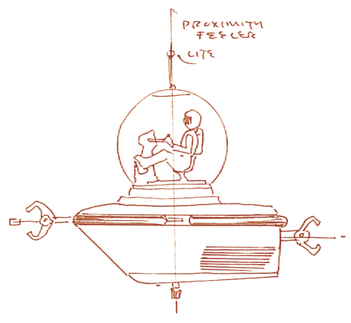


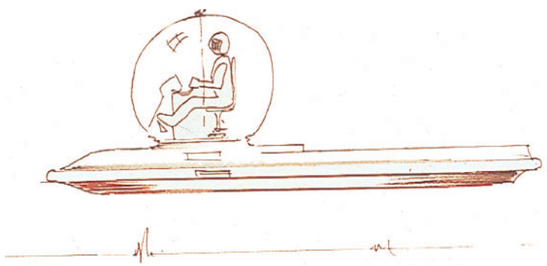


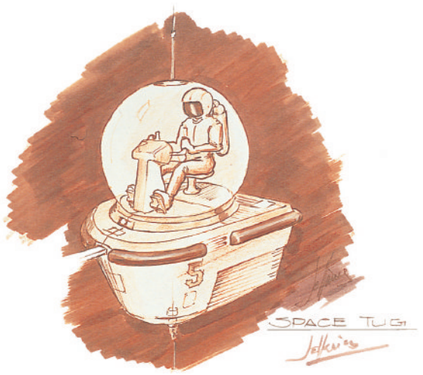


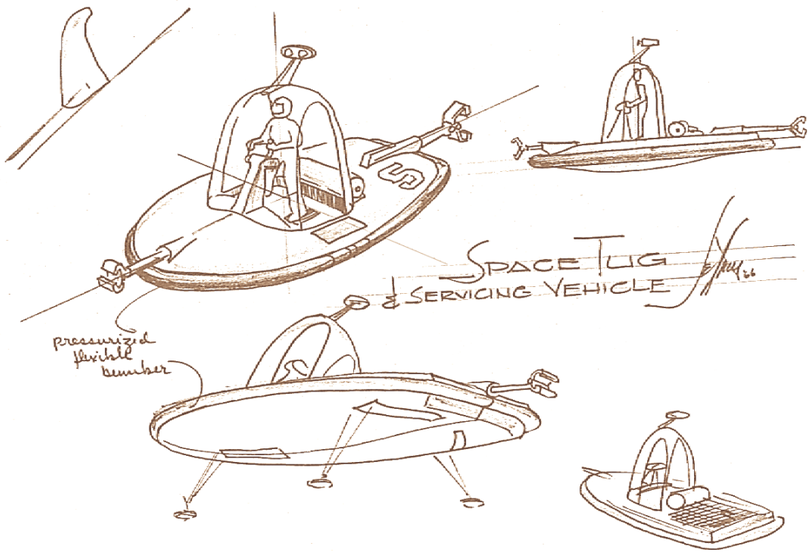


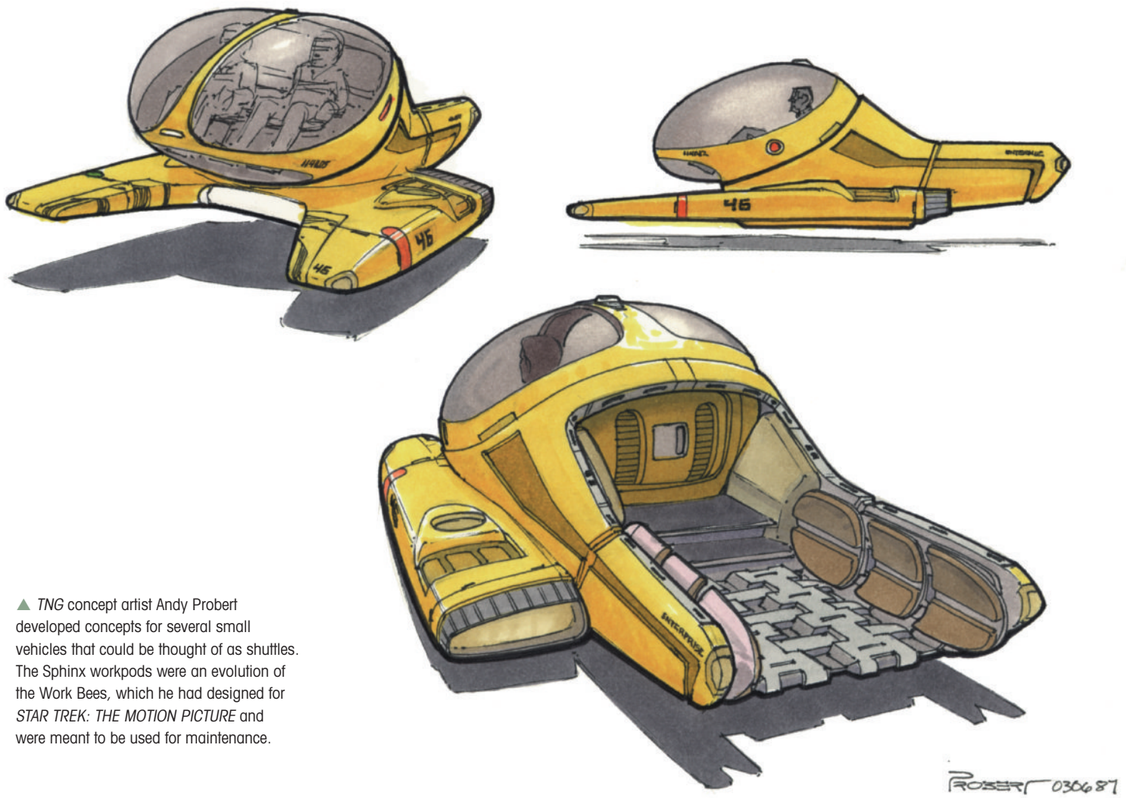












▲ *TNG* concept artist Andy Probert developed concepts for several small vehicles that could be thought of as shuttles. The Sphinx workpods were an evolution of the Work Bees, which he had designed for *STAR TREK: THE MOTION PICTURE* and were meant to be used for maintenance.

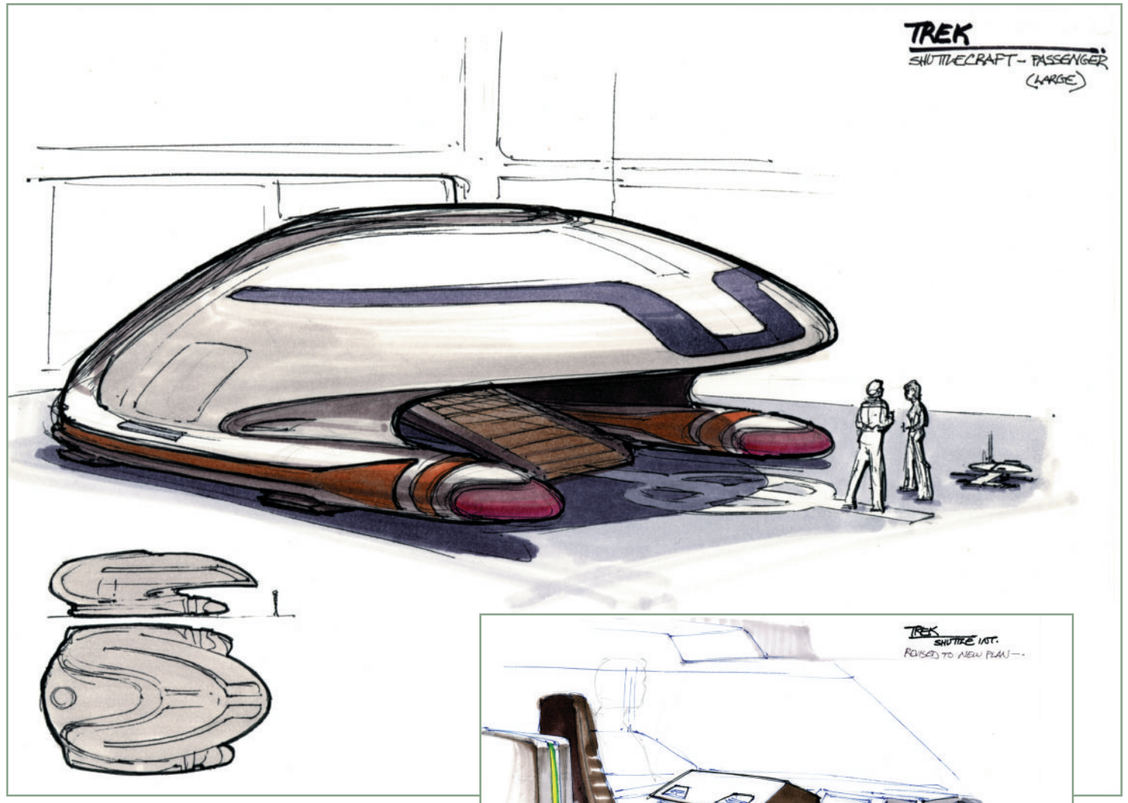
DESIGNING THE III FIRST TNG SHUTTLES

The original shuttles that were designed for the ***Enterprise***-D shared its curves, but were abandoned when they proved difficult to make.

Andrew Probert was no stranger to designing small Federation ships; 10 years before he worked on *TNG*, he had created the Vulcan shuttle and the Work Bee for *STAR TREK: THE MOTION PICTURE*. Even before he was asked to design a shuttle for the new *Enterprise,* he'd thought about updating his Work Bee concept. "I came up with these small service craft, which Herman (Zimmerman) nicknamed the Sphinx. This would be an extension of the Work Bee, it was designed to be basically a pickup truck that could be used for different purposes."

The Sphinx workpods never made it to the screen because the design was challenging to build on a TV budget.

When Probert turned his attention to the shuttle, he reasoned that, since the shuttles would have to make interplanetary journeys, they would need warp engines and all the components associated with them.



▲▶ Probert's design for the *Enterprise*-D shuttle involved a curved shape that proved too difficult to make at full size with the available budget. In his unused concept, crew members walked into the shuttle using a ramp that folded down from the front. Eventually the production made a much 'squarer' version that used many of the same design cues.

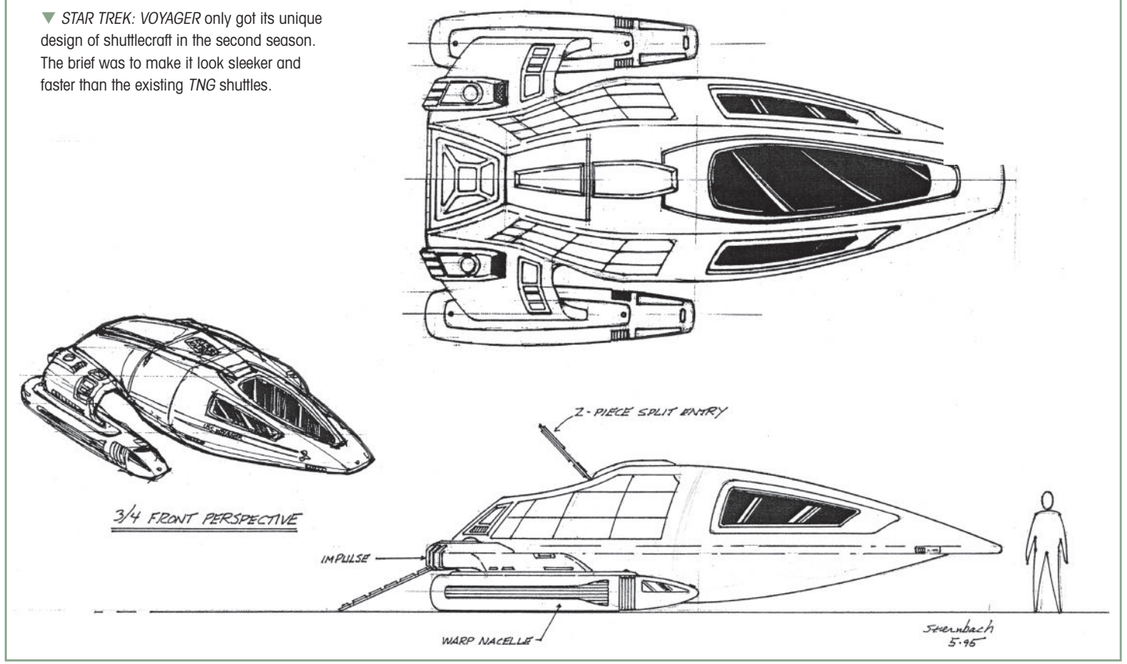
"I tried to address the fact that the shuttles would need a smaller version of the warp core, so I provided a back section that would have a core in it. My thinking was that there would be an operator's cab separated by a wall that would have the ability to project a barrier in that open area if they needed to seal off the back space."

In an effort to make the new shuttles more interesting, Probert planned to move the entrance from its traditional position at the side. "Entry into the shuttle was by the front; there's a ramp that lowers between the two operators. The top portion of that would actually slide up – much like a sunroof does on a car – allowing the people to walk straight up into the shuttle between the operators."

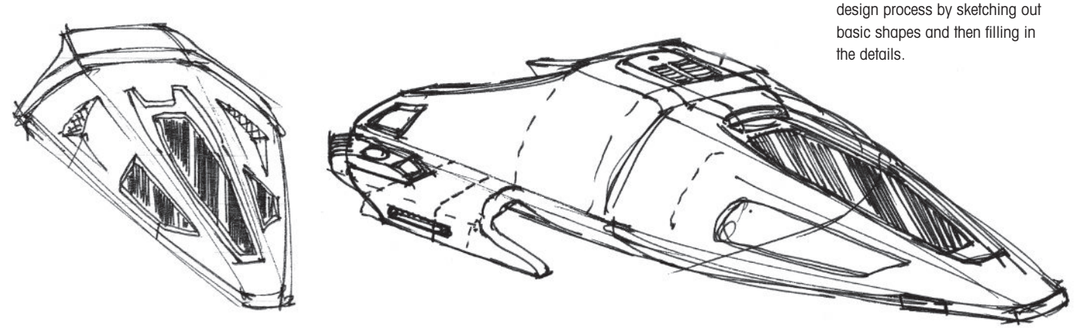
This shuttle design was approved, but when it was sent down to the construction shop the extremely curved design proved too difficult for the carpenters on the lot to build at life size. As a result, the design had to be rethought. "They built a shuttle that basically had square edges on it. It was kind of my shape from the side, but it had square edges. Then they came up with the idea of getting into the shuttle from the side."

The finished shuttlecraft first appeared in *Coming of Age;* it was eventually superseded by an even boxier design, which was even simpler to make.

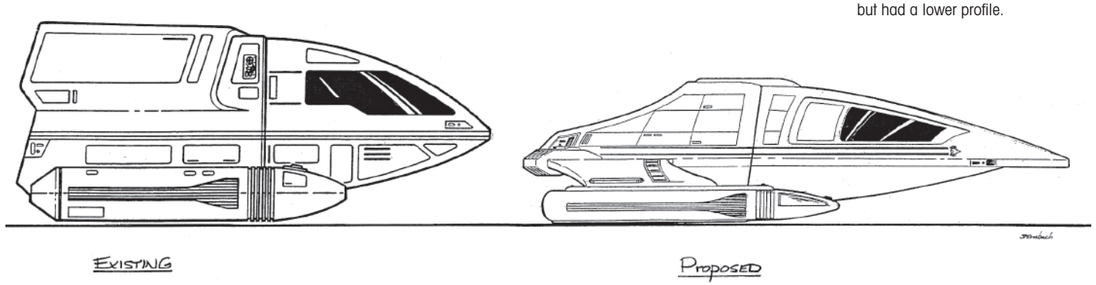
▼ *STAR TREK: VOYAGER* only got its unique design of shuttlecraft in the second season. The brief was to make it look sleeker and faster than the existing *TNG* shuttles.



◄ Sternbach always started the design process by sketching out basic shapes and then filling in the details.



▼ The new shuttle was about the same length as the existing version but had a lower profile.



DESIGNING THE III 'SPEEDBOAT' SHUTTLE

The original shuttles that were designed for the ***Enterprise***-D shared its curves, but were abandoned when they proved difficult to make.

Toward the end of *STAR TREK: VOYAGER*'s second season, the producers sent the art department a memo asking them to design a "cool and sleek shuttle." A new shuttle had been on their wish list for some time, but until now there hadn't been a compelling reason to build one. But the next episode in production, 'Threshold,' justified the expense. The story dealt with a specially modified shuttlecraft that could achieve warp 10, something the traditional shuttle just didn't seem capable of.

VOYAGER's resident illustrator Rick Sternbach remembers that he was particularly pleased by the project. "New hardware was always welcome, so I began working up preliminary hull shapes while (production designer) Richard James and the set designers, particularly John Chichester, developed the interior. I got the ball rolling on a few interior sketches, showing the producers early on how the cockpit might accommodate two seats, two seats plus a folding jumpseat, or four seats. We knew that 'cool and sleek' was going to mean long, low, and streamlined, but we also had to insure that our actors could stand up inside, so the minimum ceiling height was kept at almost six feet. If we were required to make the speedboat as sleek as, say, a Lotus or Ferrari automobile, they'd have to crouch inelegantly to enter their seats."

Remarkably, the new shuttle, which the art department dubbed the 'speedboat,' was the first major redesign the shuttles had undergone since the second season of *STAR TREK: THE NEXT GENERATION*. As Rick explains, until now the previous 'new shuttles' had been modifications of the same basic ship. "When we began *VOYAGER* we had the *TNG* shuttle, which was given an improved cabin, and even one modification to the exterior, though that was seen only in a miniature for one or two episodes. True to the *STAR TREK* phrase 'like nothing we've seen before,' the speedboat was custom build inside and out. With the exception of the sports car seats, the set construction was new."

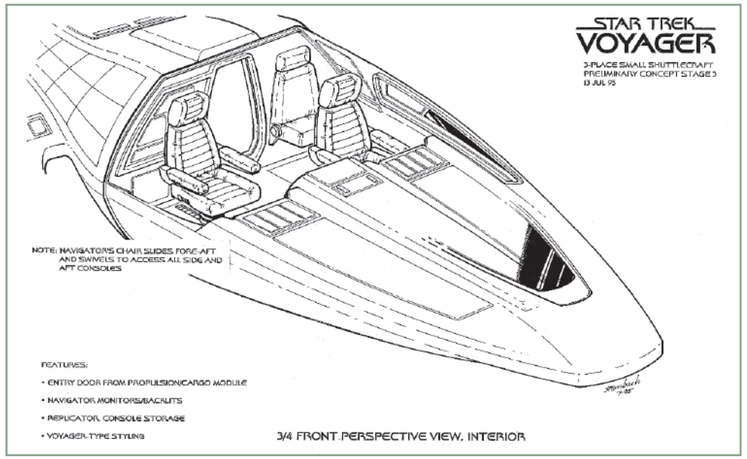
DESIGN LINEAGE

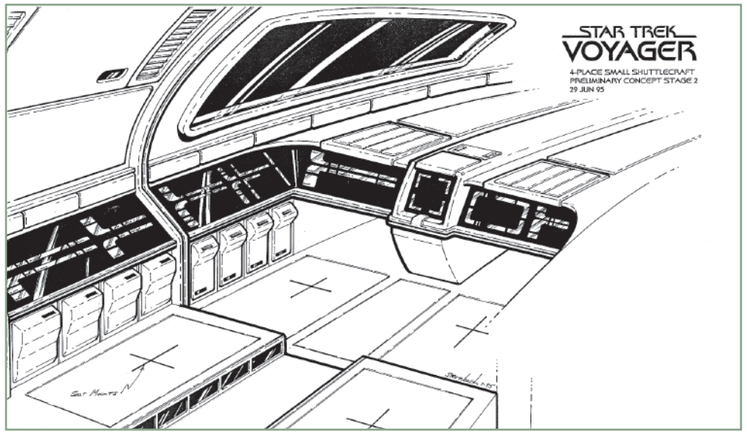
Although the speedboat was a major leap forward, Sternbach was careful to make sure that the exterior was clearly related to these earlier shuttles. "The exterior was developed in just a few days, given the form-and-function rules established for the boxy *Type-6* and the shuttlepod, with new curves added from *Voyager* itself. The simple, undetailed hull shape is the easy part; you take a hexagonal cross-section and pull the surface lines more or less to a point in the front and a slightly blunter shape in the back where the door goes. Hull curves could still be pushed and pulled to make the shuttle recognizably new and satisfy the 'cool' requirement.

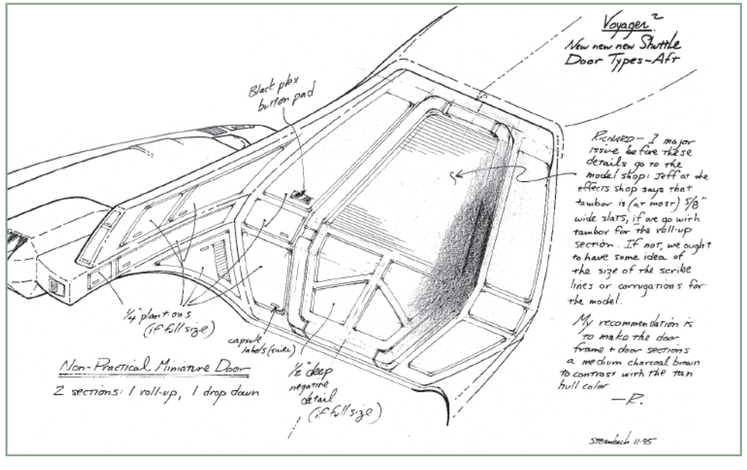
"The 'recipe' then says to add pylons and nacelles and sprinkle generously with the usual details. There aren't too many reasons to vary that Starfleet recipe within a particular story time period. Like the other shuttles, the speedboat had RCS thrusters, a shield grid, phasers, nav deflector, and engine access hatches.

DOUBLE DOORS

"The aft entry door differed a bit from the Type-6 shuttle door in that it split across the center, with one half lifting up and the bottom dropping down to form a ramp. At one time we considered a flexible rollup piece for the upper half, but a solid panel was easier to fabricate and move by hydraulics. We didn't







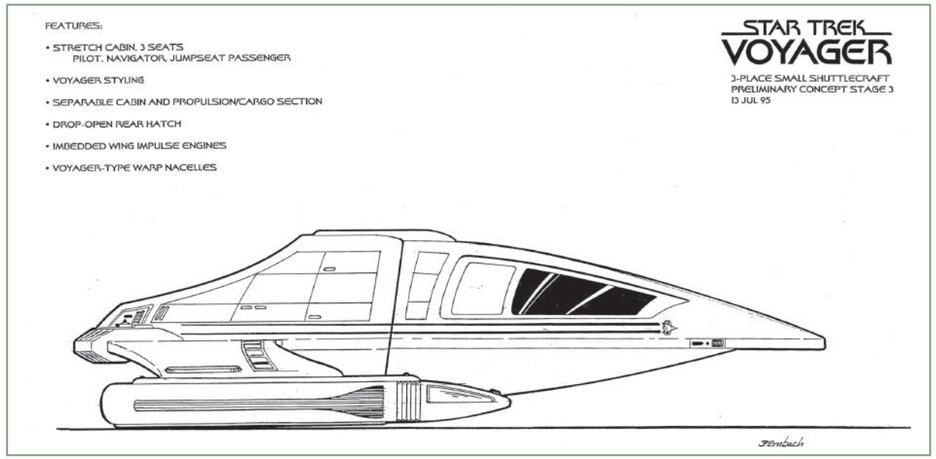
◀ Sternbach also produced a series of drawings showing the layout of the interior and how the doors at the back would work.

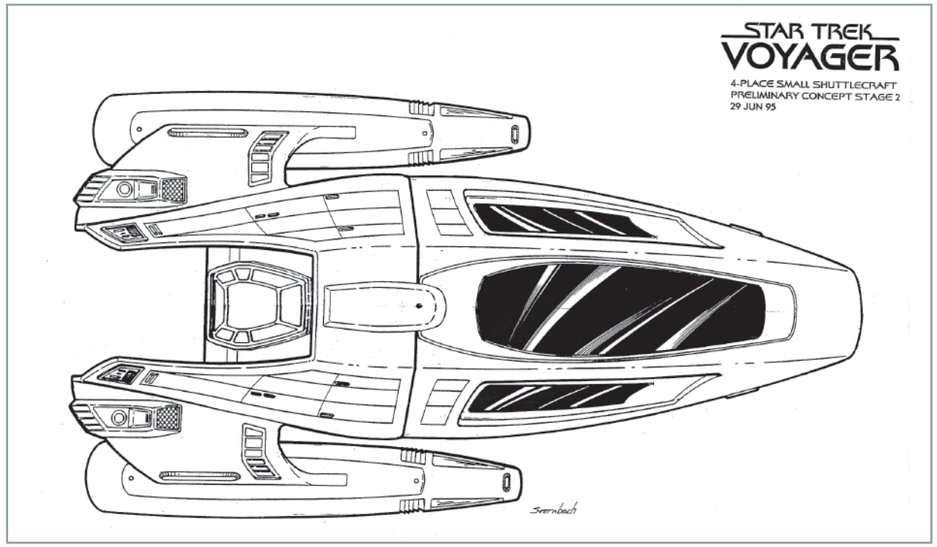
need to build the outer surfaces except in CGI, and when we did need to show in live shooting that the speedboat was in the shuttlebay, all we had to do was place the correct style wall outside the door opening."

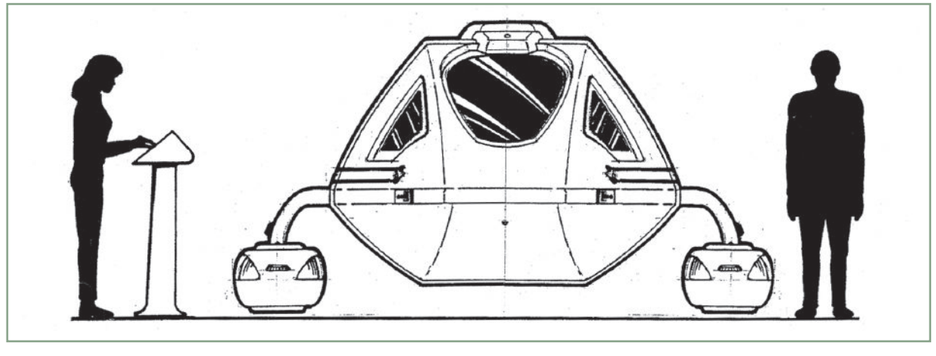
Sternbach's approach to the design was accepted at once, and the shape went through very few changes before the model was built. But, in order to complete the shuttle, his exterior design had to be integrated with the interior Richard James and John Chichester were designing. "The first sketches of the exterior hull were obviously produced before the set designers finalized the window and door shapes. I had sketched in 'placeholder' versions of the windows, which were close proportionally and in the right locations; those were changed to the final versions during the blueprint stage. I also mirrored one of Chichester's ceiling curves on the top of the speedboat to become the dorsal sensor array, so that was a nice bit of serendipity.

"We gave the shuttle all of its basic interior parts; the seats, consoles, aft 'cargo hold,' windows, and lighting units. Aside from the *DS9* Runabout, we've almost never seen actual transporter hardware in a small craft. We've assumed that the transport emitters were buried in the structure somewhere."

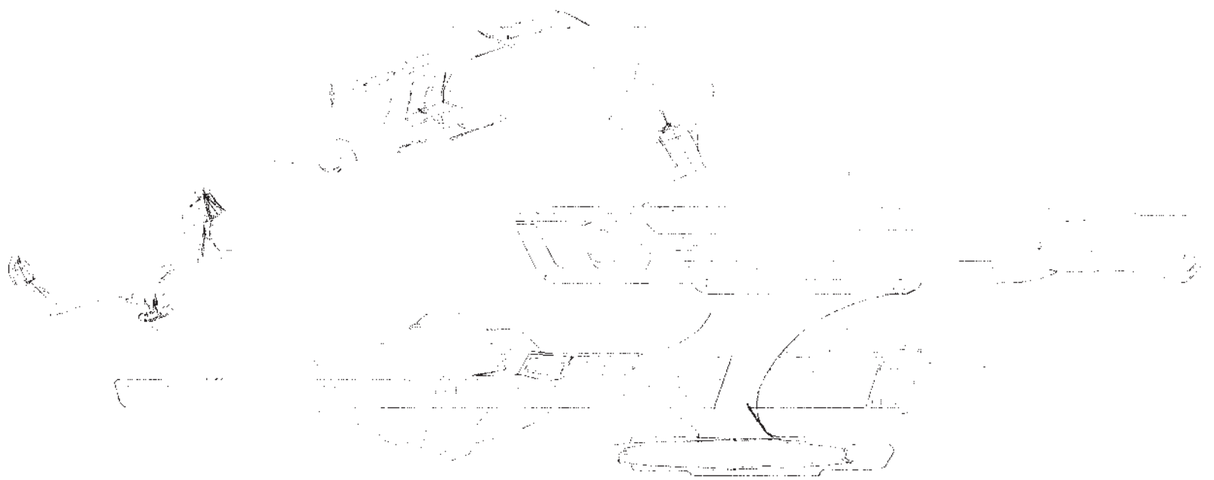
The speedboat shuttle marked the end of an era for *STAR TREK,* because it was the first time the art department didn't bother to build a full-sized version of the exterior that could be used on the sound stage. On the few occasions we saw the shuttle in the shuttlebay, it was a CG model. The speedboat was also the last shuttlecraft that was built as a practical miniature before the show moved over to CG.



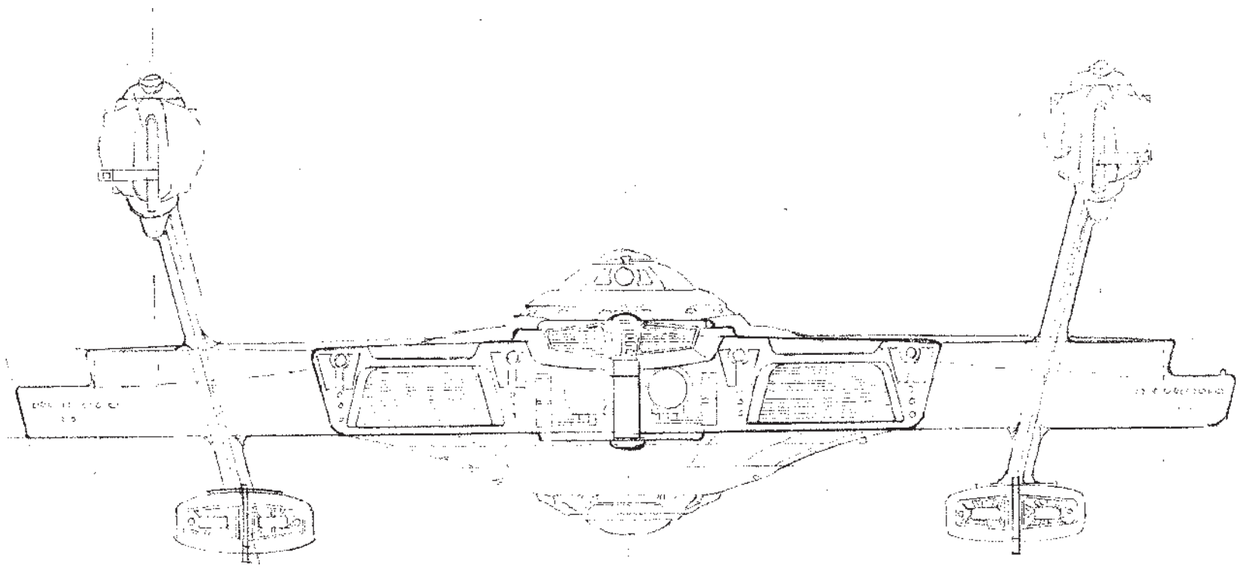




◀ Sternbach produced a full set of elevations that showed the shuttle from every angle. This was important in establishing scale, but would also be used by the CG vendors when they created their model.

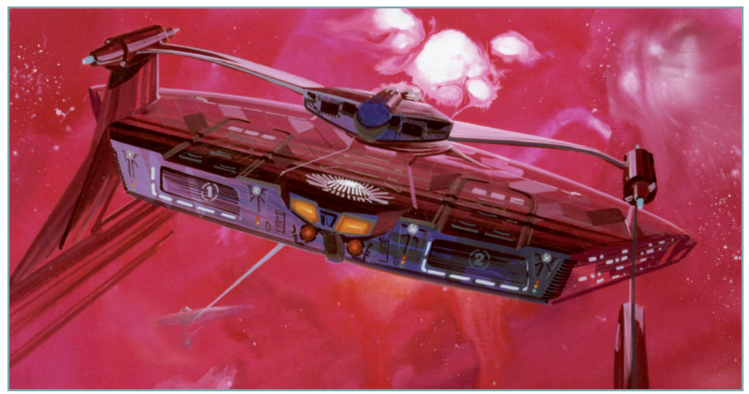


▲ The original concept for the *Reliant* shows its origins as a cut down version of the *Enterprise,* with a saucer and nacelles, but no engineering hull.



▲ In these early construction drawings the *Reliant* is shown with the nacelles above the saucer and no roll bar.

DESIGNING THE U.S.S. RELIANT



▶ By the time this full-color concept artwork for the battle in the Mutara Nebula was produced the *Reliant* had been reconfigured into the layout that would become familiar.

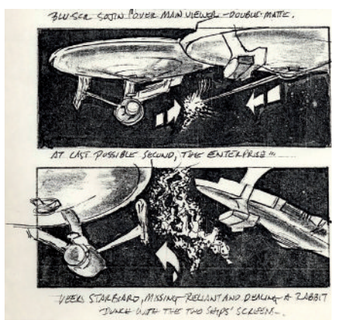
The designers relished the opportunity to create the *U.S.S. Reliant*, the first new Starfleet ship to be seen on screen since the *U.S.S. Enterprise*.

When the *Miranda*-class *U.S.S. Reliant* NCC-1864 appeared in *STAR TREK II: THE WRATH OF KHAN*, it was, surprisingly, the first time a Starfleet starship had been seen on screen that was not actually a redressed *Enterprise* model.

The design of the *Reliant* was mainly the work of two people, production designer Joe Jennings and art director Mike Minor, with contributions by graphic designer Lee Cole.

They set out to make the *Reliant* look distinctly different from the *Enterprise*, but at the same time to make it instantly recognizable as a Starfleet ship, so that it would appear to have come from the same technologic background.

In the earliest scripts of *STAR TREK II: THE WRATH OF KHAN*, the *Reliant* was described as a *Constitution*-class ship, albeit an older and more worn example than the *Enterprise*. The producers, however, decided that a new design was needed because they were worried that audiences would struggle to tell the two ships apart, especially during the key battle sequences.



▲ An original storyboard shows the early version of the *Reliant* battling the *Enterprise*.

DISTINCT DESIGN

"In the dogfight you had to instantly recognize which ship you were looking at, so they had to look different," said Joe Jennings. "At the same time, you had to make them look like they came from the same culture and had the same technology."

The fact that there was going to be a new design of starship also meant that there was going to be a new studio model for filming, news that went down particularly well with the people working on the special effects. Ken Ralston, the special effects supervisor, was especially delighted as he had found the *Enterprise* studio model from *STAR TREK: THE MOTION PICTURE* cumbersome and thus difficult to film.

Jennings and Minor relished the challenge of coming up with a brand new design of Starfleet ship and Jennings later elaborated further on the thinking and process behind the design, explaining, "It was the first time a new spaceship had been designed since the Klingon battle cruiser. That was a lot of fun. (The *Reliant*) was supposed to be a coastal and geodetic survey ship, like a buoy tender. She would be armed perhaps, but only lightly; she wasn't a lion ship like the *Enterprise*. Also remember, the *Enterprise* was supposed

to be an exploratory vessel, where the armament was secondary. That was even more true for the *Reliant*; she was supposed to just stick around in the known universe and take care of things that everybody already knew about. It was fun to try to make it look identifiably different; we had long postulated that the circular saucer said, 'This is Starfleet Navy,' and it uses engines that looked pretty much like those on the *Enterprise*."

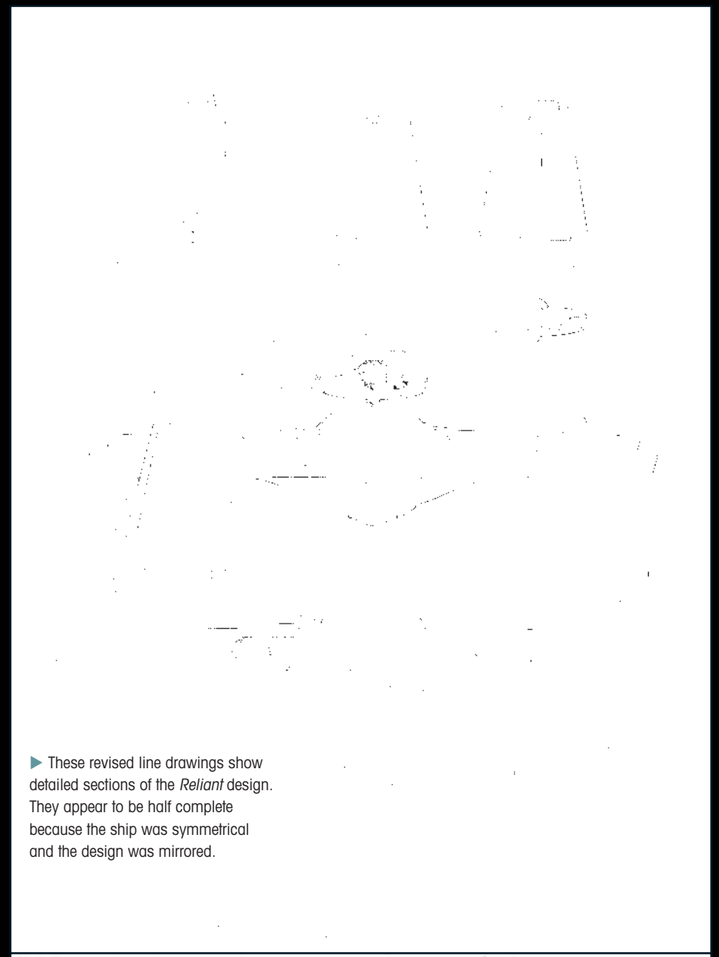
ACCIDENTAL ARRANGEMENT

The original design drawings of the *Reliant* actually featured the warp engines raised above the saucer section on outwardly slanted pylons, similar to how they were on the *Enterprise*, with two counterbalancing torpedo launch pods below the dish. These designs were sent to producer Harve Bennett, who approved them and returned them to the production crew. When they looked at the returned illustrations, however, they discovered that Bennett had been looking at them upside down and signed them off in this inverted state; he had, in effect, approved an upsidedown ship.

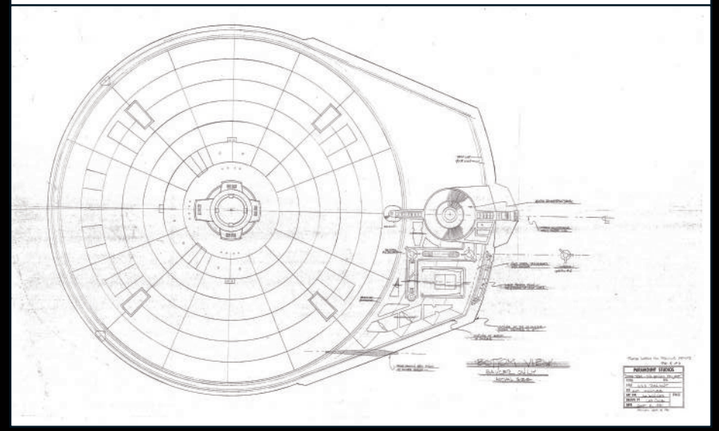
By the time everyone had realized what had happened, Bennett had left the country on another project and there was no time to resubmit the drawings to him in their proper orientation to get his approval.

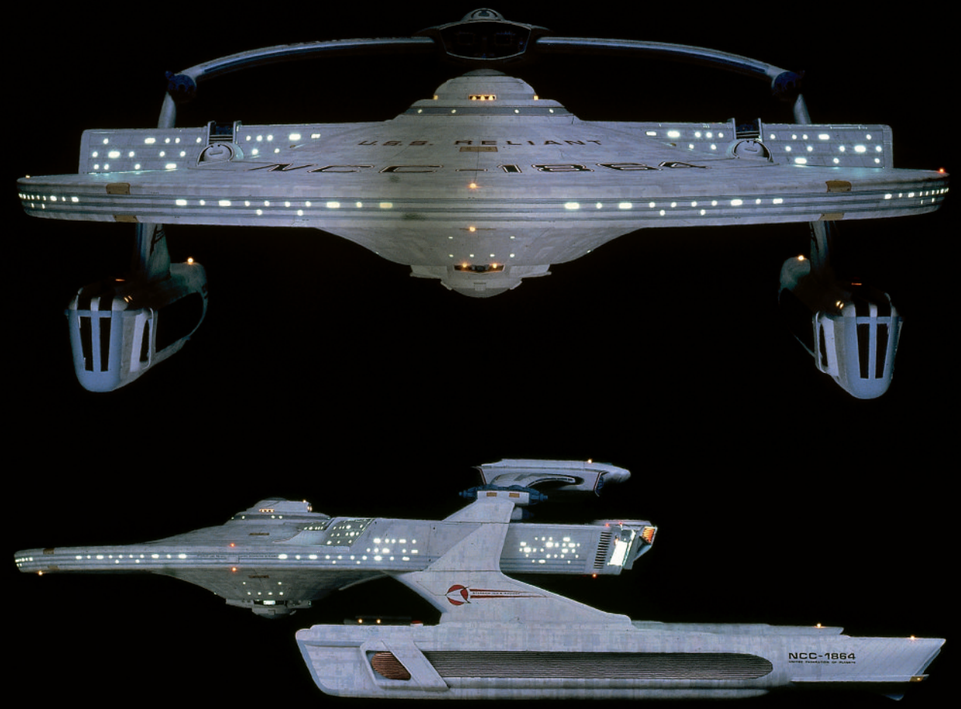
Instead, it was decided to move the *Reliant*'s warp nacelles below the saucer based on Bennett's approved design. To help balance out the hanging nacelles, a substantial weapons structure was then added in the form of a roll bar above the saucer.

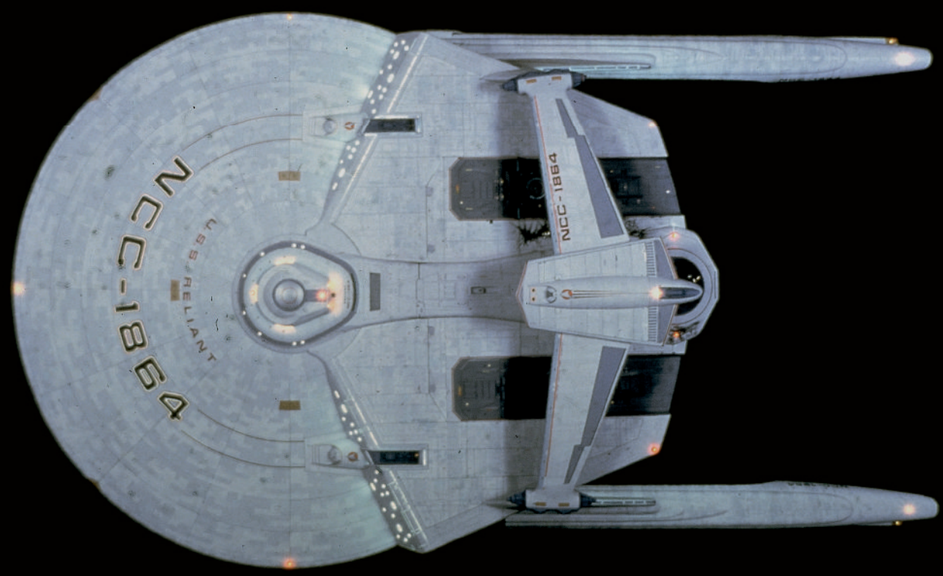
Ironically something similar had happened with Matt Jefferies' original designs for the *Enterprise*, which at one point had nacelles that hung below the saucer. Despite the last minute confusion, the design of Starfleet ships had come full-circle.



▶ These revised line drawings show detailed sections of the *Reliant* design. They appear to be half complete because the ship was symmetrical and the design was mirrored.

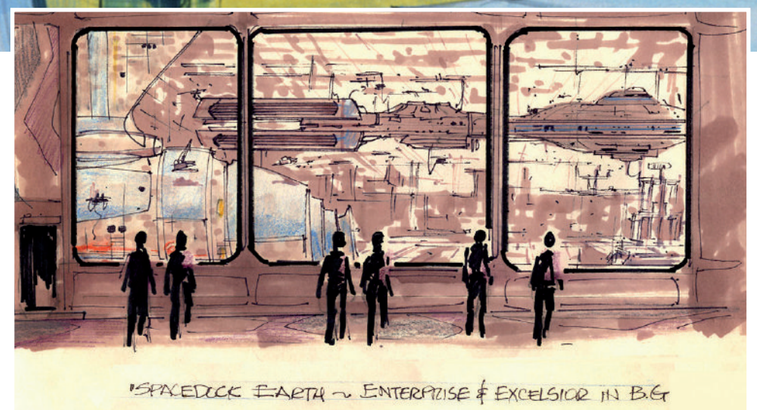




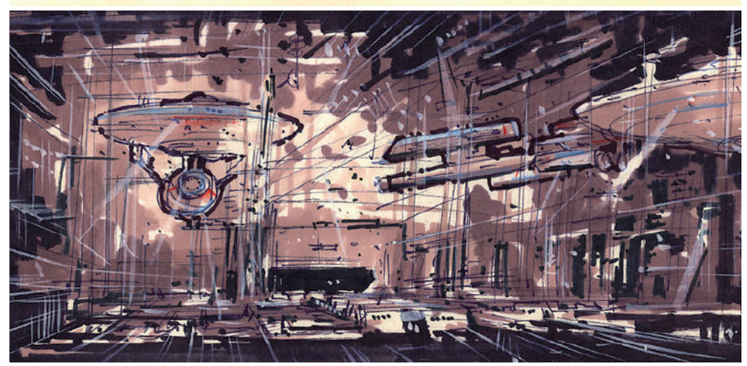


◀ These pictures show the studio model of the *Reliant* that was built at Industrial Light & Magic based on the design illustrations provided to them by the Paramount art department. The blue coloring shown in these photographs was altered by the filming process which left the ship a lighter gray color

▼ This picture shows Bill George's study model of the *U.S.S. Excelsior* NX-2000 that was chosen by Leonard Nimoy.



"SPACEDOCK EARTH ~ ENTERPRISE & EXCELSIOR IN BG"



DESIGNING THE III

U.S.S. EXCELSIOR

▲ Visual artists David Carson and Nilo Rodis produced storyboards and concept art that feature their original design for the *Excelsior*.

▶ These illustrations show a longer, sleeker *Excelsior* with an unusual four-nacelle design.

The design of the ***U.S.S. Excelsior*** not only wowed cinema audiences in 1984, but went on to be the most enduring ship in ***STAR TREK*** history.

The script for *STAR TREK III: THE SEARCH FOR SPOCK* called for a number of new designs of starship, including the *U.S.S. Excelsior* NX-2000. This vessel was supposed to be an advanced design that made the *U.S.S. Enterprise* look old and out of date. The script described it as having, "similar lines to the *Enterprise*, but bigger, sleeker – it sits in her moorings like the new queen of space."

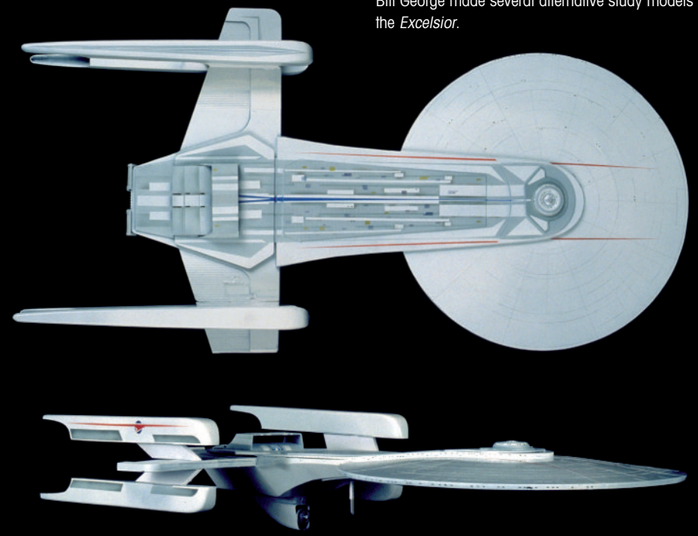
An unusual approach was taken to designing the ships for *STAR TREK III: THE SEARCH FOR SPOCK*. Instead of concept designers sketching out detailed drawings to be approved by the director and effects supervisors before the model was built, basic study models were created in a collaborative effort with the model makers and were then submitted for approval.

This process involved visual artists, David Carson and Nilo Rodis-Jamero of Industrial Light & Magic (ILM), producing their artwork of the ship before handing it over directly to the model makers Steve Gawley, Bill George and their team, who then built study models, incorporating their own interpretation of the artwork.

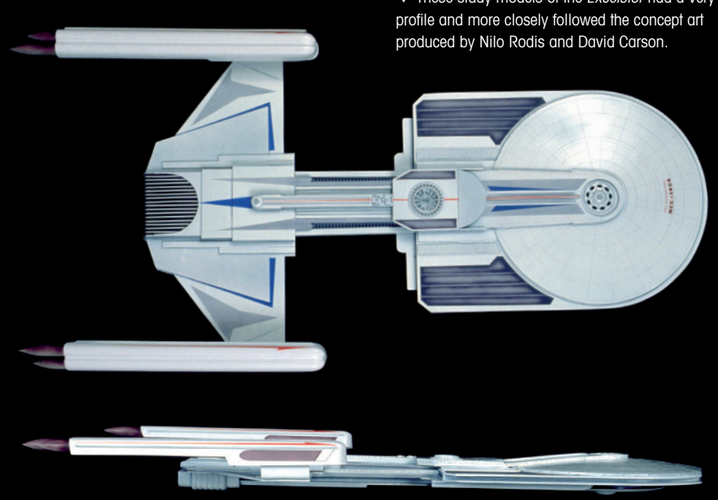
As David Carson later remembered, "We'd churn out quite a few sketches. Then the ones that were most promising we might polish up a little in color for presentation. It wasn't uncommon for me to do a drawing that would inspire Nilo, who would then turn it into his own drawing that would be much more impressive! He would often inspire me."

MODEL APPRAISAL

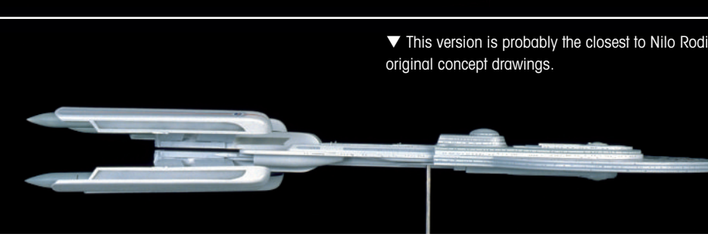
Once the sketches had been turned into study models, they were presented to producer Harve Bennett and director Leonard Nimoy for appraisal. As supervising model maker Steve Gawley put it, "You had all these models sitting on a table so that the director could really get a feel for what we were talking about. It just made everything easier to understand, and ensured that everybody was on the same page.



▼ The model making team led by Steve Gawley and Bill George made several alternative study models of the *Excelsior*.



▼ These study models of the *Excelsior* had a very thin profile and more closely followed the concept art produced by Nilo Rodis and David Carson.



▼ This version is probably the closest to Nilo Rodis's original concept drawings.

It also made it easier to give cost estimates."

Director of Photography Ken Ralston elaborated further: "When Leonard (Nimoy) and Harve (Bennett) and (associate producer) Ralph Winter came to meetings we presented them with three dimensional models. It really is a lot better doing it that way because they can physically see how different (camera) angles would work."

The process still began with a quick sketch. In the case of the *Excelsior* Carson explained, "We kicked around a few different ways to go with the *Excelsior*, but when Nilo did the drawing that led to the eventual design that was it, because it was very well received. It seemed to be a believable extension – a kind of next-generation design."

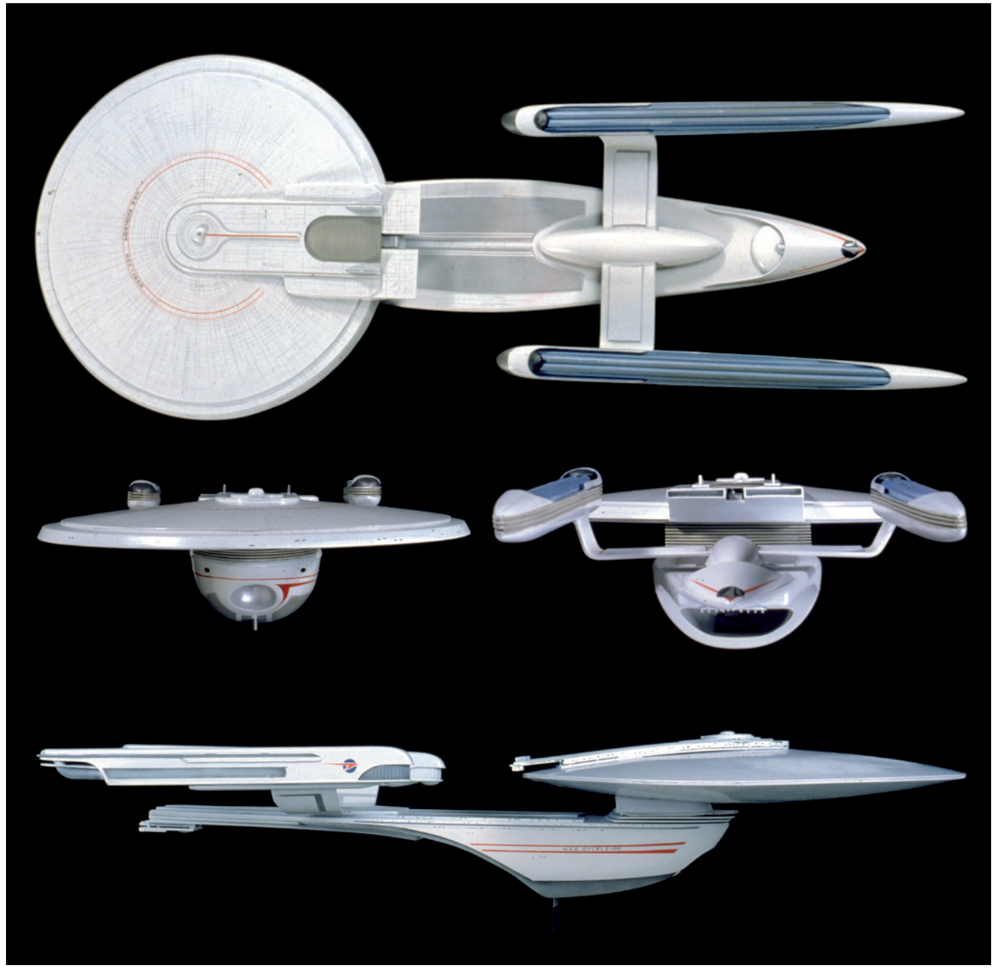
PHYSICAL 'SKETCHES'

The drawings were then sent down to ILM's model shop where the study models were built. As Bill George explained, "The art department had done a number of sketches. All of them were very different and very futuristic. They still had the basic theme of the dish and the engines, but they did not look like the *Enterprise* at all. I was given the job of building prototypes of those sketches. Leonard Nimoy was going to come up and look at them and hopefully choose one."

All the sketches of the *Excelsior* were long and thin and when George finished the study models with plenty of time to spare, Carson suggested that he produce another study model using his own ideas. As George recalled, he decided to take a different approach that drew on a Japanese aesthetic: "When you're designing something you want to come up with a take on it that will drive the design. At the time I was really into Japanese design, so I thought, 'OK, what would the *Enterprise* look like if the Japanese designed it?' That was the basis of what I came up with for the *Excelsior*."

George built a final study model, which had a deeper profile and a more rounded secondary hull section. To his surprise, Nimoy chose his version as the template for the final studio model. "When we laid out all these things on the table, he pointed to the study model that I had done and said, 'That one.' And I think it was just because it was so much more familiar. It was quite a surprise when I found out that was the one he wanted. There were a couple of the other study models that I really liked, and I certainly hadn't tried to figure out which one he was going to choose."

As it transpired, the model of the *Excelsior* that was designed and built for the movie was so successful that it would go on to appear in four more *STAR TREK* films and in all three of the *STAR TREK* television series that were set in the 24th century. Apart from the hero *Enterprise* ships, this has probably made the *Excelsior*-class the most frequently seen ship in the *STAR TREK* franchise – no small achievement.

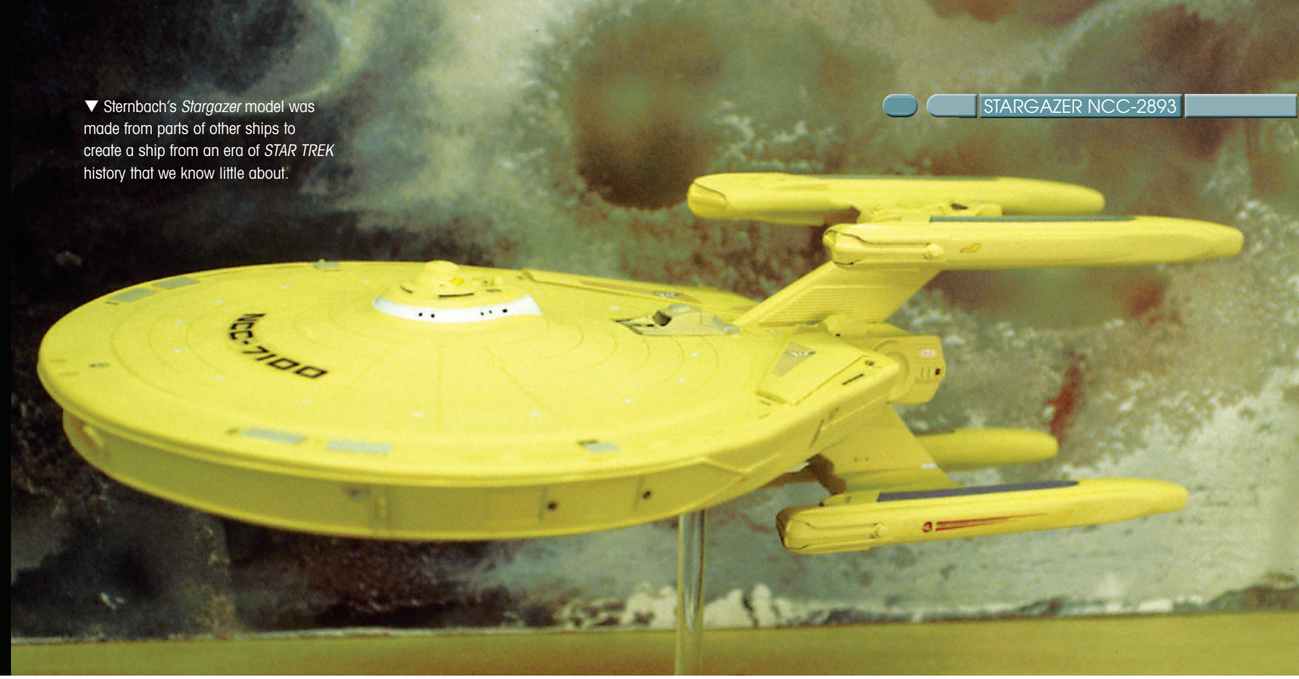


▲ This study model built by Bill George looked much more like the original *Enterprise* than the sketches that were produced by Nilo Rodis.

The original *Excelsior* model that featured in *STAR TREK III: THE SEARCH FOR SPOCK* was sold at auction in 2006 (after it had been redressed as the *U.S.S. Lakota* NCC-42768). It had been expected to make between $3,000 $5000, but actually went for $110,000.

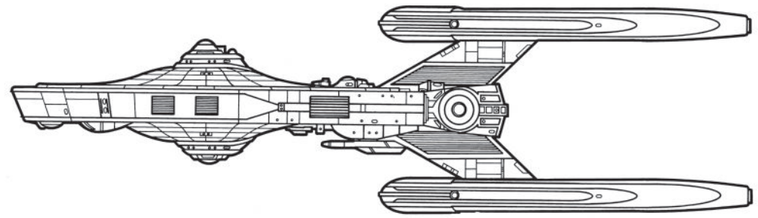
Although the *Excelsior* is supposed to be considerably larger than its predecessor, the physical model of the *Excelsior* is actually 12 inches (30cm) smaller than the one for the *Enterprise*.

▼ Greg Jein's four-foot model of the *U.S.S. Stargazer* was closely based on Sternbach's kitbashed model, but the two ships aren't identical.



▼ Sternbach's *Stargazer* model was made from parts of other ships to create a ship from an era of *STAR TREK* history that we know little about.

DESIGNING THE STARGAZER



▶ Once the model had been built, Sternbach prepared drawings that could be used as the basis for onscreen graphics.

The script called for the *Stargazer* to be a *Constitution*-class ship, but an alternative was waiting in Captain Picard's ready room.

Unlike most starships, the *Stargazer* started life as a piece of office furniture. If you look carefully, you can see it standing on a pedestal in Picard's ready room in '*Encounter at Farpoint*', months before the full-scale model made its onscreen debut in the episode '*The Battle*'. Although the model *Stargazer* had been there all along, it very nearly didn't make it to the screen. The writers originally expected Picard's old ship to be a *Constitution*-class vessel like the movie version of the *Enterprise*. But things change…

The story begins before a second of *TNG* had been filmed. When the art department were dressing the sets for the *Enterprise*-D, they decided that Picard would have a model of his old starship in his ready room. At this point, there was a brief mention of the *Stargazer* in the Writer's Bible but no more than that. No one knew the ship would actually appear in an episode.

WORKING IN PAIRS

Concept artists Andy Probert and Rick Sternbach worked together on the initial design, putting down a few quick sketches that established the basic layout. Probert was responsible for designing all the other ships in *TNG*'s first season and, as he explains, he insisted on a few guiding principles. "In my ship designs the engines are nearly always parallel. Gene stated that Starfleet ships have engines that are co-dependent. There are always two engines; there's never one; there are never three. I took that a bit further in assuming that most of the ships had pairs of engines that could see one another – there was nothing in between."

Although there were rules, the designers were always looking for ways to give their ships a unique profile that would make them stand out. In this case Probert and Sternbach decided to give the *Stargazer* four nacelles rather than the regular two. "The rule," Sternbach explains, "was that Starfleet vessels had an even number of nacelles to make the warp fields symmetrical. *Stargazer* fit that requirement perfectly with four nacelles, which also implied that it might even be a faster ship, able to reach a larger number of targets and respond to trouble spots quicker."

The two designers theorized that Picard's old ship was a fast science vessel, so they gave their design a thickened saucer section with larger outer doors that implied it had a large hangar deck for exploratory shuttles and probes.

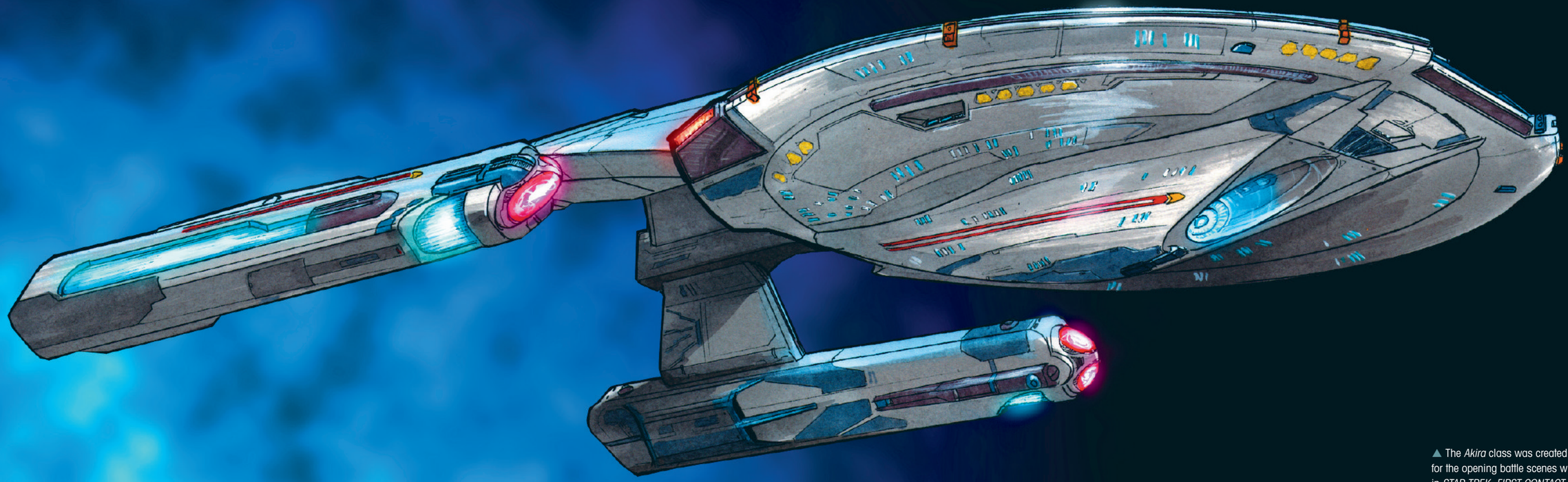
The next stage was to build a physical model, with most of the work falling to Sternbach, who used a combination of commercially available *Enterprise* model kits, scrap styrene and a few interesting bits and pieces he borrowed from other model kits. He sandwiched two saucer sections together to create the thicker forward hull. (As a result, at a glance the *Stargazer* might look as if it has bridges on the top and underside of the saucer.) Then two pairs of nacelles were turned through 90 degrees and fitted to new support struts that Sternbach fashioned from styrene.

HIDDEN ROBOT

Finally, Sternbach covered the underside with sensor arrays, using model parts that were borrowed from a variety of anime kits, "A few large sensor blisters underneath showed that the *Stargazer* could perform a great deal of science or intelligence data gathering. As a tip of the hat to Japanese anime, I cemented a small transforming robot to one of the sensors, where it looked like a piece of Starfleet equipment."

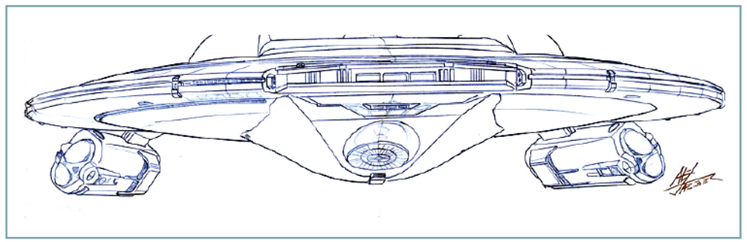
The finished model was then painted yellow for the simple reason that it would harmonize nicely with the red and blue color scheme in the ready room. And the ship was given the registry number NCC-7100, because that could be done easily by rearranging the numbers in the *Enterprise*'s registry – 1701.

When the script for 'The Battle' called for the *Stargazer* to appear on screen, the producers realized that the art department had already designed it. They had also discovered that because of the new approach to visual effects they could afford to build more models, so instead of pulling the movie version of the *Enterprise* out of the warehouse, they had Greg Jein borrow Sternbach's model and use it as the basis for a four-foot shooting model. He copied it so closely that he even included the tiny robot on the sensor array.



▲ The *Akira* class was created especially for the opening battle scenes with the Borg in *STAR TREK: FIRST CONTACT.*

DESIGNING THE III AKIRA CLASS



▶ Alex Jaeger initially came up with about 18 different designs of Starfleet starship for the Battle of Sector 001. His design for the *Akira* class quickly became a favorite with both himself and the producers, so he provided several more detailed blueprint-style drawings of the ship.

The need for new Starfleet vessels to battle the Borg led to the creation of the *Akira* class, a design that became a firm favorite with fans.

In previous STAR TREK **movies,** the range of Starfleet ships seen on screen had been limited to just a few classes, but for *STAR TREK: FIRST CONTACT* the filmmakers wanted to treat fans to some brand new designs. The spectacular opening sequence involving the Borg at the Battle of Sector 001 provided the perfect opportunity to showcase some fresh new designs of starship.

According to writer Ronald D. Moore, this opening battle with the Borg was originally envisaged as being much larger and longer than the version that wound up in the final cut. In one of the early versions of the script for the movie, the battle was described as "involving dozens of Starfleet and Borg vessels, engaged in a fierce firefight as far as the eye can see. Ships turning, twisting, firing, exploding. Lots of movement. It's a spectacular sight."

▲ Visual arts director Alex Jaeger, pictured here with a small model of the *Akira*-class ship he designed.

In order to turn this description into a reality, executives at Paramount instructed that they should avoid reusing ships that had been seen many times before and invent some new ones.

NEED FOR NEW DESIGNS

As *STAR TREK: FIRST CONTACT*'s visual effects supervisor John Knoll said, "I didn't look forward to trying to do the space battle with these same four ships we've already seen a hundred times. Starfleet would probably throw everything it could at the Borg, including ships we've never seen before. And since we figured a lot of background action in the space battle would be built from scratch anyway, I realized that there was no reason not to do some new designs."

The then 22-year-old visual arts director Alex Jaeger was the man tasked with envisioning some new Starfleet ship designs. His only instructions were that they obeyed the existing aesthetic of *STAR TREK* and that their silhouette should look significantly different from the *U.S.S. Enterprise* NCC-1701-E, so that in the melee of battle they would not be confused with the new *Enterprise*, which was making its debut in the film.

"Initially, they wanted a dozen new starships, so I did about 18 designs," said Jaeger. "But once they realized what it would cost to build and texture all of these different CG models, they whittled it down to four ships really fast."

Among these designs, a clear favorite established itself early on, and this was the *Akira* class. It featured a traditional saucer section and nacelles, but had a catamaran-style double hull rather than a separate engineering section. These features meant it would be easily

distinguishable from the *Enterprise*-E on screen.

The inspiration for the design came from the *Miranda* class and the Klingon bird-of-prey, as Jaeger explained. "I loved the stance of the Bird-of-Prey, so that was my main influence, to make a ship with an aggressive stance. It also has some of the feel of the old *U.S.S. Reliant* and its 'roll bar' effect, but with the catamaran style of the split hull."

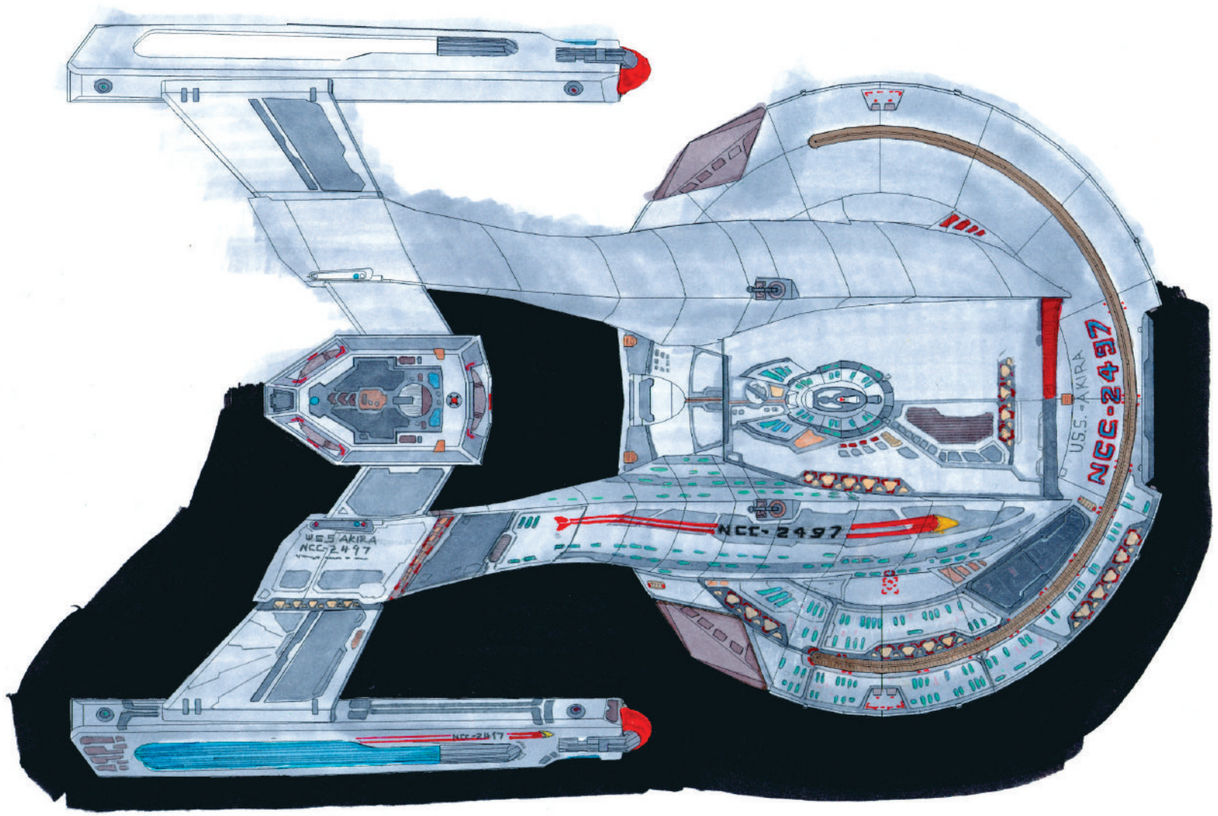
Jaeger was careful to make sure that the *Akira* class fitted into the design language of Starfleet, but just as the new *Enterprise*-E had evolved a more warship kind of look compared to its predecessor, the *Akira* too reflected the heightened military feel of the film.

"When I was designing the *Akira*," said Jaeger, "I was in military mode, and since it was only going to show up in Earth's defence for the film, I loaded it up with lots of defensive and offensive weapons."

These included 17 torpedo launchers, 12 on the weapons pod 'roll bar', one under the deflector dish and, unusually, four on the saucer firing sideways, two on each side.

AIRCRAFT CARRIER

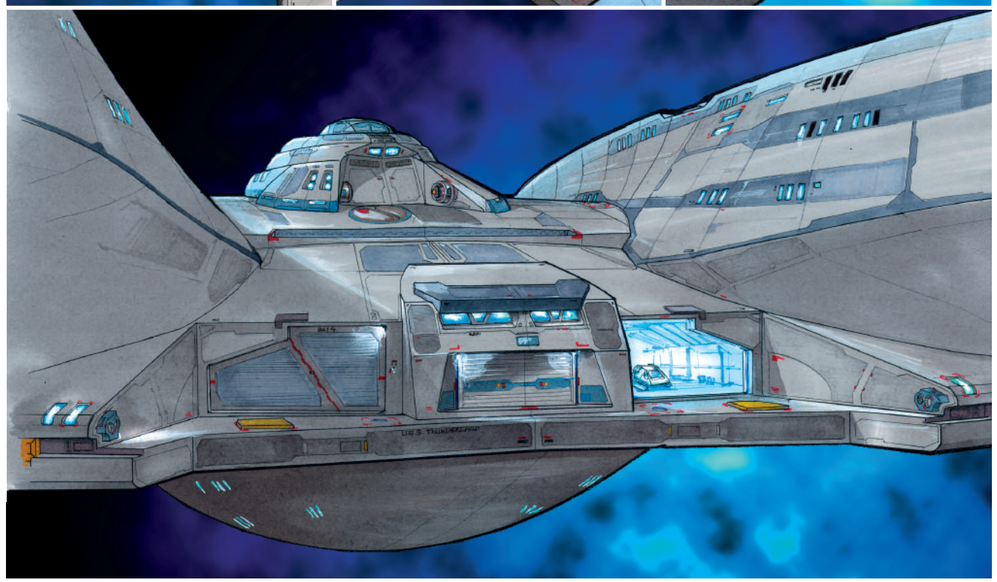
Despite all the weaponry, Jaeger saw the *Akira* class as more akin to an aircraft carrier than an out-and-out warship. "I wanted to make a carrier of sorts… with fly-through shuttle hangars," said Jaeger. He designed it so that there were two shuttlebays – one in the front, with three doors located in the notch at



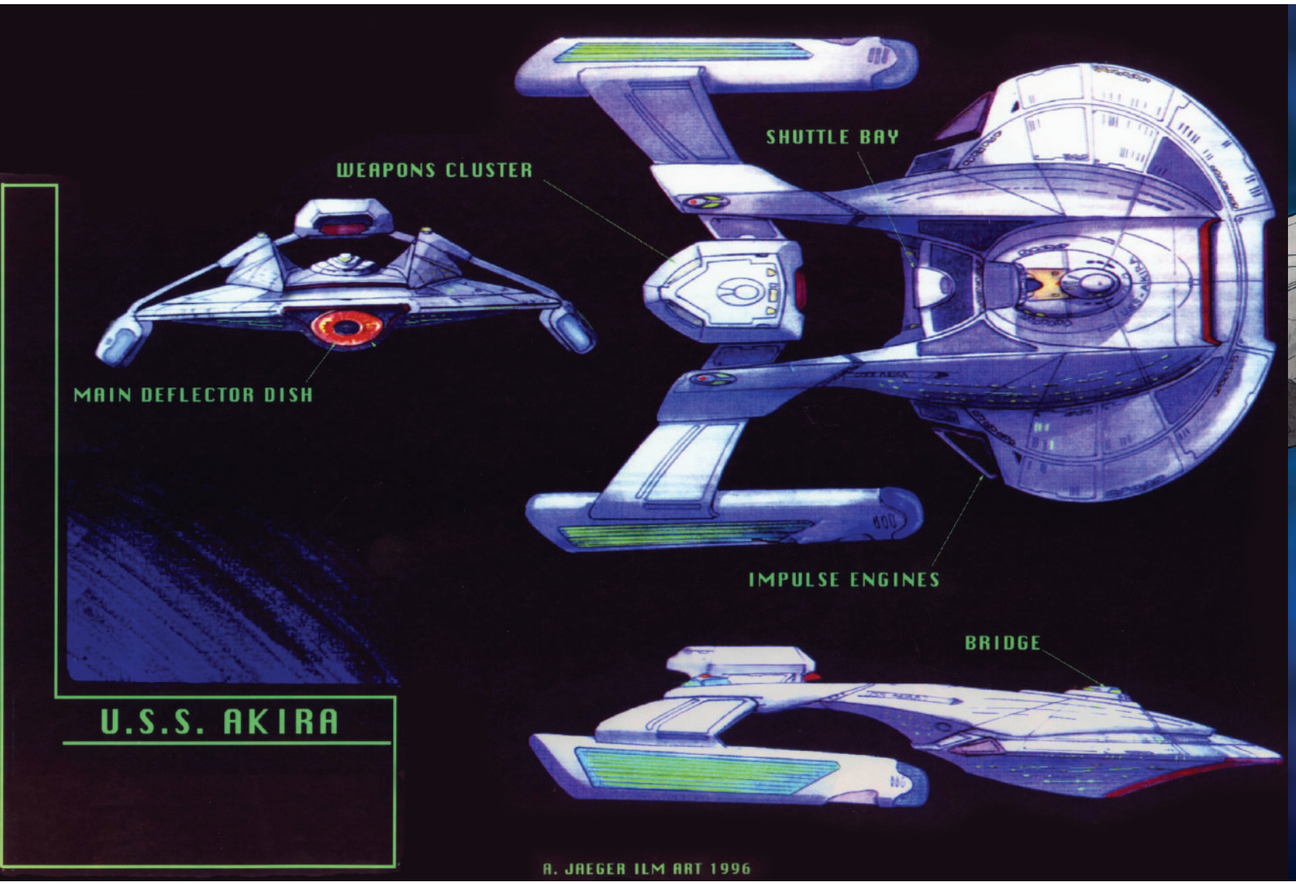
▲ Alex Jaeger has said that his design for the *Akira* class was influenced by the aggressive stance of the Klingon bird-of-prey, while the weapons 'roll bar' located behind the saucer section between the nacelles was inspired by the *Miranda* class. This illustration, drawn early on in the design process shows that these key elements were already in place.

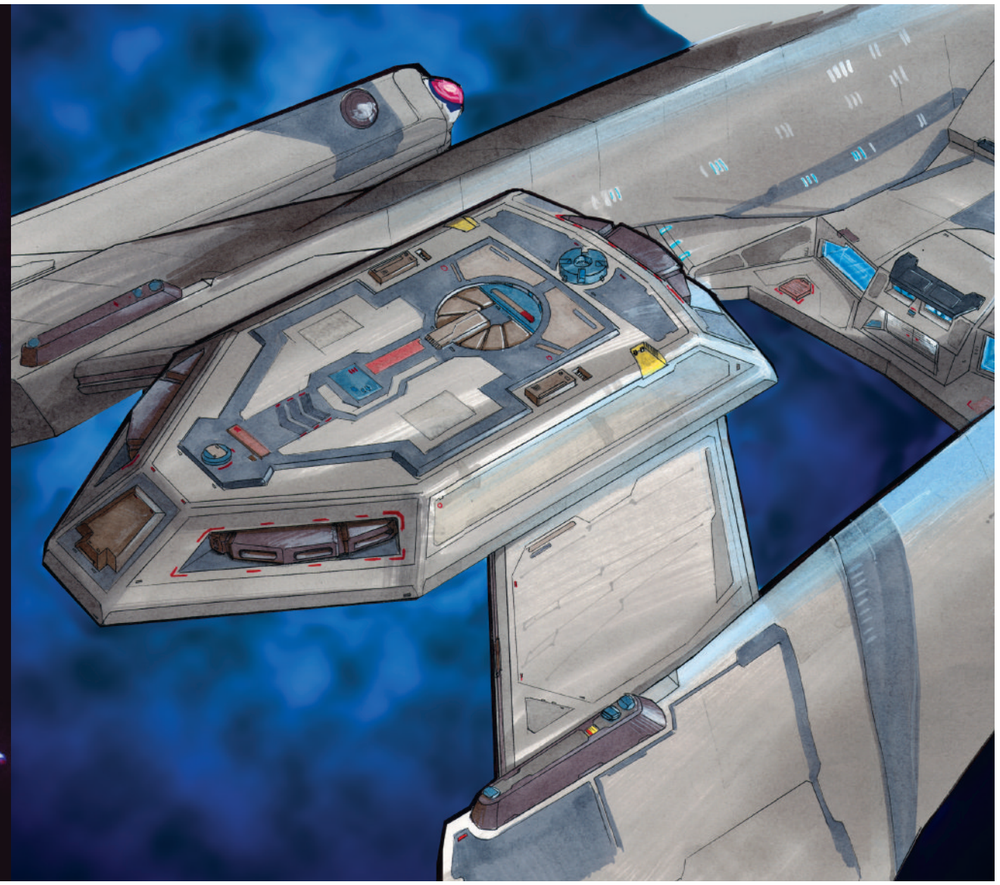
◀ Various detailed sections of the *Akira* class were illustrated by Jaeger. This drawing shows how the main bridge was nestled down between the catamaran-style hull and further protected by shield generators that were located in notches on either side on top of the catamaran hull. The illustration also shows a good view of the weapons pod, with the seven openings for the forward torpedo launchers.

◀ The inset pictures show various details at the rear of the ship, including a rear view of the weapons pod with three of its launchers, plus different perspectives of the rear shuttlebays.



◀ This rear view close-up of the *Akira* class shows the main shuttle bay and shuttle control centre. Jaeger envisioned the *Akira* class as being like a starship version of an aircraft carrier where shuttles could come in to land in this well-protected area in the rear. They would be launched from the notch at the front of the saucer section, enabling the swift exit and entry of small craft into battle.





▲ These illustrations show Jaeger's final design of the *Akira* class from several different views. The side view shows that the *Akira* class has a much narrower side profile compared to previous Starfleet ships. Jaeger also said that he felt this made for a more friendly crew environment as the engineering personnel were no longer stuck in the 'bowels' of the ship and that the split catamaran hull allowed for more windows, giving the crew a better view of their own ship.

the front of the saucer for the fast exit of small craft into battle, plus a shuttlebay at the back of the saucer where the auxiliary craft would land when they returned to the ship.

SHUTTLE PROTECTION

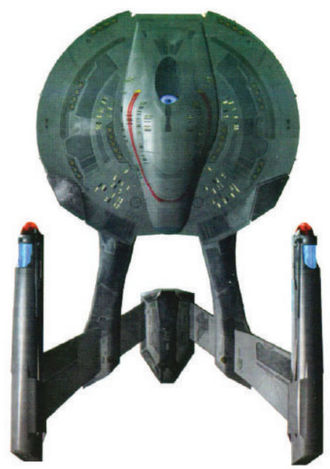
This rear area also provided plenty of protection for the shuttles in a firefight as it was tucked down between the hulls and flanked by the nacelles.

"I really got into it with this one," said Jaeger, "with the whole idea that the front bay would be the launching bay, and then to return the shuttles would come into the back, because they'd be protected by the rest of the ship."

The bridge, unlike that on most other Starfleet ships, was also well protected as it was nestled down between the split hulls, while extra shield generators were located in a notch on either side of the bridge. Also in this protected centre region were most of the sensor arrays for the transporters and communications.

"There was considerable thought put into the placement of elements," said Jaeger. "Since we were going to flesh out one of these background ships for a close-up, I knew it would be scrutinized… and it has been!"

Despite appearing only relatively briefly in *STAR TREK: FIRST CONTACT*, the *Akira* class drew plenty of attention from fans, many of whom consider it to be one of the best-looking ships in the *STAR TREK* canon. In fact, such was its positive reception that it became the inspiration for the look of the *Enterprise* NX-01 when a new *STAR TREK* TV series was launched, and a testament to the design skills of Alex Jaeger.



◀ This wider view of the rear of the ship shows how the rear shuttle bays were protected by the twin hulls and the weapons pod that was positioned above them. Jaeger said that the weapons pod was inspired by the 'roll bar' that featured on the earlier Miranda class.

◀ Jaeger's design for the *Akira* class was quickly approved by the producers of *STAR TREK: FIRST CONTACT* and his illustrations were passed on to CGI modelers Larry Tan and Paul Theren at Industrial Light & Magic. Their computer-generated images of the *Akira* class show just how closely they followed Jaeger's original design. No physical studio models of the *Akira* class were ever constructed.

▶ Adam Buckner designed the *U.S.S. Centaur* using existing parts of other ships, which he thought would fit together well. He never expected it to be filmed so it has no room for lights and you can see the registry is a piece of paper.

DESIGNING THE III

U.S.S. CENTAUR

▲▶ These shots of the model were specially made by Adam Buckner for this article. He still has the model of the *Centaur,* which he photographed at home before using Photoshop to add the lights.

The *U.S.S. Centaur* was designed by the VFX team rather than the art department and was literally made out of spare parts.

The U.S.S. Centaur has one of the most modest origins of any *STAR TREK* ship: it was built from plastic model kits as a present for a small boy in Spain but it ended up on screen, where it went toe to toe with a stolen Jem' Hadar fighter in a brief appearance that made it into a firm fan-favorite.

The *Centaur* was built and designed by Adam Buckner, who was one of *DEEP SPACE NINE*'s VFX supervisors. As he explains, the beginning of a season was always a reasonably quiet time for the VFX team,. When they started work on the sixth season, his boss Gary Hutzel suggested that he make good use of the spare time by building some models. "Gary was interested in getting some additional ships we could use. He also wanted to teach me about what was fast becoming the dying art of motion control models. And I was happy enough to spend time sitting in the modelling shop. I was never a modelmaker to the level of the professionals who could build something from scratch, but when I was younger I would buy kits from the hobby shops and get glue everywhere. I had also done a few stop motion films using these models when I was at university. Now I had all the gear and Gary was willing to teach me."

Buckner started off by making two ships that were based on Franz Joseph designs from *The Starfleet Technical Manual,* which was published in the 70s. "Those models would later become known as the Jupp and the Bradford," Buckner remembers. "The Jupp was sort of like the Franz Joseph destroyer but I thought it was a bit anaemic as a ship. So then I moved onto what then became known as the Bradford. That probably could have been shot if it hadn't ended up sitting on Peter Lauritson's desk for so long. That was a tug. These were big models. They had LED running lights that blinked and nacelles that lit up and all the proper gear for a motion control model."

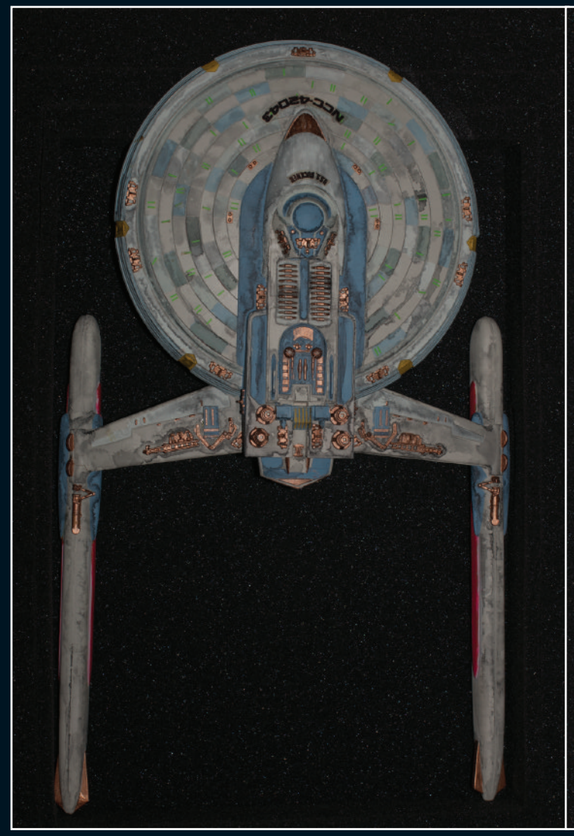
Ironically, neither of these ships would make it to the screen, but they weren't the only ones that Buckner made, although the third one, which became the *Centaur,* was the one he least expected to make it through.

During the break between seasons he had been traveling in Spain, where he had met a small boy called Guillermo who was interested in *STAR TREK*. "I told him quite off the spur of the moment 'I'll build you a ship when I get back.'" Buckner recalls. "So now I'm in the workshop and I don't have anything I can really do on the two models I'm building, so I decide to quickly whip out a kitbash of a small ship that I can mail to him.

FRANKENSTEIN SHIPS

"I wanted it to be a small, sleek, fast ship that used existing stuff we had at hand. Because I didn't have time to do anything else, I went to the hobby shop and bought some model kits that I could use for this one."

Building a ship completely from existing ships made perfect sense to the VFX team. When they had been working on the other models, Hutzel and Buckner had talked about how during a war Starfleet would have done whatever was necessary to put ships on the front line. "Gary had this idea," Buckner says, "that people were literally rebuilding some of these things. That if they had two bits of a spaceship that worked, maybe if you welded them together they could go into battle."



◀ Buckner's model of the *Centaur* on a stand ready to be filmed. The UV tape on the sides could be isolated in the editing booth and replaced with glowing lights. Different colors were used for different kinds of light.

So Buckner had already been looking at the existing ships and thinking about how elements from them could be combined to make something new. As he recalls, he could see a way of taking parts of the *Excelsior* and the *Reliant* to make his ship for Guillermo.

"I was surprised at how quickly it came together. I had an *Excelsior* dish but I used a *Reliant* bridge. The idea was that the ship was much smaller than the *Excelsior*. The top and the bottom of the nacelles are the side bits off the *Excelsior* engines, which were very tall and had all sorts of other gubbins along them. They had these two little pieces, which fit together to make nice compact nacelles. Then the rollbar from the *Reliant* just fit nicely underneath."

Before Buckner could get his ship in the mail, Hutzel took an interest in it. "Gary was beginning to shoot the season opener 'A Time To Stand'. They needed a deep intruder Federation ship and he wasn't happy with any of the stock models, but he liked this little ship I'd built and he asked if he could use it."

TIME FOR AN UPGRADE

Of course Buckner was happy to hand the model over, but there were a few things that had to be done first. Unlike his other ships, Buckner hadn't expected it to be used for filming, and as a result it was both small and sealed up. "Because it was too small and it was finished, we couldn't add any lighting to it, at least not in the conventional way. So all of the lighting was done using UV. We put UV paint onto the nacelles and used a different color of UV tape to make windows, primarily on the dish. When Gary shot it he was able to separate those colors out to make different passes – one for the windows and one for the engines."

Fortunately, the script only called for the ship to be seen briefly, and, because it was behind enemy lines, Hutzel and Buckner figured it would do everything it could to avoid being seen.

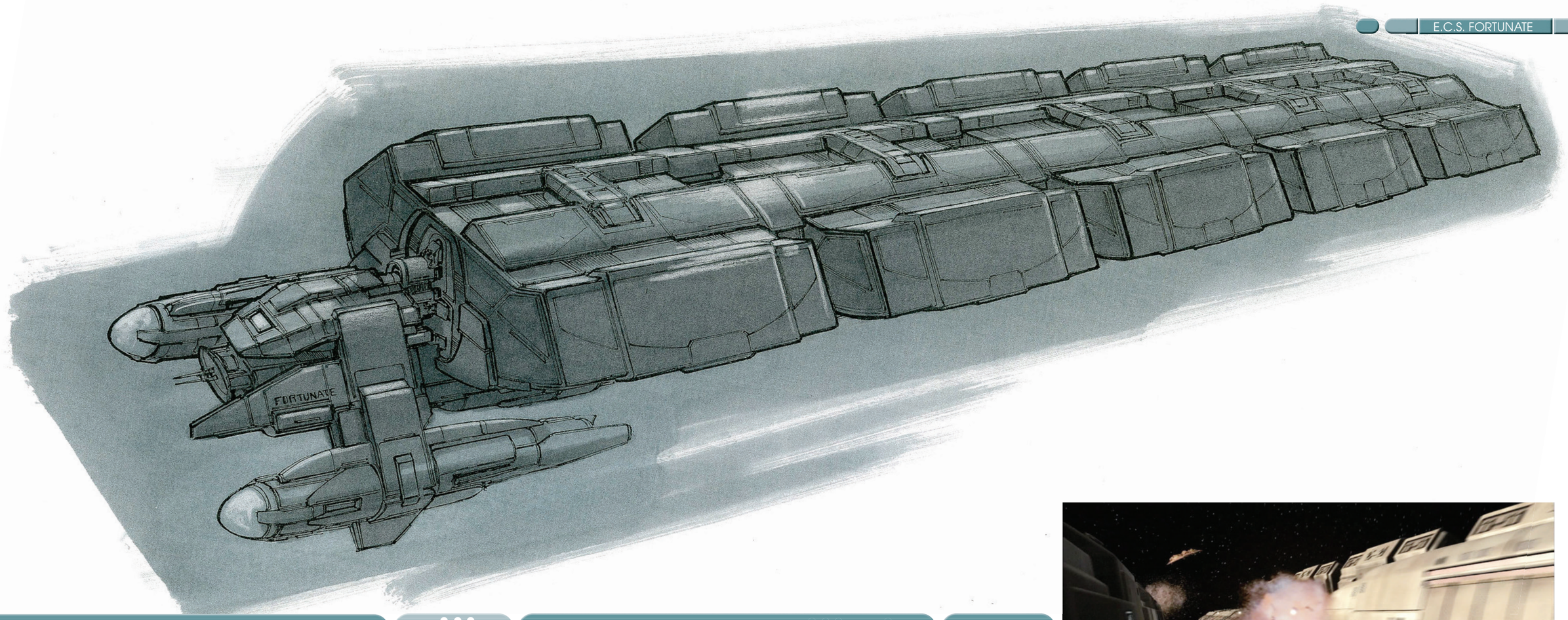
"One of things Gary and I discussed was that the ship was supposed to be a deep intruder. It was always going to be moving fast so we could get away with a small-scale model where the detail was quite harsh without it looking that bad, especially when it was moving."

READY FOR ACTION

Even though they knew it would never be seen in detail, Buckner and Hutzel made changes to bring the model closer to the kind of ship that the script called for. "Gary and I – primarily Gary – gave it a doctoring. I added additional greebles to it, because I felt that there was some potential ambiguity in scale. The original was a lot smoother. Now we knew it was supposed to go behind enemy lines, be fast, pick up signals and report back so I figured it had been tricked out; it had ECM stuff on it, sensing material. I also wanted to obscure the dish a bit so I added some additional detail to try to hide it a little bit and to give it the sense that it was a deep intruder. Some of the extra doctoring, particularly on the underside, was probably a little bit overdone and not quite as delicate as it could have been."

The final detail was to give the ship a name and registry. The finished script would clearly identify the ship as the *Centaur* but when Hutzel and Buckner finished off the model they didn't know that. "In the show it's clearly the *Centaur*," Buckner explains, "but that's not what's written on the dish. Gary asked me 'What can we call it?' I said 'the Guillermo' but for some reason he decided that was inappropriate. Traditionally, at least internally, the ship class is named after the person who built it. So there's a Hutzel, a Buckner, which is what this turned out to be, and that's the name written on the dish."

The story wasn't quite over. Buckner still had a promise to keep. "I had to make another one to send to the little boy because this one was being shot. The one I sent to Guillermo was probably better built than the first one. The one we used for filming ended up in my loft. I hope Guillermo has still got his."



DESIGNING THE E.C.S. III

FORTUNATE

As usual the design of the *E.C.S. Fortunate* started with John Eaves' drawings, but it was completed by Ron B. Moore and the VFX team.

When the original *STAR TREK* was on air there were frequent references to Earth freighters and to human crews hauling cargo around the Galaxy, but we never actually saw one. An Earth cargo freighter did appear in the animated series, but remarkably, they didn't really feature on *TNG* or *DS9,* so when the script for 'Fortunate Son' called for us to spend time on an Earth Cargo Ship there really wasn't much to go by.

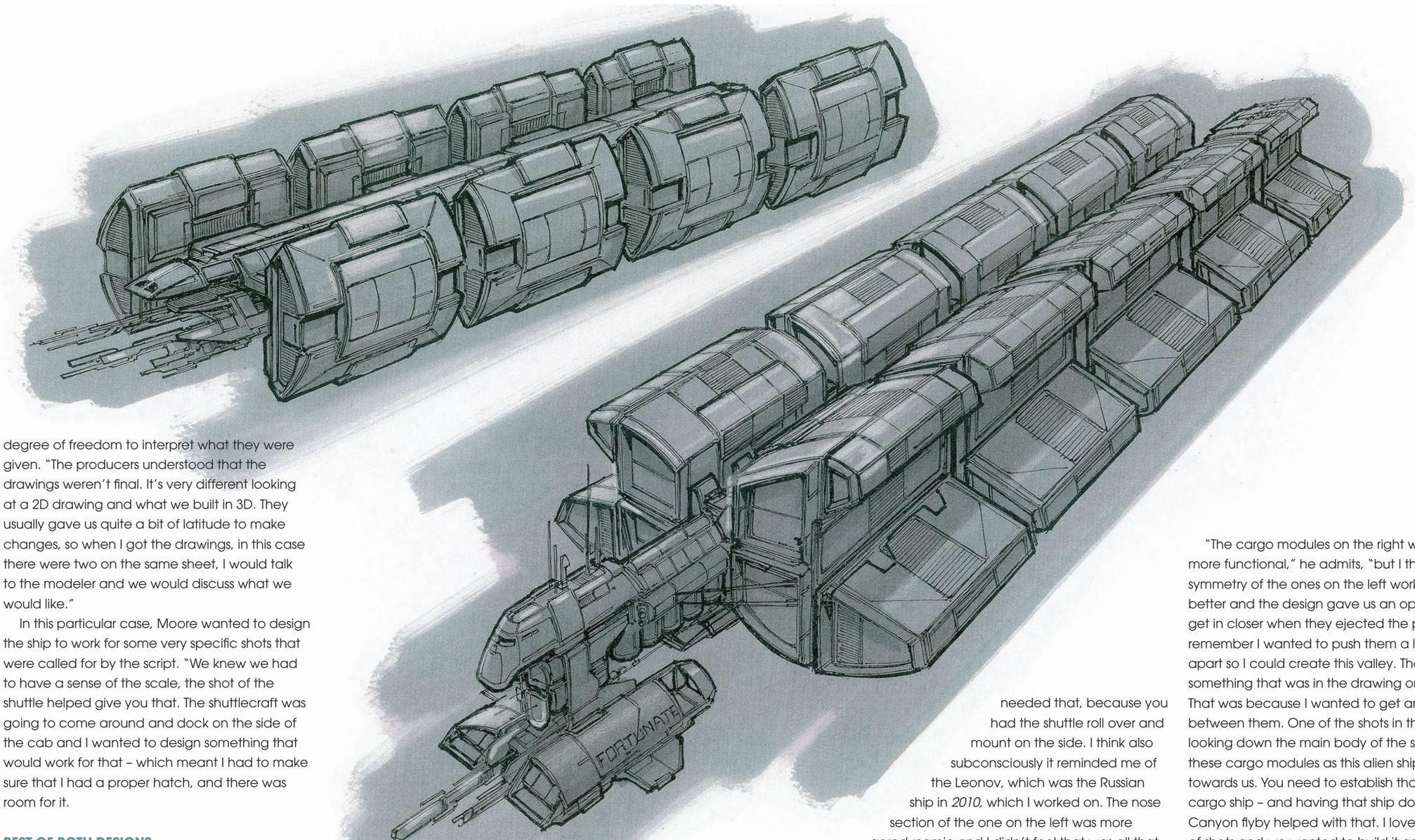
Concept artist John Eaves produced three alternative drawings for the *E.C.S. Fortunate,* all of which shared the same basic architecture: a central framework with a series of cargo pods on either side. In this case the script dictated a lot about the design – it made it clear that the *E.C.S. Fortunate* was a massive ship and called for one of the cargo pods to be blown off during the episode. So Eaves concentrated on slightly different takes on basically the same thing, offering up different shapes for the pods, and the "cab" at the front. In one of his drawings the front section was like a tug, with twin warp nacelles on either side, but the producers rejected this approach in favor of the two other designs, which were passed on to the VFX team to be built as a CG model.

▲ The *E.C.S. Fortunate* was our first proper look at one of the missing elements of *STAR TREK* mythology: an earlier Warp 1.8 freighter.

MAKING CHANGES

'Fortunate Son' was being supervised by Ron B. Moore, and his input had a major influence on the final design. As he explains, the VFX supervisors and their modelers were often given a substantial

▲ The *E.C.S. Fortunate* was carefully designed so that the VFX team could produce some specific shots, one of which featured a Nausicaan fighter making a strafing run down the length of the ship's spine.



◀ Two of John Eaves' drawings were on the same sheet, and this was what was passed to the VFX team. They took elements from both drawings and added their own ideas about what was on the underside to create the final model.

degree of freedom to interpret what they were given. "The producers understood that the drawings weren't final. It's very different looking at a 2D drawing and what we built in 3D. They usually gave us quite a bit of latitude to make changes, so when I got the drawings, in this case there were two on the same sheet, I would talk to the modeler and we would discuss what we would like."

In this particular case, Moore wanted to design the ship to work for some very specific shots that were called for by the script. "We knew we had to have a sense of the scale, the shot of the shuttle helped give you that. The shuttlecraft was going to come around and dock on the side of the cab and I wanted to design something that would work for that – which meant I had to make sure that I had a proper hatch, and there was room for it.

BEST OF BOTH DESIGNS

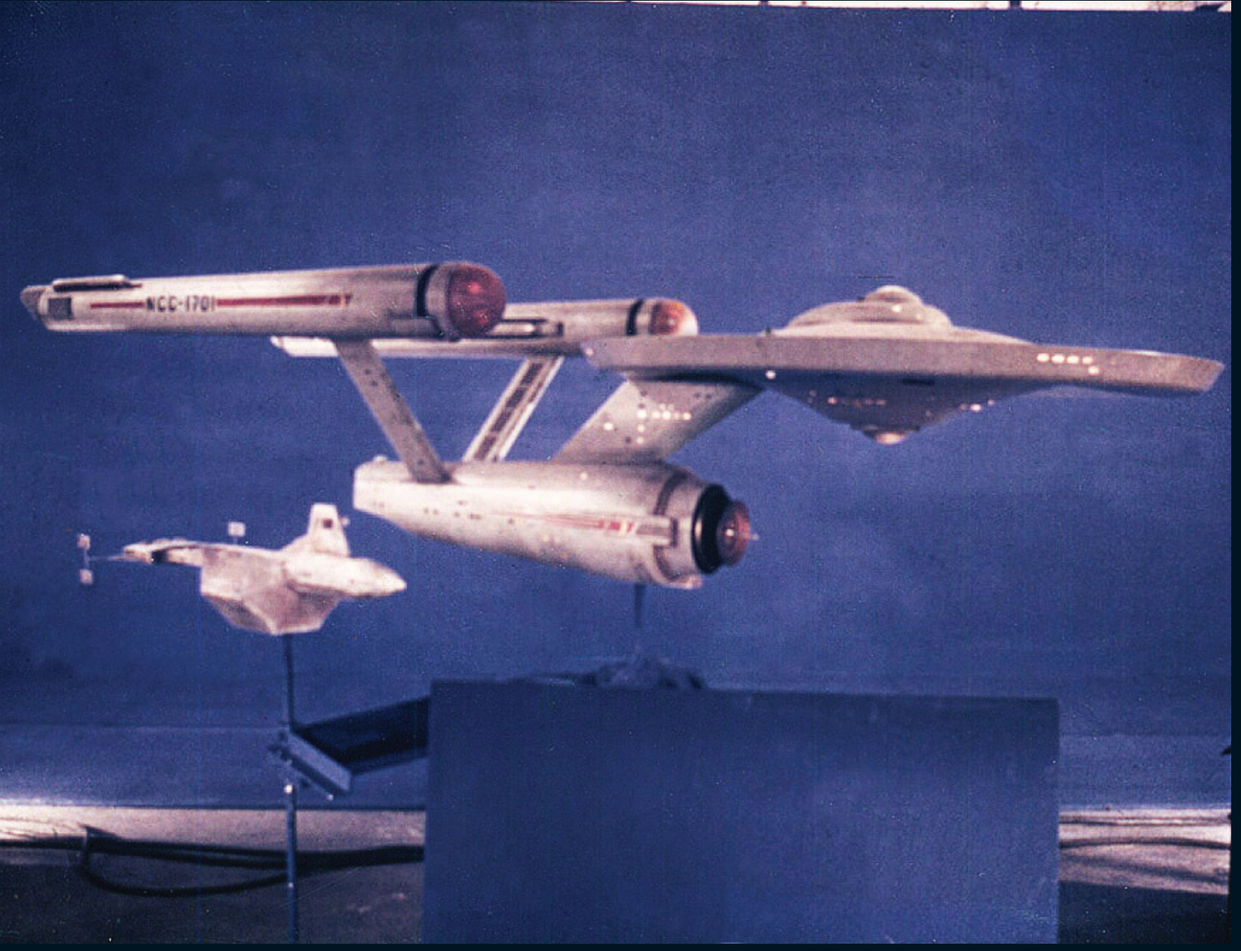
"Also I needed to have one of these cargo modules come off and float off into space. So I varied the model a little bit to make all of that work as well as possible. Either one of the drawings we had would have worked but if you look at the model in the show, what we came up with is kind of a cross between the two."

Specifically, what Moore did was to take the nose section from the right-hand design and the cargo modules from the one on the left. "Sometimes it was just because I liked one element better," he says, "but we had reasoning for some of it too. I thought the nose on the one on the right gave us a little more bulk and we needed that, because you had the shuttle roll over and mount on the side. I think also subconsciously it reminded me of the Leonov, which was the Russian ship in *2010*, which I worked on. The nose section of the one on the left was more aerodynamic and I didn't feel that was all that necessary, especially for a freighter."

When it came to the cargo pods, Moore had two concerns: one of the pods had to be ejected when the freighter's acting captain, Ryan, turned on Archer, and Moore was planning a shot when a Nausicaan fighter flew the length of the ship, establishing its size.

"The cargo modules on the right were probably more functional," he admits, "but I thought the symmetry of the ones on the left worked a little better and the design gave us an opportunity to get in closer when they ejected the pod. I remember I wanted to push them a little bit further apart so I could create this valley. That was something that was in the drawing on the left. That was because I wanted to get an alien ship in between them. One of the shots in the teaser is looking down the main body of the ship between these cargo modules as this alien ship is coming towards us. You need to establish that this is a big cargo ship – and having that ship do a Grand Canyon flyby helped with that. I love those kinds of shots and we wanted to build it and get the spaces just right to make that work."

Moore and his modeler also added warp nacelles to the design, which were tucked into the unseen underside of the ship. Looking back he couldn't have been happier with the results. "I really liked this episode," he says, "I liked building this ship and I really like the final design."



▲ The *Botany Bay* was built by Film Effects of Hollywood and filmed in their studio against a bluescreen alongside the *U.S.S. Enterprise*.

DESIGNING THE III

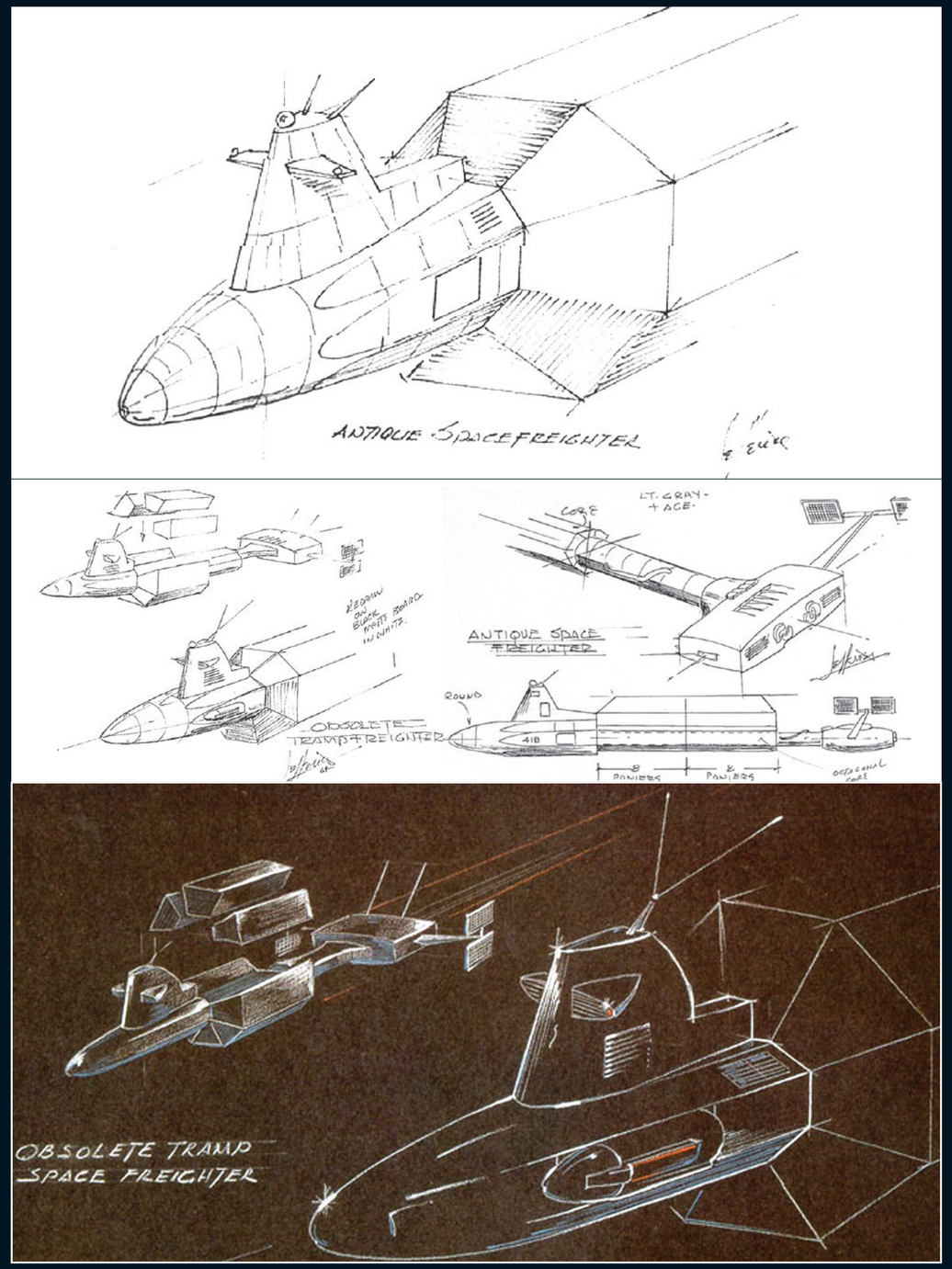
S.S. BOTANY BAY

The *Botany Bay* was actually designed to be a space freighter by Matt Jefferies, but it ended up being used as Khan's sleeper ship.

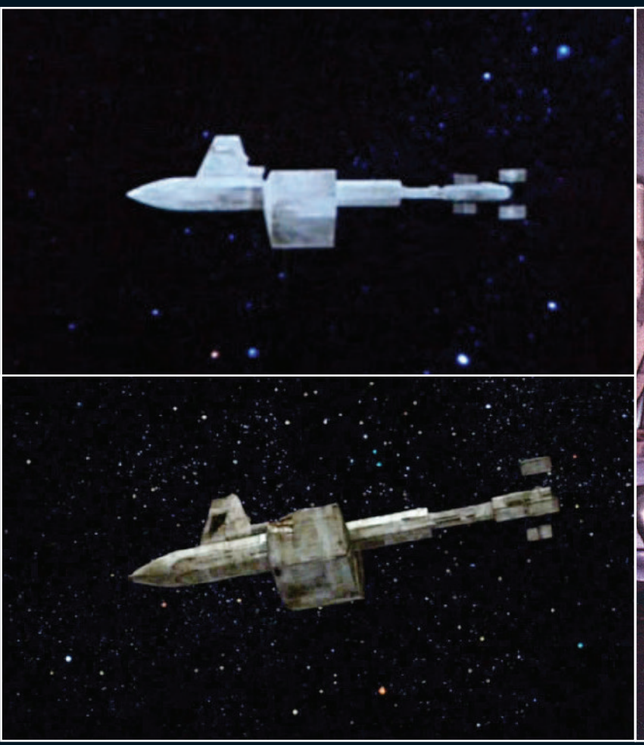
The original model of the *S.S. Botany Bay* was designed by Matt Jefferies, the creator of the original *U.S.S. Enterprise* NCC-1701. He stated in 1968 that "The *Botany Bay* was actually designed before the *Enterprise*. It was a little idea that popped up and was labeled 'antique spacefreighter.'" His sketches also labelled it as an "obsolete tramp space freighter," and it included the numbers '418' on the hull. As its name suggests, it was not originally intended to be a 'sleeper ship,' but some sort of cargo vessel.

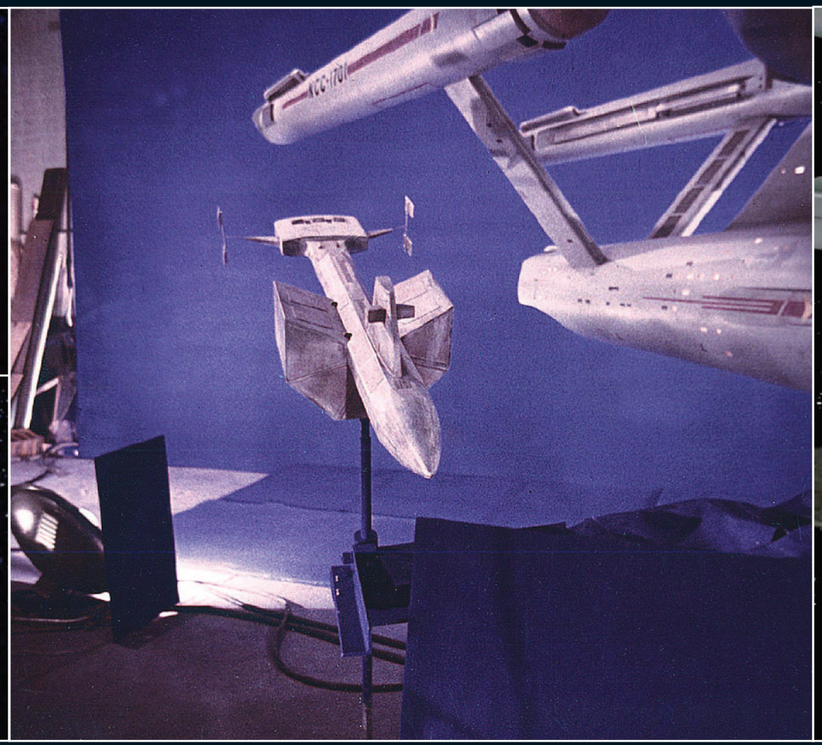
Jefferies was pleased with the notion of modular shipping crates, which could be automatically loaded and unloaded without anyone being required to venture into space.

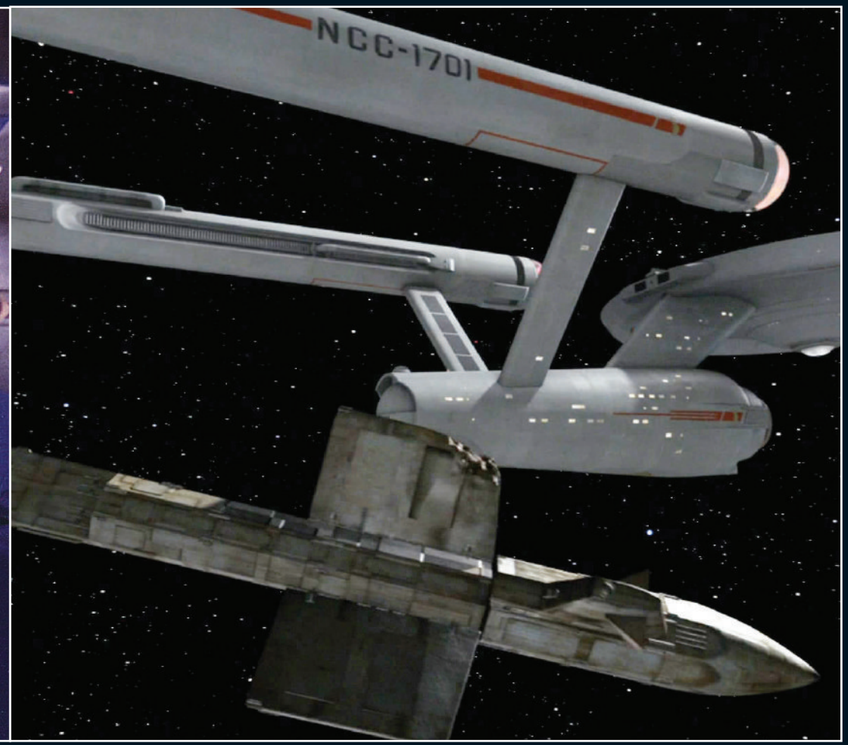
In the sketches, Jefferies envisioned that three additional cargo containers could be attached to complete the middle section. In fact, judging from



▶ Matt Jefferies designed what would become the *Botany Bay* before he came up with the *U.S.S. Enterprise*. As can be seen from his sketches, he intended it to be an ancient freighter, with additional cargo holds that could be added.







◀ The CG version of the *Botany Bay* was built for the 2006 remastered edition of *THE ORIGINAL SERIES*. On advice from a NASA engineer, its conning tower [the raised fin part] was given a small port in order for it to dock with the International Space Station.

◀ MIDDLE LEFT: From the front, the *Botany Bay* studio model resembled a submarine. It was constructed mostly of wood, but metal antennae were used for the solar panels attached to the aft engine module.

▲ The difference between the studio model [top] and the CG model [bottom] of the *Botany Bay* can been seen in these two pictures. The CG model allowed the ship to be shown at a different angle, and its hull was much more weathered.

the actual model, it appeared that additional sets of containers could be attached on top of those that were already there.

SIMPLE CONSTRUCTION

The original studio model of the *Botany Bay*, measuring 43 inches x 18 inches, was most likely built by Film Effects of Hollywood. It was simply made, being constructed primarily from wood, and had no internal lighting. It was embellished with miscellaneous model kit parts and metal components. The leading edge of the tower structure featured a corrugated metal foil and the engine pod included metal antennae.

The model was painted in a brown/red-gray hue, although that finish was washed out into an overall gray color on screen. This was due to the bright lighting conditions in the studio, and the use of the bluescreen filming technique that caused light to bounce off the screen onto the model. Although it was not actually built by Jefferies, he did add the weathering on the hull.

The only footage of the model was shot at Linwood G. Dunn's Film Effects of Hollywood, where it was also filmed alongside the *Enterprise*. It was later converted into the *Woden* NCC-325 Federation freighter in the season two episode 'The Ultimate Computer,' where stock footage of it was used from its earlier photoshoot.

PUBLIC APPEARANCES

The studio model of the ship then appears to have been kept in storage until it made a public appearance in April of 1988 at the Equicon Science Fiction Convention in Los Angeles. After this, it was later bought by life-long *STAR TREK: THE ORIGINAL SERIES* fan and modeler Greg Jein. He had it at his workshop in 1988 for refurbishment, where amongst other things, he accentuated the brown-gray hull color. Jein then loaned the model to the National Air and Space Museum for their 1992-1993 *STAR TREK* Smithsonian Exhibit and its 1993-1994 follow-up exhibition at the Hayden Planetariun, New York City.

A table-top model of the *Botany Bay* complete with several space-shuttle style booster rockets, which suggested how it might have made it into orbit, was subsequently built by Greg Jein. It was photographed for *STAR TREK* Chronology and the third edition of the *STAR TREK* Encyclopedia.

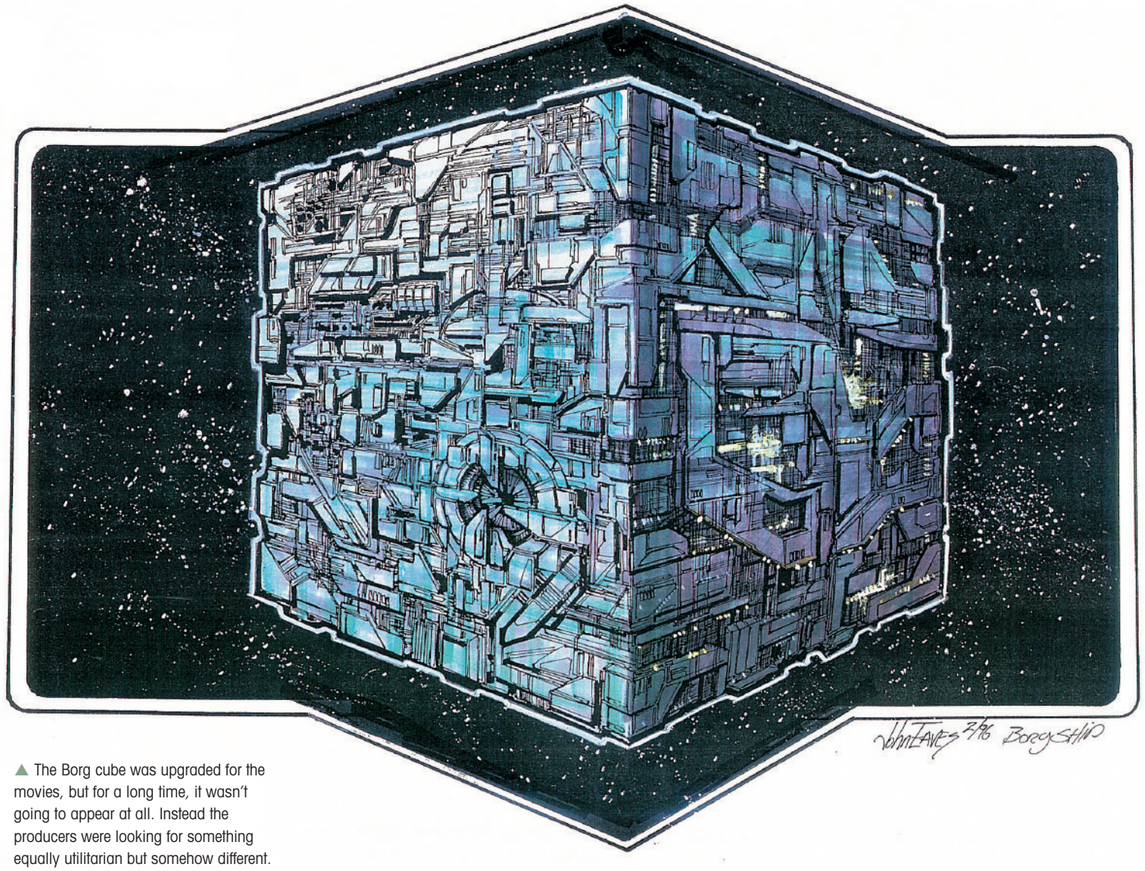
The model itself featured on the desk of Rain Robinson's office in the *STAR TREK: VOYAGER* episode *Future's End*. A launch photo of the same model also appeared in Rain Robinson's office. It also featured in the *STAR TREK: ENTERPRISE* episode 'First Flight.' It was seen on the walls of the 602 Club where many of the pilots and engineers involved in the NX Project liked to drink, while it was also seen in the episode 'Home,' where it was featured on the walls inside Starfleet Command.

CG MODEL

For the 2006 remastered version of *THE ORIGINAL SERIES*, a CG variant of the *Botany Bay* was used at CBS Digital. It appeared adrift on a different axis to the *Enterprise*, and was in a much more weathered state than it was in its original appearance. It was originally built by Finnish fan and digital modeler Petri Blomqvist, and was brought to the attention of Michael Okuda, the supervisor for the remastering of *THE ORIGINAL SERIES*, by technical consultant Gary Kerr.

The CG model was originally constructed in LightWave 3D software and was rebuilt under the supervision of Niel Wray and David Rossi in Maya CGI software. As the result of translating the model from one format to another, some of the resolution was lost of Blomqvist's highly-detailed original in order to speed up computer rendering time.

Regarding the remastered version of the *Botany Bay*, Michael Okuda said, "…the top of the 'conning tower' now has a tiny circular docking port, very similar to those used on the real-life International Space Station. The docking port was added at the suggestion of a former NASA engineer, who noted that a spacecraft built in 1996 would probably have included such equipment to dock at the station."



▲ The Borg cube was upgraded for the movies, but for a long time, it wasn't going to appear at all. Instead the producers were looking for something equally utilitarian but somehow different.

REDESIGNING THE III BORG FLEET

FIRST CONTACT established that not all Borg ships were square: the Queen's ship was spherical and for a while the main ship was a brick.

When the Borg came to the big screen, *STAR TREK*'s producers wanted everything to be bigger and better, including the Borg's ships. The task of rethinking the Borg fleet for their movie debut was given to concept artist John Eaves, who was one of the first people production designer Herman Zimmerman recruited to work on *STAR TREK: FIRST CONTACT.*

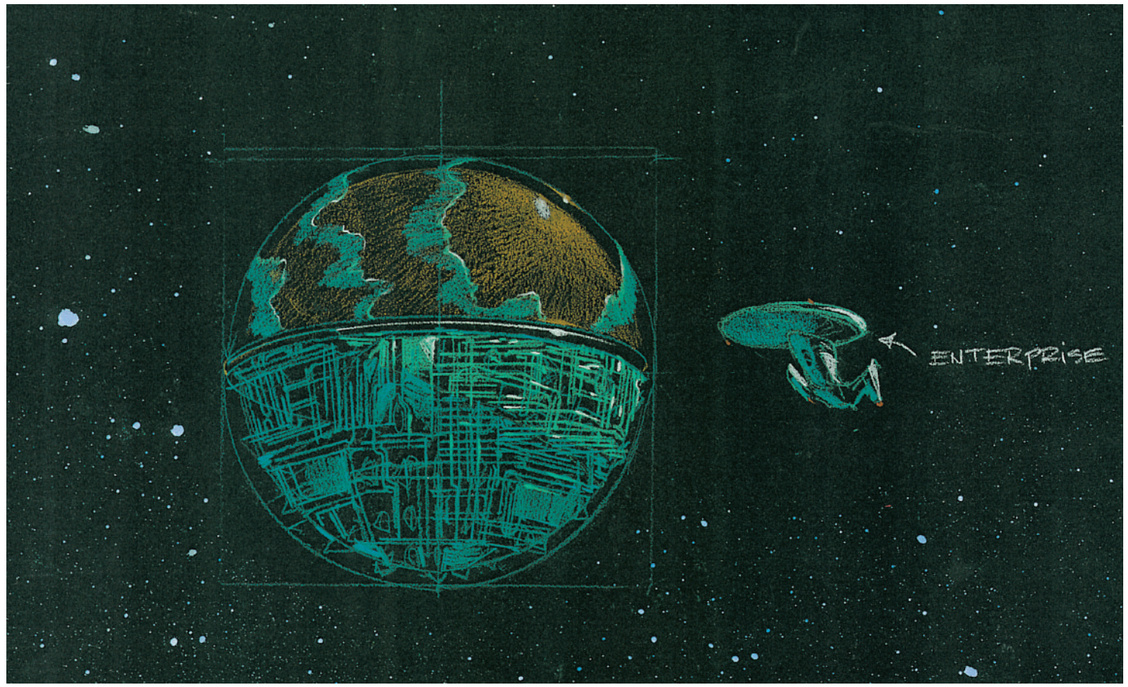
At this point, the only established ship was the Borg cube, and it wasn't surprising that the writers decided that the Borg should also have spherical ships. From early versions of the script onwards the sphere was intended to be a smaller ship that the Queen used to travel back into Earth's past, but at this stage the cube was nowhere to be seen; in early drafts of *FIRST CONTACT,* the assault on Earth was carried out by what the script described as "a large tetragon."

▲ John Eaves' first attempts to design the Borg sphere were rejected because they looked far too much like the *Star Wars'* Death Star.

This posed Eaves with a slight problem – no one in the art department actually knew what a tetragon was! Fortunately, as he recalls, before he'd even had time to look for his dictionary, the writers and producers provided a little clarification. "They wanted different shapes that were kind of along the lines of a cube, but not really the cube; they thought we maybe needed a different look because we'd seen so much of that ship."

With this brief in mind, Eaves settled down to work on the two designs. He started out with the sphere. As he explains, his biggest worry was that spherical 'ships' had already featured heavily in both *Star Wars* and *Starman.*

"Everyone who knows *Star Wars* was thinking 'Death Star.' We actually went over to one of the producer's offices and said 'We're kind of concerned about the sphere shape.' I had this



giant *Star Wars* book and I opened it up to the Death Star and said, 'I think viewers might confuse the two.' He looked at it for a long time then he said, 'No one will ever remember this!'"

DETAILING THE SPHERE

Joking aside, everyone was determined to make sure that the Borg sphere was a distinct ship with its own identity. One of the first things Eaves did was to call John Goodson, the ILM modelmaker who would be building the ship, and tell him they needed to do everything they could to make the sphere look new and interesting. Then Eaves started to turn out a series of drawings for his boss Zimmerman and the producers to look at.

Eaves says the basic design for the sphere came together quite swiftly, but he did explore a few dead ends before the producers settled on the final look. "At one point it was going to be little spheres inside of a sphere, then it grew away from that. I actually came up with a sphere with open holes at either end; you can't really see it, but there is a sphere inside a sphere.

"My first drawing was of a staggered puzzle-piece looking sphere. It had a little escape pod inside of it and you could see this kind of undersphere under the surface. That was a good direction; Herman and Mr. Berman liked it. They told me to keep going and to keep the shapes really irregular; they didn't want any mathematical patterns whatsoever. So I took it a little bit further, and made the next one with really raised surfaces and very inset surfaces."

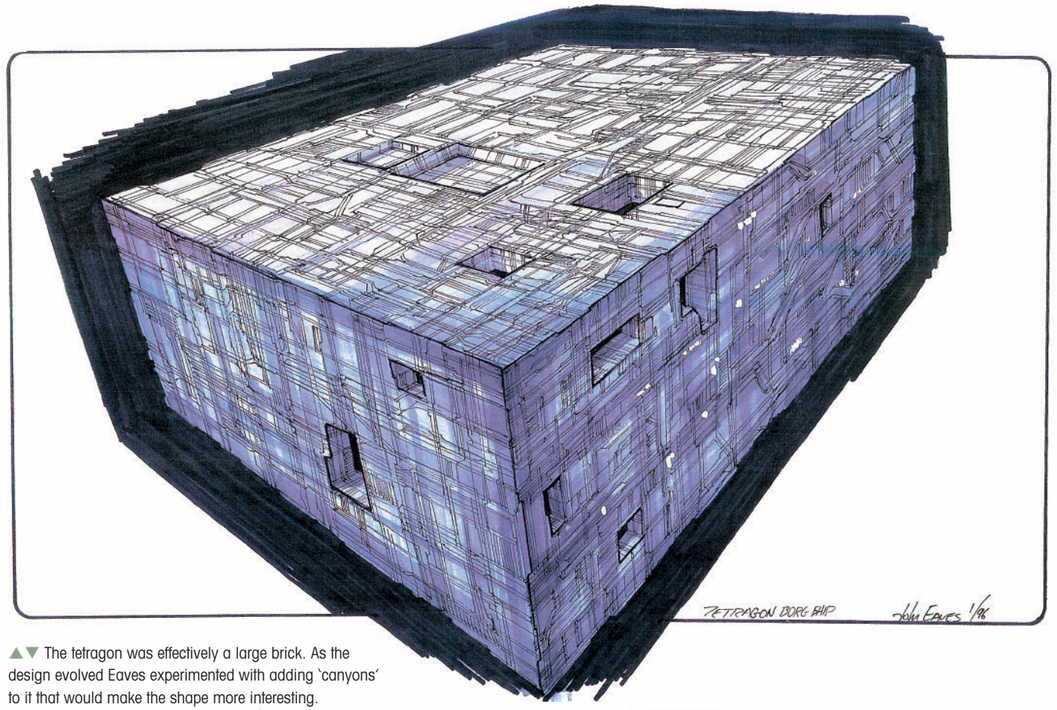
▲ John Eaves wasn't the only concept artist working on *FIRST CONTACT*. Ricardo Delgado was working on the look of the Borg themselves, and came up with an alternative version of the sphere.

NEARLY PERFECT

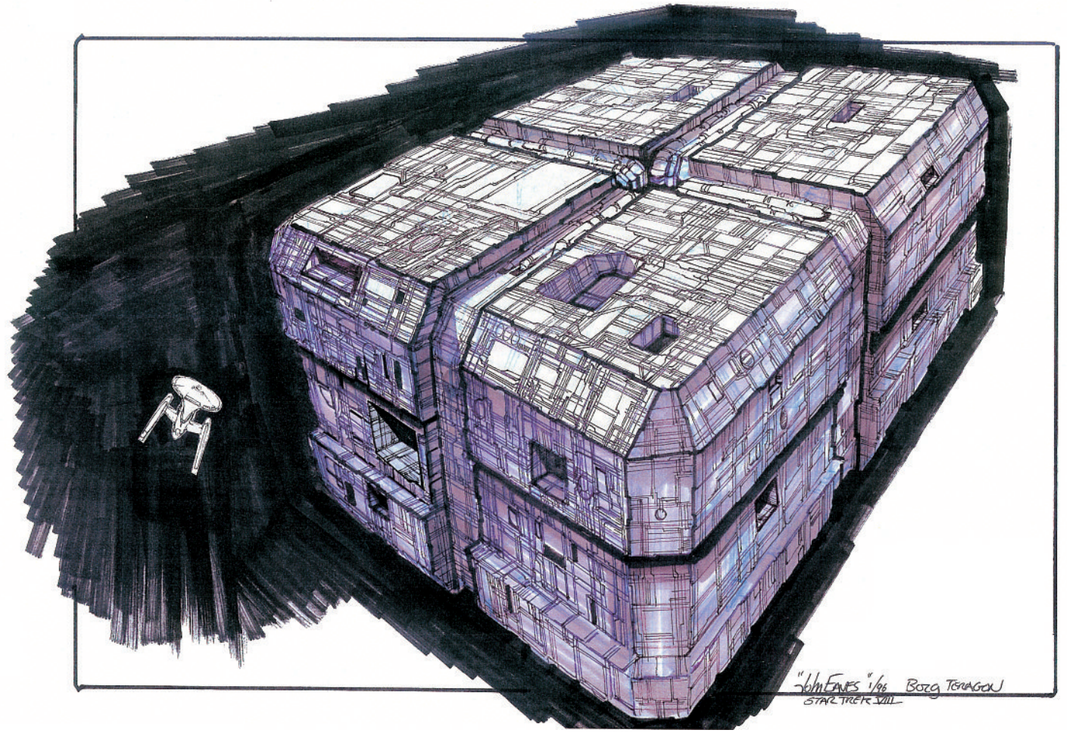
This design was very close to what everyone was looking for but, Eaves explains, it had a major flaw that needed to be corrected. The script described how the sphere would fire on Zefram Cochrane's complex on the surface, so he had designed a large weapons platform that was made up of a series of rings that went deep inside the ship. "They wanted an open hole with some rings, but that did look too like the Death Star, so we got rid of it. It's still there on the final ship, but it's covered by paneling. Finally, I did one with giant exposed pipes on. They seemed to like that."

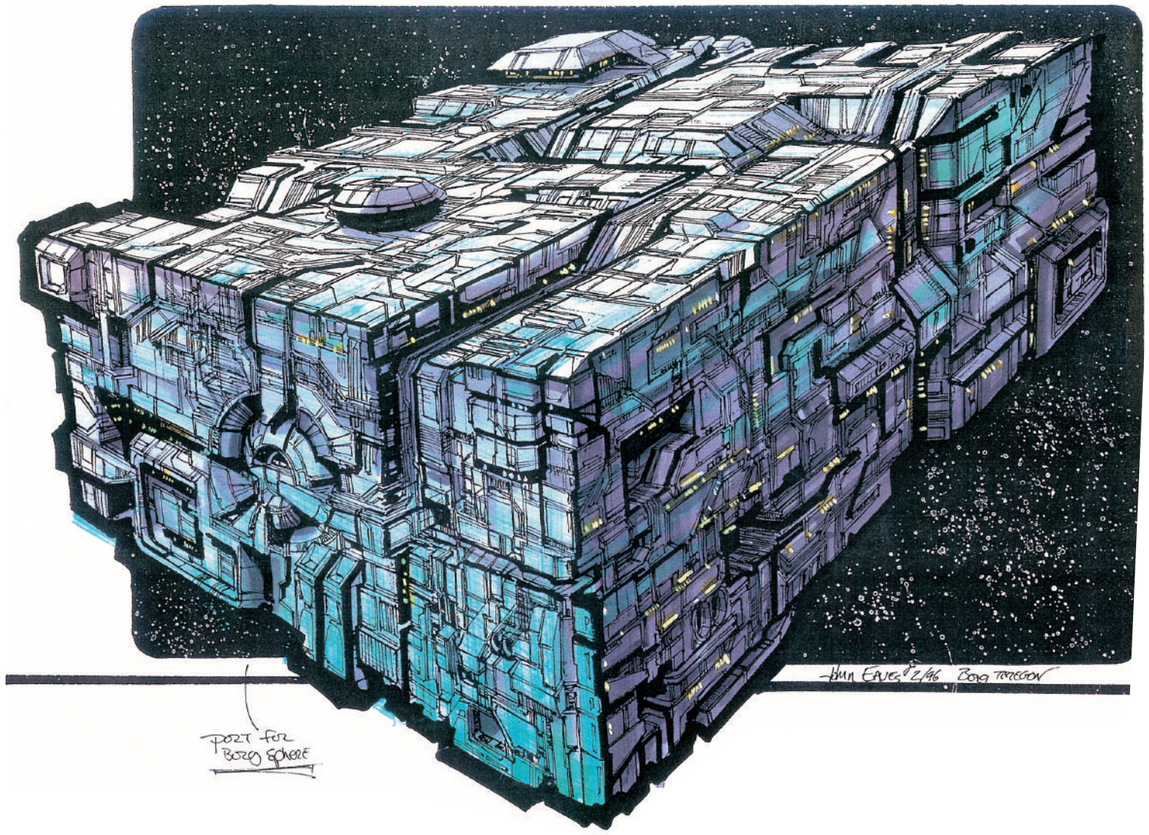
Eaves wasn't the only illustrator working on the

◀ Delgado's designs for the Borg drew inspiration from Egyptian art, and he suggested that the 'tetragon' could actually be an obelisk.



▲▼ The tetragon was effectively a large brick. As the design evolved Eaves experimented with adding 'canyons' to it that would make the shape more interesting.





movie; Ricardo Delgado, another *STAR TREK: DEEP SPACE NINE* veteran, had been asked to take a look at the design of the Borg themselves. In his spare time, he threw out a couple of designs for their ships.

EGYPTIAN INSPIRATION

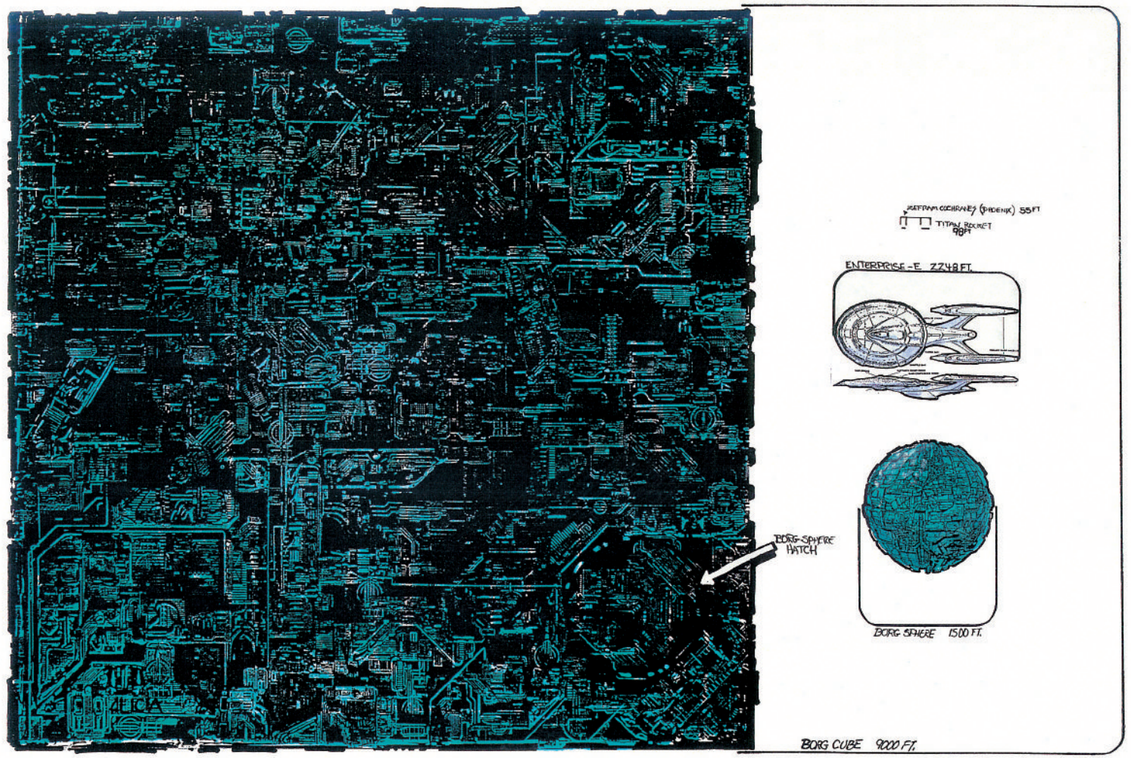
His designs for the Borg Queen and her drones were heavily influenced by the ancient Egyptians, so he suggested that the still-undefined larger ship should actually be an obelisk with the sphere set into the top. His version of the sphere was also radically different to anything seen before: one half would be made up of traditional Borg panels, but the other half would be a forcefield that contained gaseous energy, which the sphere used for fuel.

Meanwhile, Eaves was producing his own designs for the larger Borg ship. His first drawing was of a large, rectangular ship, rather like an enormous Borg brick. "The first one I did was very, very smooth; that was when it was still very large. It was this reflective block and it had all these inset passageways you could fly through or things could fly out of. They said, 'OK, that's kind of cool. Let's carry that a little bit further, but not so smooth; we need that Borg detail.'"

BORG TEXTURES

However, back then Borg detail wasn't very clearly defined. The original model of the cube had only been designed for television and could never have stood up to a cinematic presentation; according to Eaves, it was essentially made up of model trees – the bits of plastic that are left behind when you've assembled a model kit. So, he had to design the detail himself. Thankfully, he says, this didn't mean he had to draw every individual

▲ The size of the tetragon kept changing and as a result Eaves altered the kind of surface detail he was designing. The approach he settled on would eventually be used on the revised cube.



hatch and panel. "I knew how John (Goodson) was going to work on the model – they were going to use brass etch, and there's really no way you can draw that – so what I did was just a guideline for the kind of shapes. I try to do that with all the drawings I do; I leave a lot of spaces open so the modeler can be part of the creative process."

Eaves' second pass suggested there would be much more paneling, and showed large, recessed areas. "The next one's got very lateral planes and a very uniform shape. They liked the idea of the detailing on it; it had ribbon-shaped canyons. They liked the feel of that, but they felt that the pattern was too mathematical."

So, in his third pass, Eaves concentrated on breaking up the design of the ship and avoiding any kind of regular pattern. "That was also rectangular, but it's got a lot of really deep valleys and its got a little round escape sphere on the surface. That one they really liked; they said 'Let's go with that.' They sat with it for a week or so, then they came back and said, 'We're going to go with the cube shape.'"

▲The producers eventually returned to the idea of using a cube, with the sphere emerging from a port in the corner.

CHANGING SIZES

It should be explained that, throughout the design process, the size of the ships kept changing. The relative sizes of the sphere and the larger ship stayed the same. At one point the sphere was 3,000 feet across, which meant that the 'mother ship' was "gargantuan." The final version of the sphere was only 1,500 feet across, which made it considerably smaller than the *Enterprise.* The point is that the changing size of the ships had a major impact on the kind of detail Eaves was putting on his designs. When the ship was enormous, he made the detail much smaller to create a sense of scale; when it was smaller, he brought the size of the detail up.

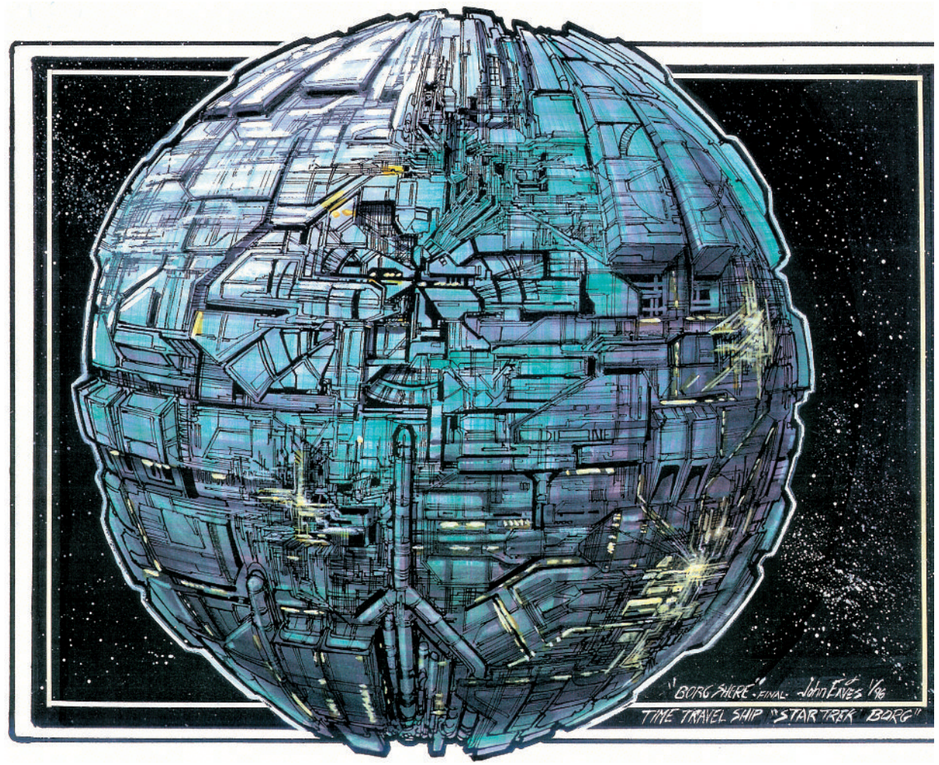
When he drew his first Borg cube, it was supposed to be vast, so the surface was filled with detail. As Eaves says, nobody really liked the look of this cube. "The first one was really overly detailed. That's where I started incorporating 45-degree lines all through it. They liked that; it was very intricate, but it was too busy, so they had me go with version two. That has the same breakup; I started putting a heavier panel on top of it and incorporating the escape hatch.

"That was more the direction they were wanting, so Herman had me do a color pass on it. That version of the design has the hatch on the left-hand side; for the very final pass they had me do, they had me put the hatch on the right side and they went back to a little finer detail. It was almost going back in a full circle back to the first sketch. It had a little bit of the heavier panel but more of the fine-scale stuff."

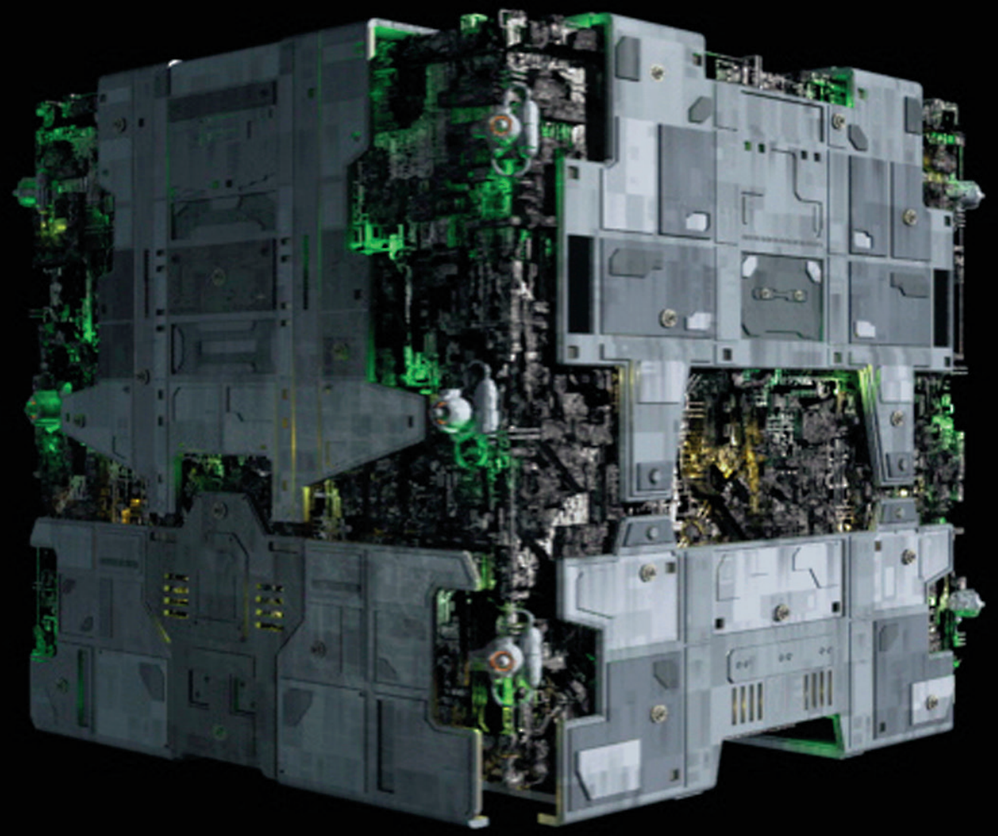
When you look at Eaves' drawings, the hatch the sphere emerges from is easily identifiable; this wasn't the case in the movie, when the sphere emerged from a concealed hangar. Eaves explains that the change was actually made while the model was being constructed. "As the model went on, they decided to keep the door hidden, so it wouldn't be seen during the attack and wouldn't be revealed until the very last moment. On all the drawings you can see where the port is; that established where on the cube that hatch is, but, in fact, you never saw it except for that one scene where it opens, so really it could be anywhere."

LASTING CHANGE

After the sphere made its debut, it become a regular feature on *STAR TREK: VOYAGER,* which used a simpler CG version, and we learned that the Borg have several other kinds of vessel, from the peanut-shaped probe to the heavily-armored tactical cube. But, the process of reinventing the Borg ships began with Eaves' work for *FIRST CONTACT,* which brushed aside many of the boundaries that had restricted the look of the Borg fleet.



◀ Eaves' final design for the sphere was sent over to John Goodson at ILM who would be responsible for filling in much of the detail on the practical model.



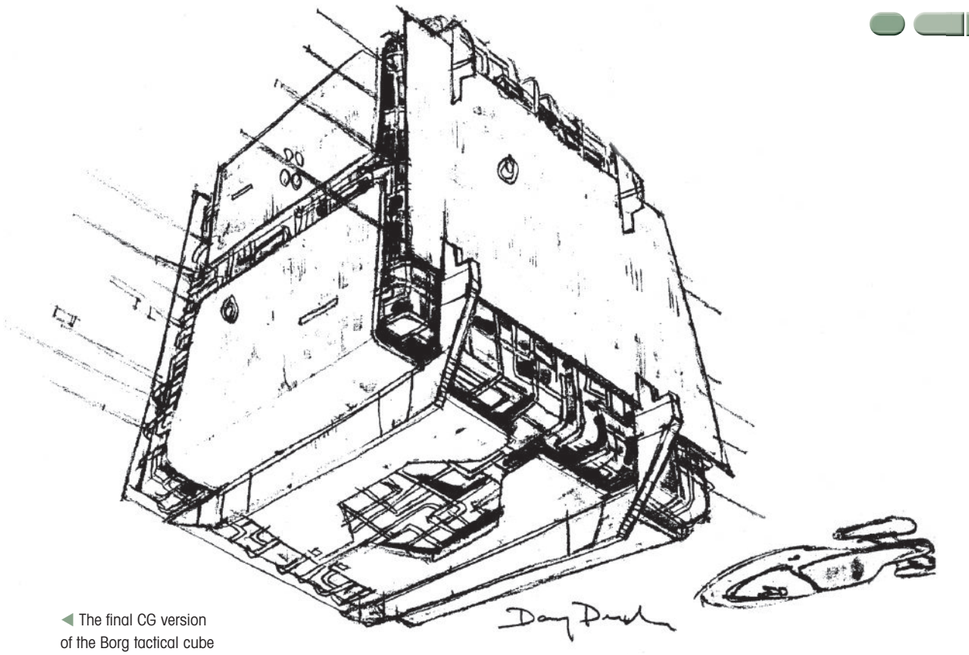
DESIGNING THE BORG III

TACTICAL CUBE

How do you make a Borg cube look tougher and more aggressive? Doug Drexler decided what it needed was a flak jacket.

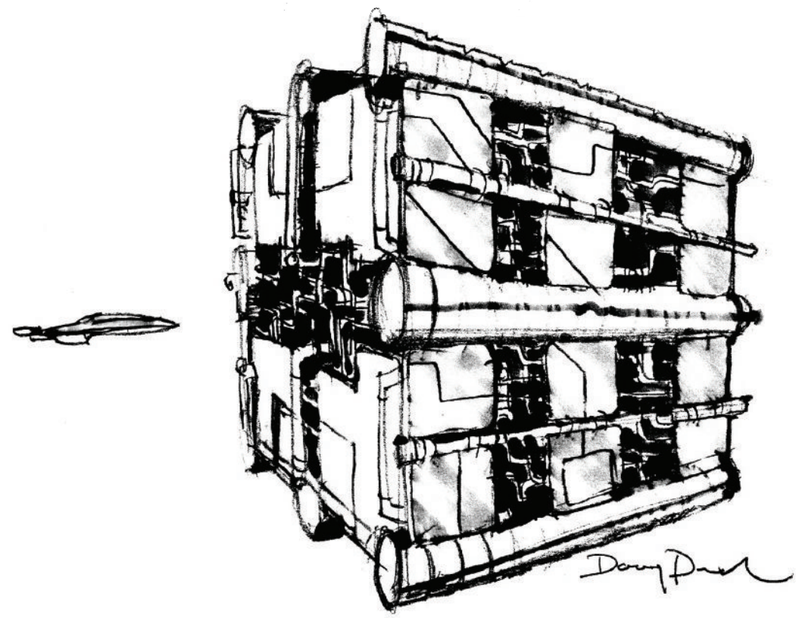
When it was time to design the Borg tactical cube for 'Unimatrix Zero,' the art department had already left on hiatus between seasons, so the job was given to visual effects house Foundation Imaging. Fortunately, their staff included Doug Drexler, who had spent several years in the art department of *STAR TREK: DEEP SPACE NINE* after a spell in the makeup department of *STAR TREK: THE NEXT GENERATION*.

"I was the only guy on the *STAR TREK: VOYAGER* team at Foundation who was a sketcher," said Drexler. "If Rick (Sternbach) was too busy, or the art department had left for hiatus, Rob (Bonchune) or Mojo (Lebowitz)



◀ The final CG version of the Borg tactical cube was built at special effects house Foundation Imaging by Koji Kuramura. He used the texture maps of the standard Borg cube as a basis and then added the parts that Doug Drexler had illustrated in his designs for the tactical cube. Only three sides of the CG cube were built, as this was all that could be seen on screen.

◀▼ Once Drexler had the brief, he produced a dozen or so rough sketches showing some possible directions for the design. Drexler felt that the original design was so iconic and represented the Borg so well that he did not want to add anything too radical or that would give it too much personality. Instead, he decided the best way to make it look more threatening was to add armor.



(*STAR TREK: VOYAGER* effects supervisors at Foundation Imaging) would ask me to bash out ideas. This was the case when I worked in the *DEEP SPACE NINE* art department as well. If John Eaves was busy I would pinch-hit. I enjoyed designing, but I think that I wouldn't have wanted to be the lead illustrator. It was a tough job. This way I got to dabble.

"When Rob told me that they wanted a new type of Borg cube, I was kind of amused," continued Drexler, "After all, a cube is a cube, right?"

With this difficult brief in mind, Drexler sat down and worked up several rough sketches. He said experience had

taught him that this was the best way to work. "I liked to give the producers a bunch of sketched concepts to look at rather than work one idea into an illustrative masterpiece," said Drexler. "It would have been a misdirection of energy. If the idea didn't sell as a sketch, the concept probably wasn't strong enough."

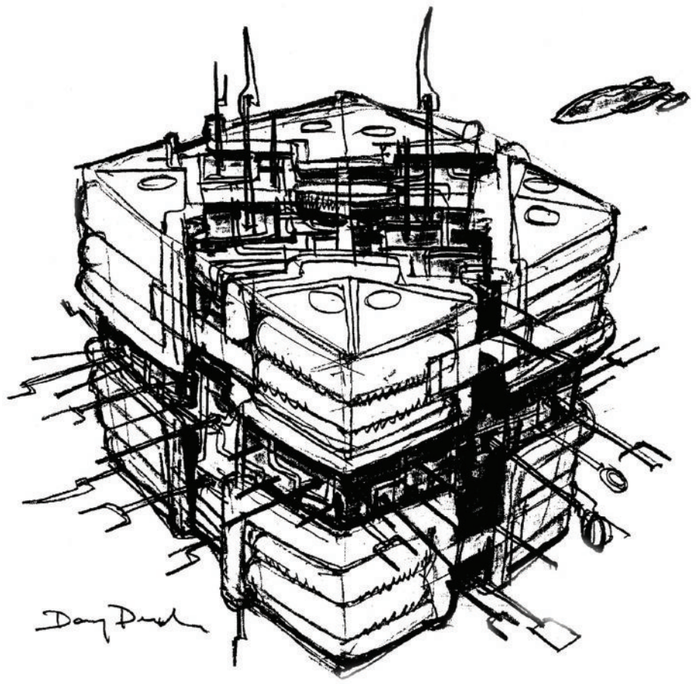
The script didn't give Drexler much help as to what it should look like. As he remembered, it simply called for a "barrel cube", which implied that it had to be more threatening than the standard cube. "Ya gotta love that!" said Drexler. "I tried adding a lot of sharp pointy masts, spears and antennas.

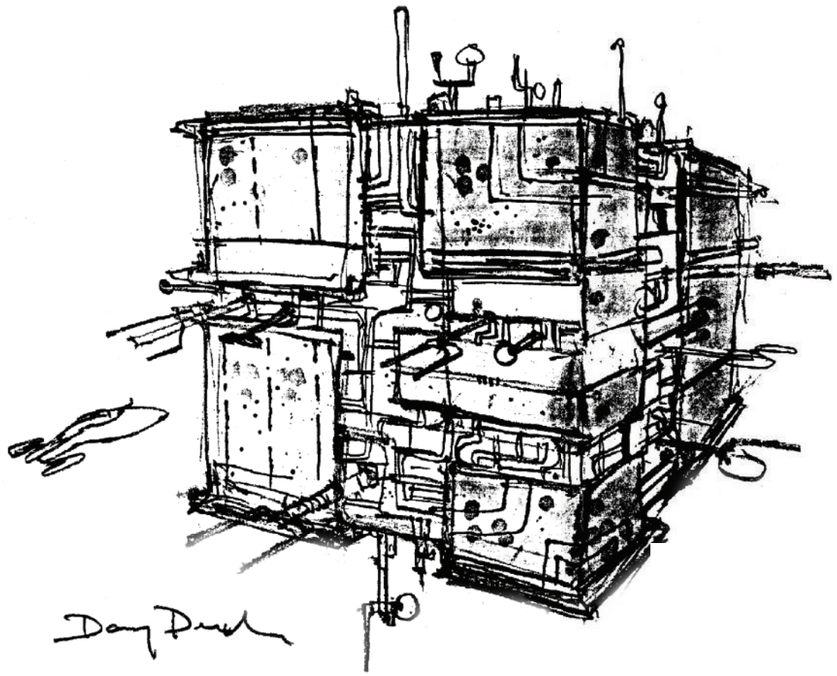
"As a joke I even drew one up that was a pyramid. You know, the UPN (United Paramount Network) symbol ... a square, a ball, and a triangle. At that point, Borg ship design had mainly been a cube and a ball. The pyramid (triangle) would have completed the thing with tongue planted firmly in cheek. I knew the powers-that-be wanted a cube, but I couldn't resist."

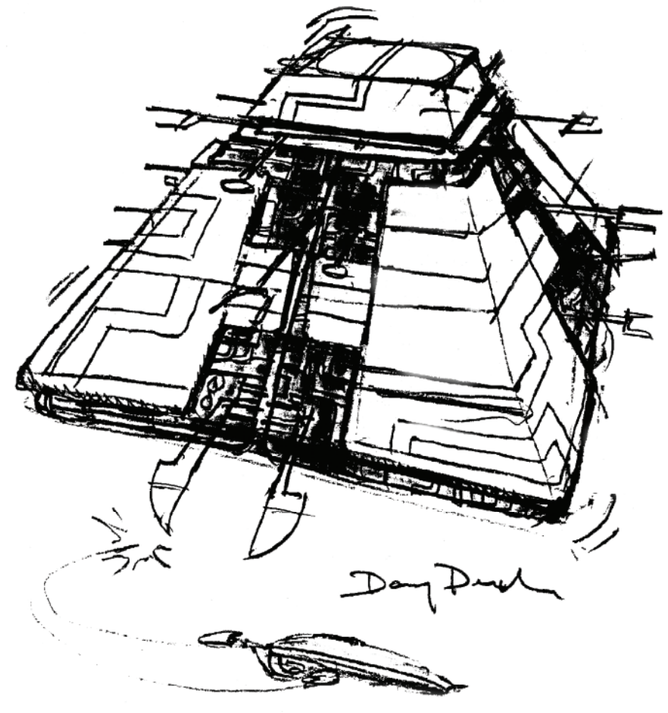
CG MODEL

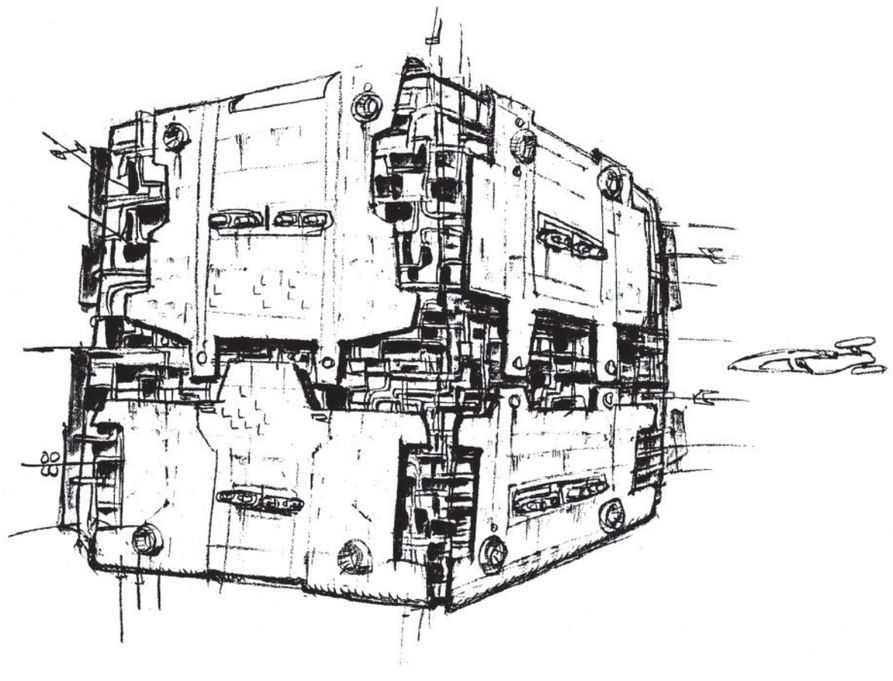
Drexler described the drawing that was chosen as basically "a Borg cube wearing a flak jacket!" Having designed the ship, he handed it on to his friend Koji Kuramura, who built the final model. "Koji sat right behind me," said Drexler. "As he worked, he'd call me over for a look-see and I'd put in my two cents' worth. If he needed clarification or more detailed sketches I would kick a few out for him."

Drexler says that most of the detailing was added at this stage. "You'll notice that my sketches were done in rather broad strokes. They were all there in the model. It was crazy to try and spell out all the mega-nooks and hyper-crannies of a Borg contrivance."





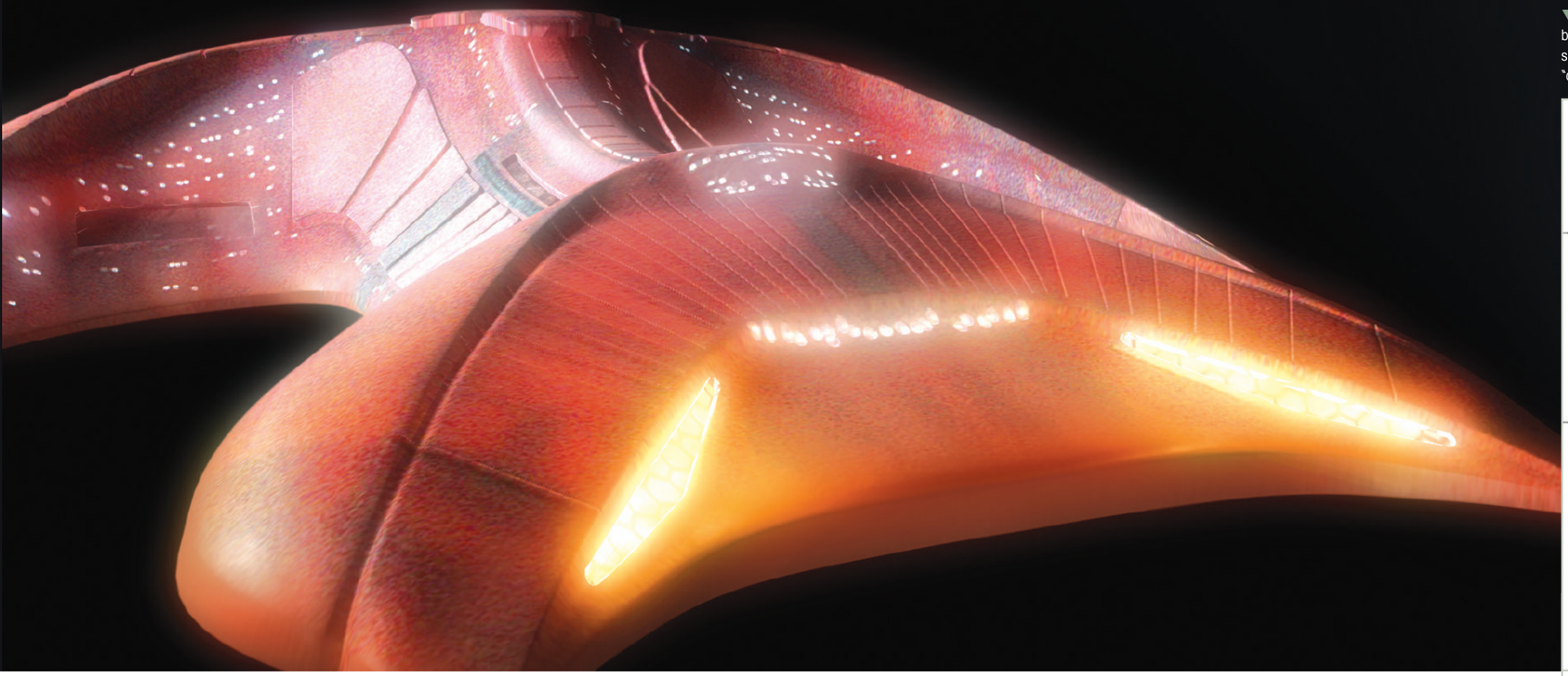




◀ Redesigning the Borg cube was a tough assignment. Drexler likened it to being asked to restyle a basketball – just about impossible. Some of his ideas included adding sharp pointy masts, spears and antennas as can be seen in these sketches. In the end, the producers decided they wanted a much less cluttered design – a decision with which Drexler wholeheartedly agreed.

◀◀ One of Drexler's designs depicted a pyramid. He never expected this to be accepted, but submitted it as an in-joke – making the shape of the different Borg vessels the same as the UPN logo, which consisted of a cube, a sphere and a pyramid.

◀ The design for the tactical cube that was approved by the producers retained the functional simplicity that was the hallmark of previous Borg ships. Drexler said that he liked the idea that the design said nothing about the Borg, while at the same time saying everything.



MARAUDER

The look of the Ferengi *Marauder* was inspired by a horseshoe crab and an earwig to help give it a suitably intimidating appearance.

The very first all-new alien ship to appear on *STAR TREK: THE NEXT GENERATION* was the Ferengi *Marauder*. It was designed by senior illustrator Andrew Probert in 1987, who at that time had recently devised the look of many of the props and sets for the show as well as designing the *U.S.S. Enterprise* NCC-1701-D.

The Ferengi had largely been developed by writer and co-producer Herbert J. Wright, who wrote the teleplay for 'The Last Outpost,' the first episode to feature the Ferengi. Inspired by a horseshoe crab he had sitting on his desk, Wright described the Ferengi ship as "a strange horseshoe crab-like design, a bit smaller than the *Enterprise*."

INSECT INSPIRATION

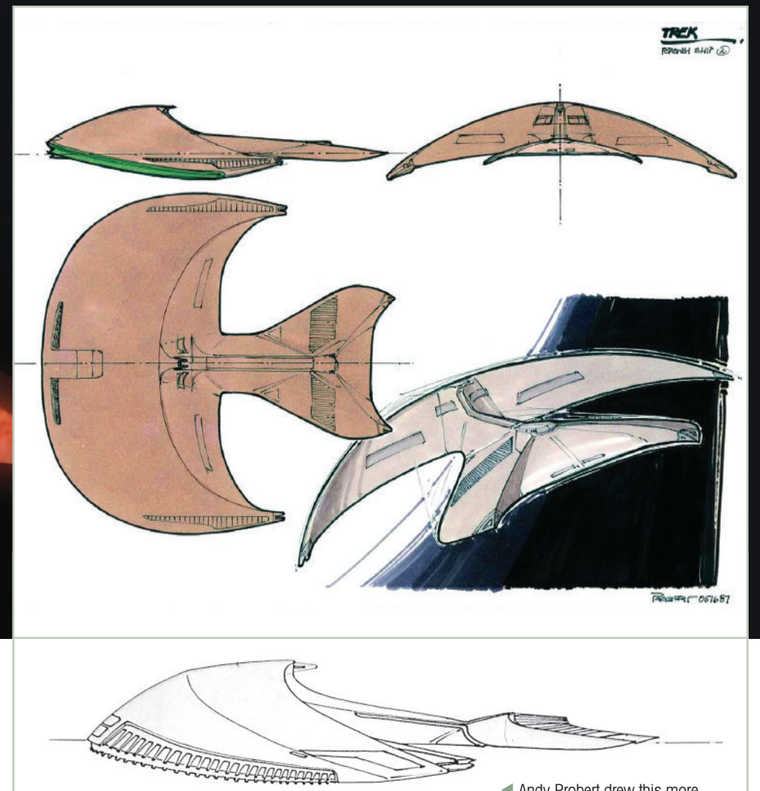
Taking this description as his starting off point, Probert proceeded to illustrate a series of sketches of how the Ferengi ship could look. Describing his design process, Probert explained, "The Ferengi ship I wanted to have not only an obvious shape difference (to the *Enterprise*), but a textural difference as well. The original description of the Ferengi ship was a horseshoe crab design with a neck that would extend. I wanted the front of the ship to look fairly dangerous. Something that seems real dangerous-looking to me are the pincers on an earwig insect. I designed the front of the ship to basically have that shape. The back of the ship is used for cargo storage, seeing as how the Ferengi are traders."

AGGRESSIVE APPEARANCE

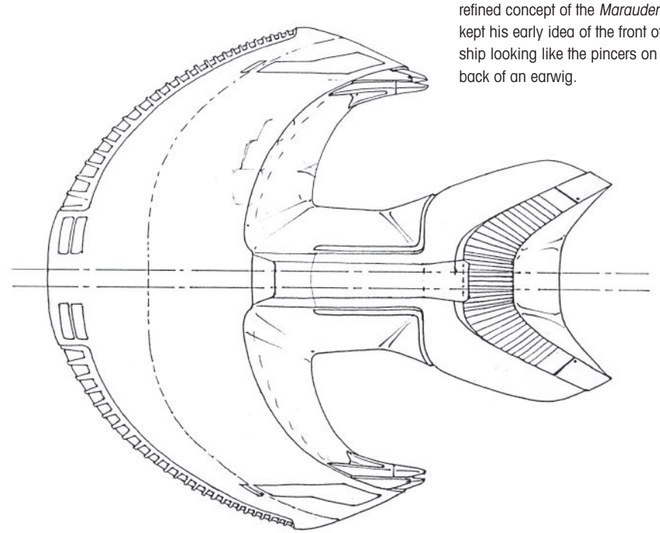
In the early development stages of *STAR TREK: THE NEXT GENERATION* the Ferengi had been devised to be the series' main villains, much as the Klingons had been in *THE ORIGINAL SERIES*. With this in mind, Probert was keen to make the Ferengi ship look suitably menacing and a credible foe.

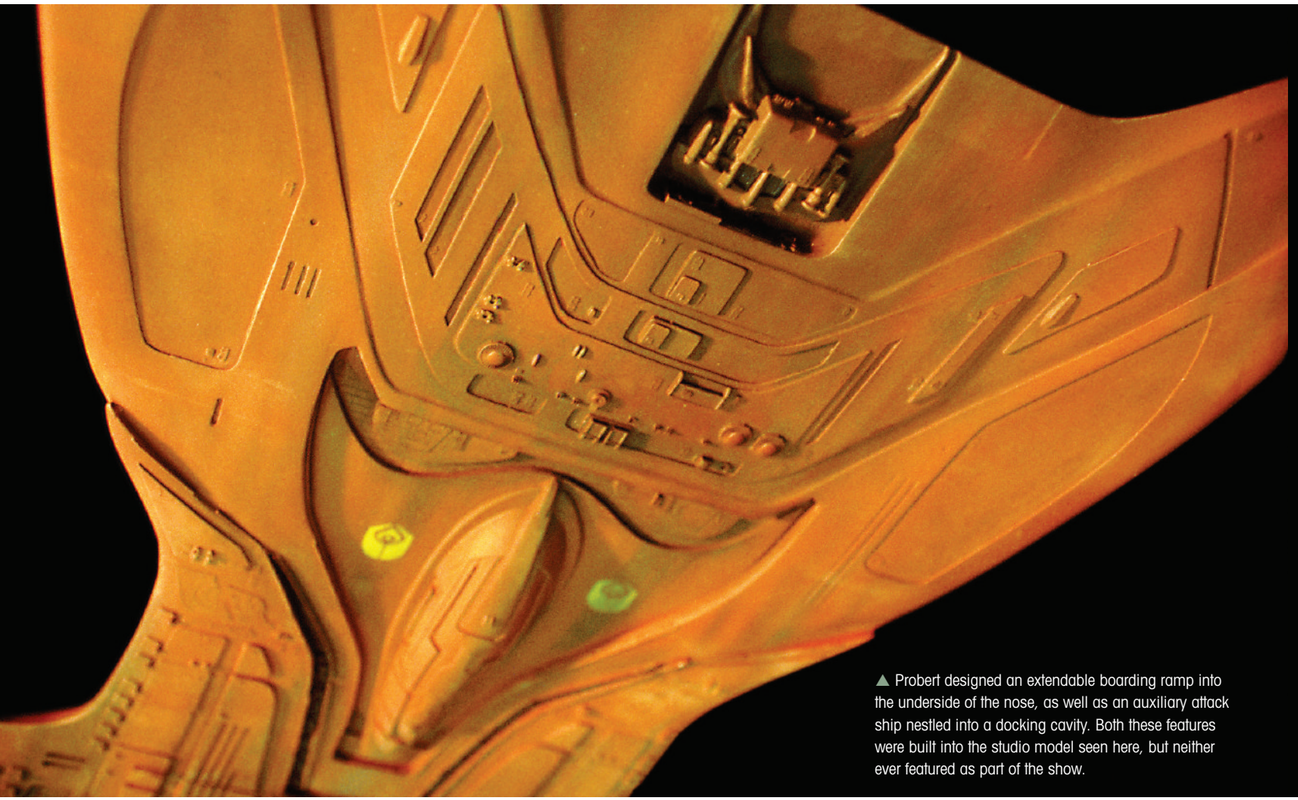
"The Ferengi people were basically space pirates," said Probert, "so I tried to give their ship a threatening look by adding pointed areas at the front, and I had it look dirtier and a little battle-scarred. Then to support the pirate persona, and provide for future episodes, I designed an extendable boarding ramp into the underside of

▼ This was a preliminary design sketch of the *Marauder* by Andy Probert. At this stage he knew that the Ferengi were supposed to be like pirates, and he wanted the ship to look "dangerous" with a clawed front end.



◀ Andy Probert drew this more refined concept of the *Marauder* that kept his early idea of the front of the ship looking like the pincers on the back of an earwig.





▲ Probert designed an extendable boarding ramp into the underside of the nose, as well as an auxiliary attack ship nestled into a docking cavity. Both these features were built into the studio model seen here, but neither ever featured as part of the show.

◀ The primary studio model of the *Marauder* featured intricate hull details that were created with model railroad parts. Scenic art supervisor Mike Okuda added the Ferengi insignia that stems from a design literally meaning "dog eat dog" and it was colored green for greed, envy and the color of money.

the ship's nose, with a clawed front that could be used on raids. Another feature I designed into the *Marauder* was a large attack ship nestled into an underside docking cavity. This forward-swept wing 'drop-ship' could land for planetary raids or maneuver in space".

Once Probert's design for the *Marauder* had been approved, the actual studio model of the ship had to be built. By this point, 'The Last Outpost,' the episode that featured the *Marauder,* had been moved up the running order, and the only person able to build the model in the shortened time frame was Greg Jein at his recently opened model shop in California. This was his company's first *STAR TREK* commission and he was determined to do a good job.

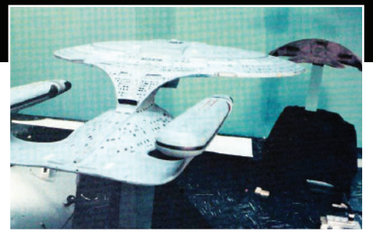
Describing the build, Jein said, "The Ferengi ship was basically an organic shape, so we chose to carve it out of foam rather than clay. Once the hard foam was vacuformed over it, which gave us a nice removable shell, we detailed those shells with model railroad parts and some pin striping tape".

ARTICULATED NECK

To complicate matters, the script for 'The Last Outpost' described a scene where the Ferengi vessel surrendered by stretching its neck, pushing its prow and 'arms' out from the main body and revealing its sensitive areas. This added feature made the construction more difficult, as STAR TREK's VFX coordinator Gary Hutzel explained.

"On top of everything else there was supposed to be this articulation. Well, of course, we were trying to knock this stuff out in an incredibly short time. We're literally talking about a situation where hours made the difference. The art department came up with drawings, and Greg (Jein) did exactly what was required; it was a motion control, articulated ship that had these arms that extended out, but because of the time line, that articulation was never really seen on the show.

"The model worked, but it was too time consuming to shoot it. I remember it had internal lighting, but when we went to articulate the arms it crushed the neon, so the lights all got knocked out right away.



◀ [Inset picture] The primary, articulated studio model of the *Marauder* often proved too time consuming to film, so a smaller, more basic model was built, seen here with the model of the *U.S.S. Enterprise*-D .

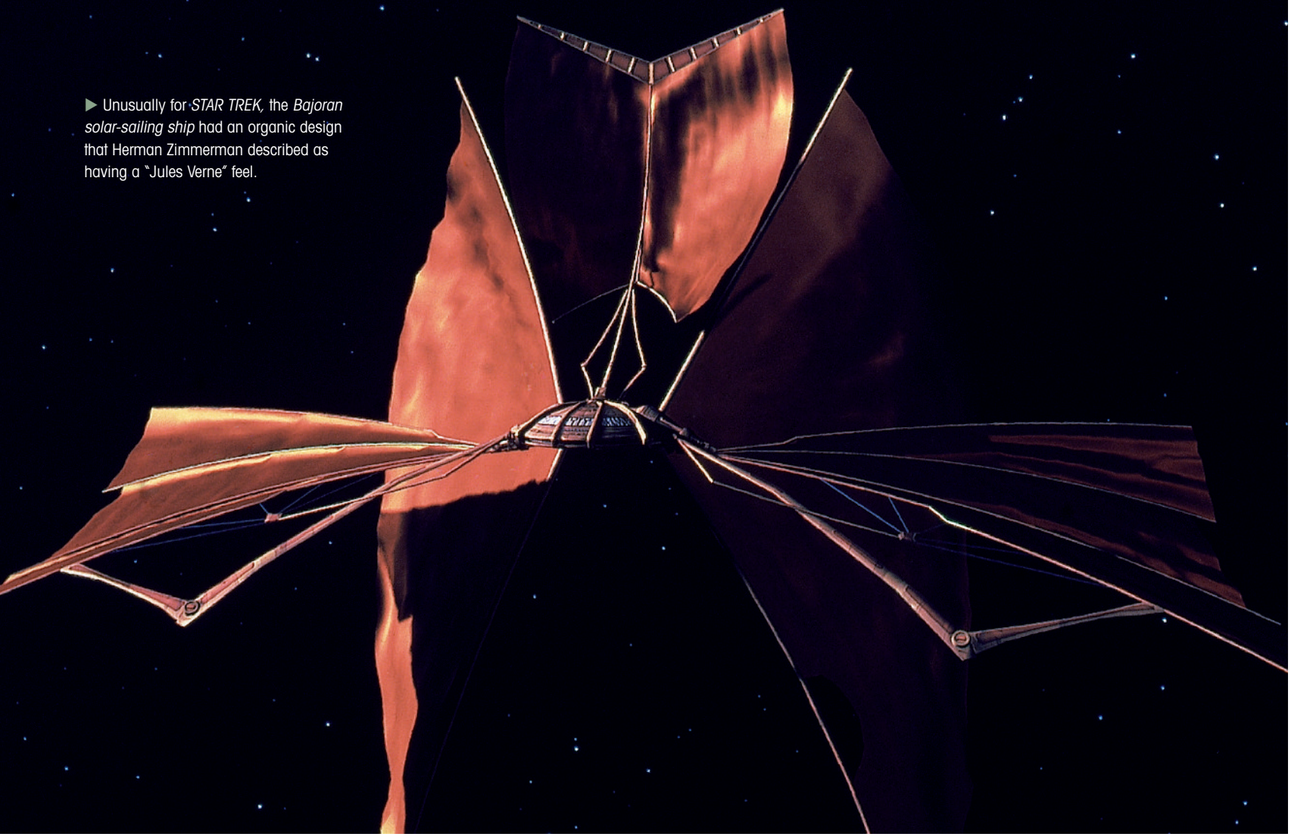
"Because of the problem with the articulated ship, Greg knocked out an additional version that was literally just a casting that he did in a day. We slapped it on a stick, and that's what we used on the show more than anything else. We did end up with a shot where the arms moved a little bit.

"Then, when they finally cut the show together and put it on the air, there was almost none of that left either. From then on, we used this shell, and we never used the articulated one again."

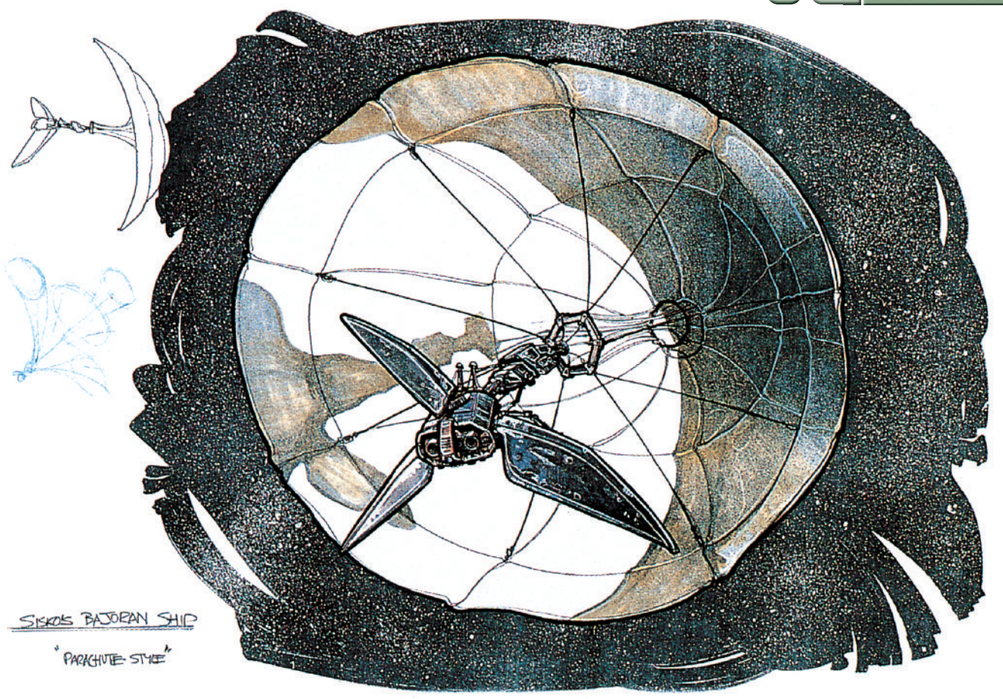
These two models of the *Marauder* were used for filming in a total of six episodes of *THE NEXT GENERATION*, their last appearance coming in the seventh season episode 'Force of Nature.'

CGI MARAUDER

The *Marauder* did not appear again until the *STAR TREK: VOYAGER* episode 'Inside Man,' by which time physical studio models had been replaced by CGI. The task of creating the CGI model of the *Marauder* fell to Brandon MacDougall, who worked for the effects house Eden FX. The studio model was shipped over to him so he could perform an exact rendering of the ship. After this, the original studio model of the *Marauder* remained crated up until it was sold at auction in 2006 for $18,000.



▶ Unusually for *STAR TREK*, the *Bajoran solar-sailing ship* had an organic design that Herman Zimmerman described as having a "Jules Verne" feel.



▲ Jim Martin began by sketching out a few different ideas showing how a solar-sailing ship might work. One of his first ideas involved using a parachute-style device attached to the front of the ship.

DESIGNING THE III

BAJORAN SOLAR-SAILOR

The Bajoran solar-sailing ship was a radical design departure that owed as much to Jules Verne as the *U.S.S. Enterprise*.

The Bajoran solar-sailor ship was one of the most unusual and elegant vessels to appear on *STAR TREK*. It was specially designed for the third season *STAR TREK: DEEP SPACE NINE* episode 'Explorers'. In the story, Sisko found the plans for an ancient craft in a Bajoran library and decided to build one to prove that it could make an interstellar journey.

The solar-sailor had its origins in Bajor's past, and because it used solar winds for propulsion, the art department knew that it needed to look quite different from anything they had designed before. Fortunately, as concept artist Jim Martin remembered, they had some advance warning and time to prepare.

EXTRA TIME

"Normally when there's an element in a script that is going to need some special design we will find out from the writers very much ahead of time, maybe two to three weeks," said Martin. "They'll let us know that something like the Bajoran solar-sailor is coming down the pipe so we have more time to start coming up with ideas. We found out from René Echevarria, who wrote the script, that this was going to be a father/son episode with Sisko and Jake, and they were going to make a solar-sailor. It got us excited."

Normally when a ship was only needed for one episode there was little scope to design anything special, but this time, Martin said, the brief allowed them to be creative.

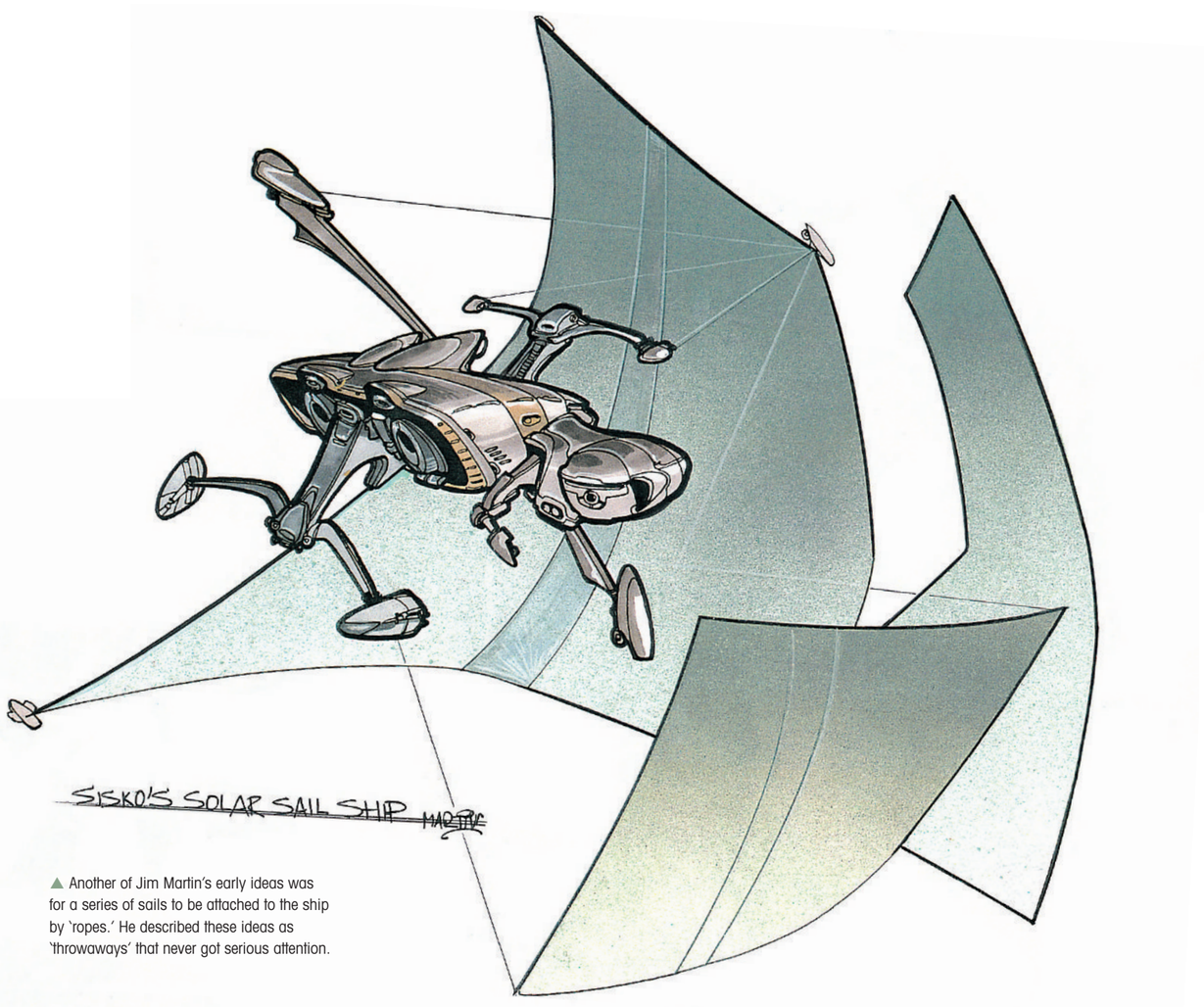
"There's a lot of recycling of ships that have been used before, dressed differently for different cultures, so there isn't really a chance to do a lot of new things if it's just going to be a one episode ship," said Martin. "But, because this was very specific about what the design had to be, we needed to come up with something new – it was a nice treat."

As production designer Herman Zimmerman explained, he and Martin began by thinking how a solar-sailing ship would work. "The original script talked about a means of propulsion which uses the ions in space to propel a craft, which would in layman's terms be the solar wind. The writer indicated that the ship was propelled by huge expanding solar sails that took advantage of the direction of the wind similar to the way a sailboat works on the oceans of the Earth.

"It was a fairly direct approach except that in space you're not sailing on a fluid that's underneath you, you're sailing in a hydrogen-enriched vacuum; in space that is all around you, so the sails couldn't be just above the ship – they would have to be deployed outward in a circular fan shape."

SCIENCE & FANTASY

Knowing that he had to incorporate these sails, Martin sat down and began to sketch out some ideas. He says that at first he tried to come up with a ship that was scientifically practical. "We did do some things with very large sails," said Martin, "because, obviously, a solar-sailor would need massive solar collectors to even be feasible." Then, during the pre-production process, the producers made a subtle modification to the way the ship worked; instead of



▲ Another of Jim Martin's early ideas was for a series of sails to be attached to the ship by 'ropes.' He described these ideas as 'throwaways' that never got serious attention.

being propelled by ions, which really exist, it used tachyons – hypothetical faster-than-light particles that were often used in *STAR TREK* episodes.

The change may not seem that important, but it had a major influence on the design. Since nobody could say exactly how tachyons worked, Martin and Zimmerman felt that they did not have to be too concerned about the science behind how it worked. In fact, they abandoned the whole idea of looking scientific in favour of a more aesthetic, romantic approach. Martin was delighted with this new, more organic direction, which rapidly led to the final design.

ELEGANT BUTTERFLY

"It was a nice change to do something that was more fantasy and less science," said Martin. "This was going to be a ship very much in the fantasy realm, as opposed to the hardware of a starship, so it was always going to be elegant instead of practical. I think my first reaction as an illustrator was to do something symmetrical, and to play on the idea of wings – sails as wings. We did do some different things, but I think that's what everyone was thinking right off the bat, and that's what it ended up being. It's essentially butterfly-like."

Zimmerman explained that they did not consciously set out to make the ship look like a butterfly; it was simply a fortunate accident. "The ship has a very insect-like quality while not being intentionally modelled after an insect. It was a fragile ship from Bajor's ancient past, and that made the challenge very sweet because we were able to go backwards from the future and reinvent what ancient Bajoran science was. That was fun."

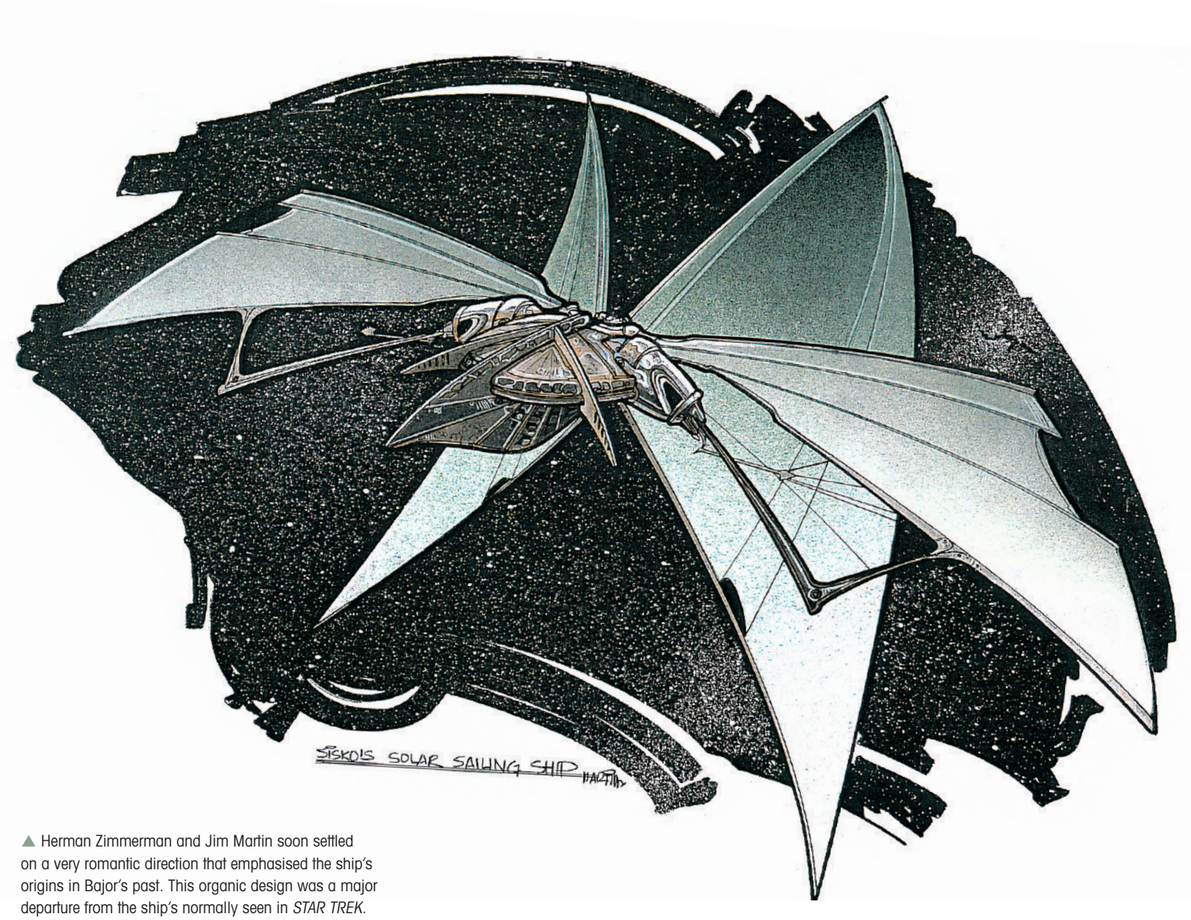
BAJORAN STYLE

That Bajoran design ethic had a profound effect on the finished ship. Martin said, "The Bajoran stuff is gentle and elegant and ornate. Also, it's supposed to be a ship from far in the past; I think as humans we look back on earlier designs and a more elegant age, and you put that into the Bajorans too."

Zimmerman went on to add, "The Bajoran influence made it more romantic; it was kind of a Jules Verne approach crossed with the Bajoran motif, which was basically a combination of Eastern cultures. If you look at the design, you'll see a lot of pierced work where the inside and the outside are the same structure. It's typical, I think, of Japanese architecture to see the structure and not to hide it."

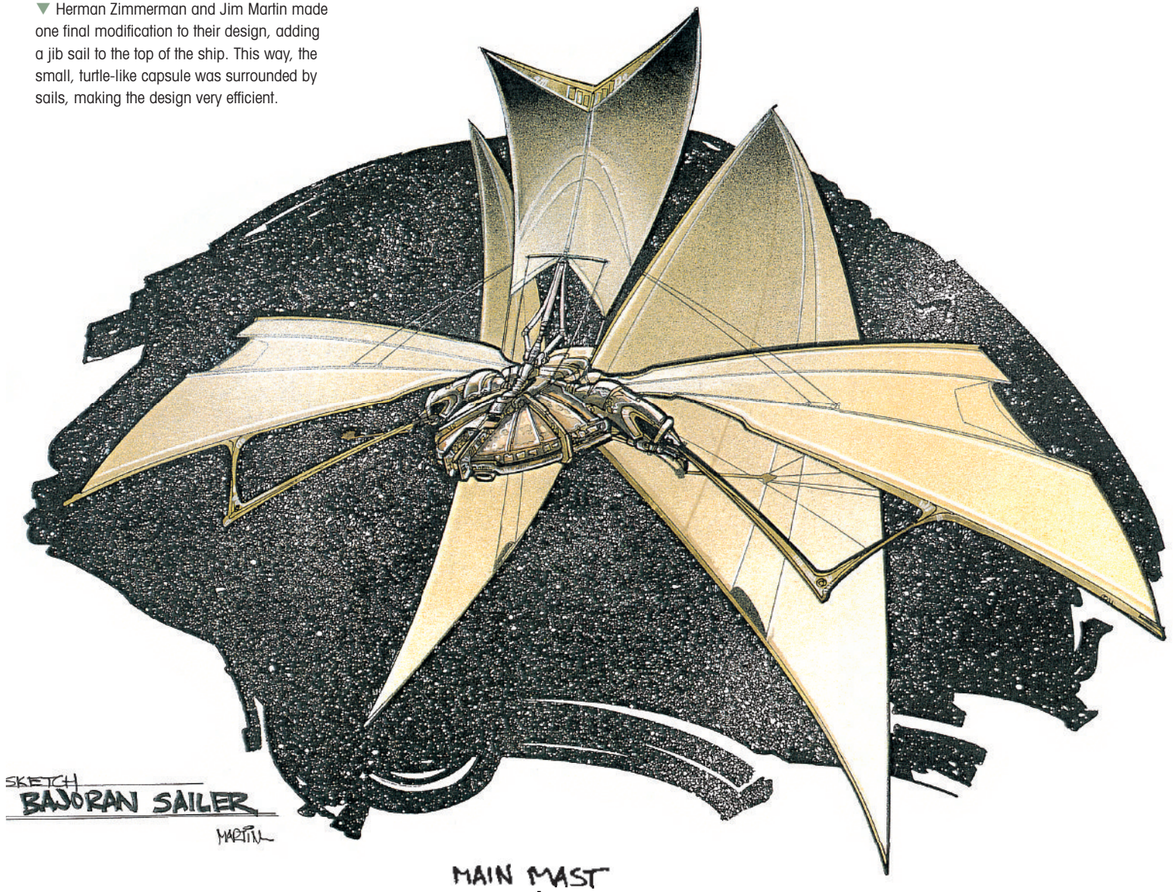
Once the ship had been designed, it was handed over to Dan Curry's VFX team. Although at that point most *STAR TREK* ships were made as practical models, they decided that the best way to handle the Bajoran solar-sailor was to build it as a computer-generated model; this made it far easier to manipulate the sails as they billowed in the solar wind. Martin remembered being particularly impressed with the results this produced.

"One of the really nice touches that the digital people did to it was to have the sails unfold as it launches. We talked about it doing that, but there were never any drawings done for the unfolding in the art department; we just kept saying, 'Yeah, and then it's going to unfold,' and I believe that's because it was in René's (Echevarria) script. So

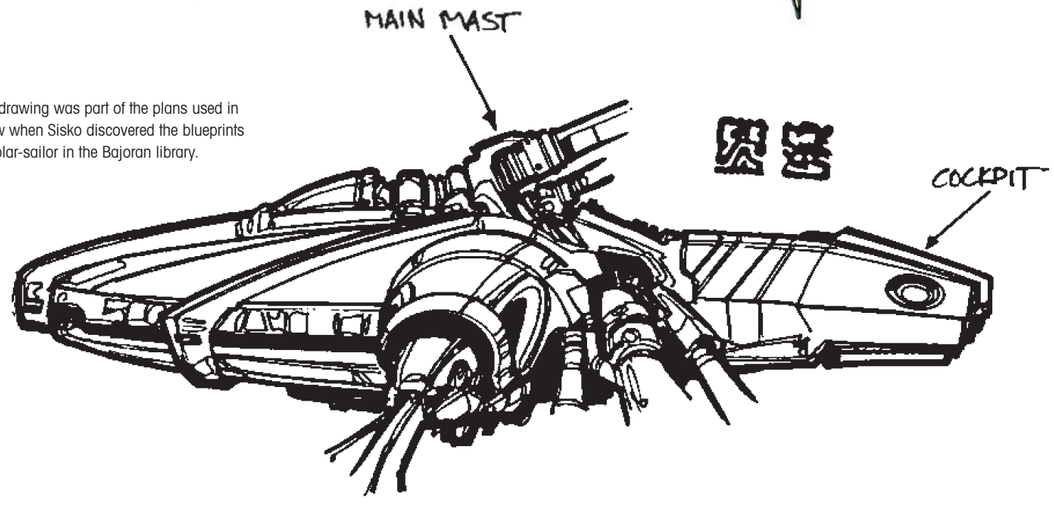


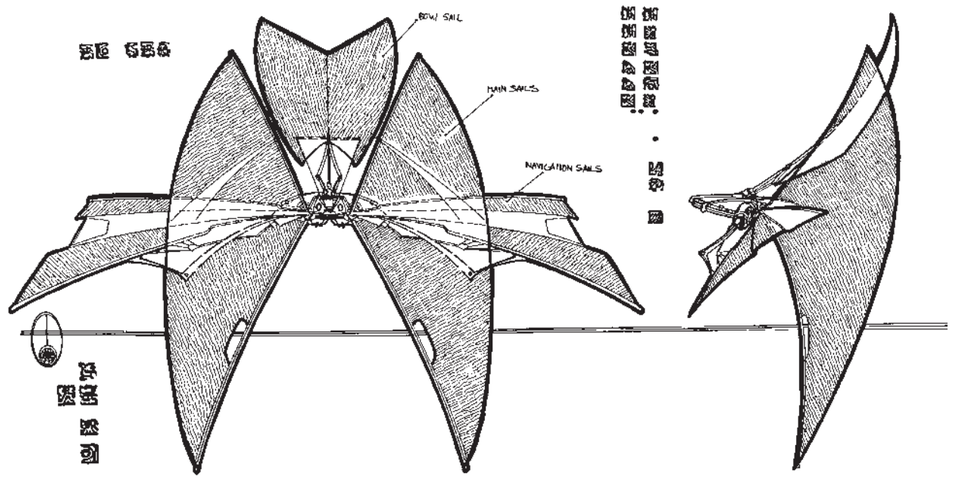
▲ Herman Zimmerman and Jim Martin soon settled on a very romantic direction that emphasised the ship's origins in Bajor's past. This organic design was a major departure from the ship's normally seen in *STAR TREK*.

▼ Herman Zimmerman and Jim Martin made one final modification to their design, adding a jib sail to the top of the ship. This way, the small, turtle-like capsule was surrounded by sails, making the design very efficient.

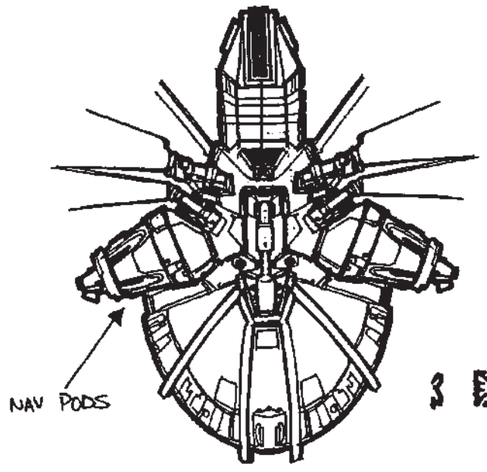


▼ This drawing was part of the plans used in the show when Sisko discovered the blueprints of the solar-sailor in the Bajoran library.

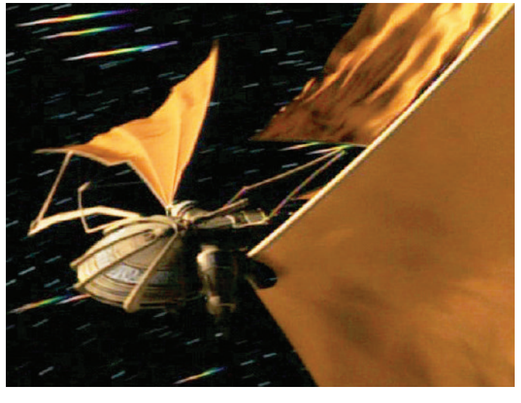




◀ The art department created the plans of the ship that Sisko found in the library by transferring Jim Martin's original drawings and adding some Bajoran symbols, including the ancient text.



◀ The Bajoran plans depicted the main body of the ship on its own minus the enormous sails. Jim Martin described the solar-sailor as being like a "Bajoran turtle with gossamer wings".

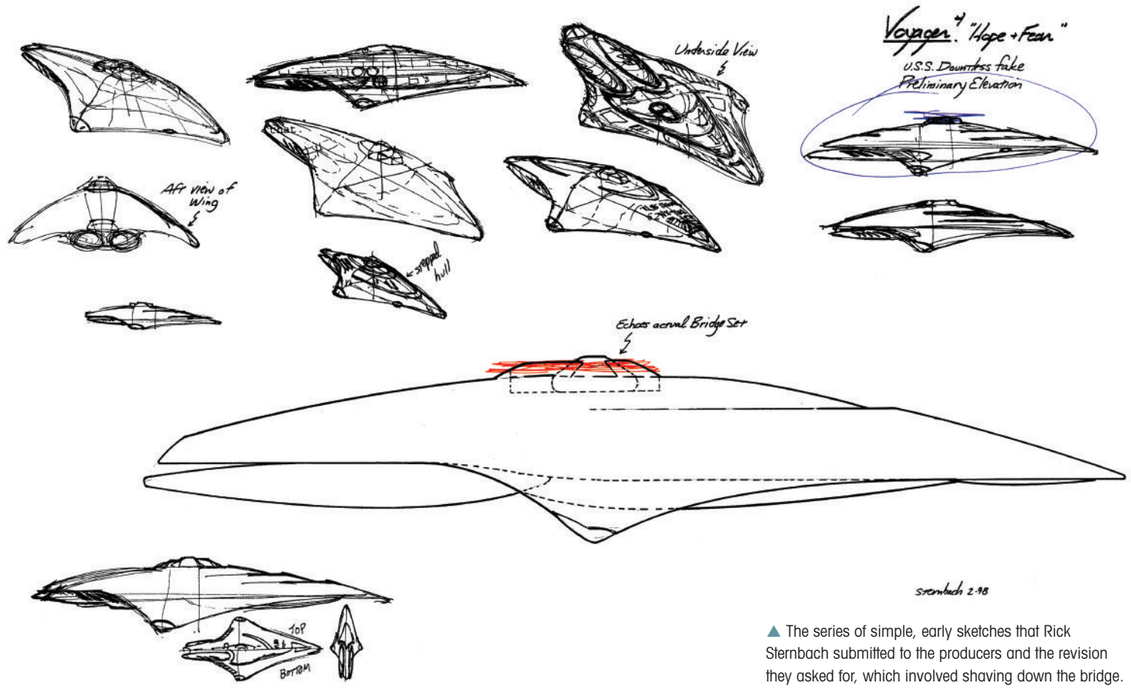


◀ The CGI version of the Bajoran solar-sailor was created by John Knoll at Industrial Light & Magic. The computer effects were particularly good at making the sails ripple and billow.

we didn't address that at all. That was handled entirely by the digital department."

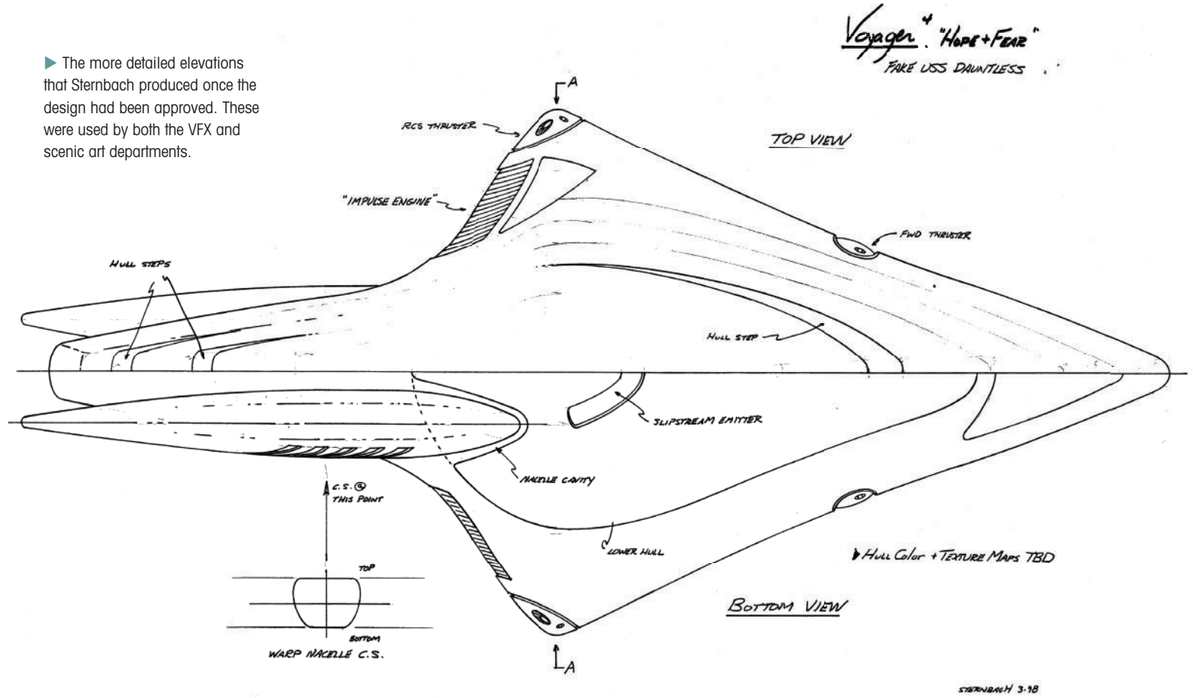
ONE OF A KIND

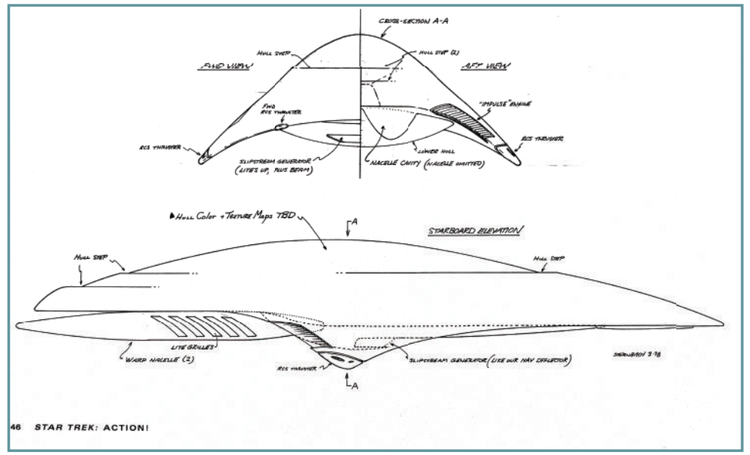
Zimmerman and Martin both named the finished ship as a personal favorite, though Martin said that might be because it was not seen again. "When it's a one-show ship, maybe you like the design a little bit more in one sense because you get nostalgic and think, 'It's too bad we can't use it again.'"



▲ The series of simple, early sketches that Rick Sternbach submitted to the producers and the revision they asked for, which involved shaving down the bridge.

▶ The more detailed elevations that Sternbach produced once the design had been approved. These were used by both the VFX and scenic art departments.





▶ As always, Sternbach's drawings identified the important components. Note the slipstream generator is at the front of the ship and could easily be mistaken for a navigational deflector.

DESIGNING THE III DAUNTLESS

The mysterious ***Dauntless*** had to look like the most advanced Starfleet vessel you could imagine, even though it was created by aliens.

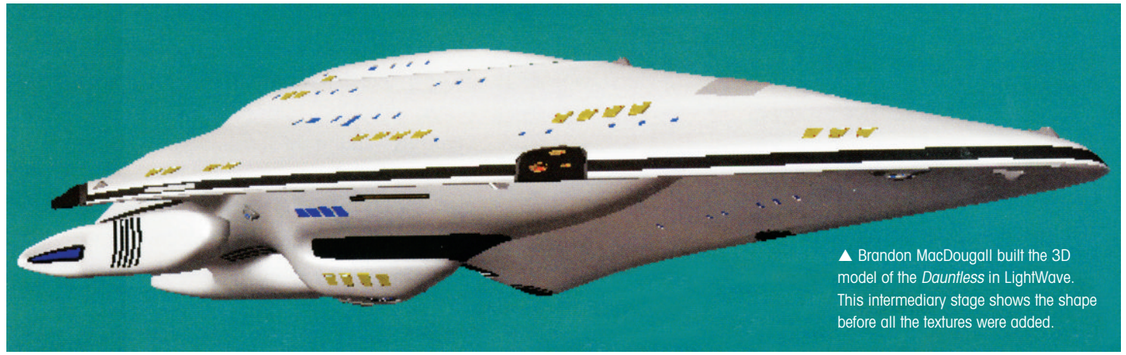
The design process for a *STAR TREK* ship almost always started with the script. The writers rarely provided much information – there were just a handful of lines that told the art department the impression the producers wanted the new ship to create. The script for the *VOYAGER* episode 'Hope and Fear' described the *Dauntless* as "a starship glowing with power and hanging in space. It is sleek and bullet shaped, as though built for speed, and is roughly half the size of *Voyager*." The rest was left to senior illustrator Rick Sternbach. Of course, as he recalls, after he knew the plot of the episode, he had a little more to go on.

"The *Dauntless* was another of those tempting bits of get-home technology that turned out to be too good to be true for the *Voyager* crew," Rick explained. "In the script it was revealed that rather than being a Starfleet ship, it was an alien ship disguised by a crafty being called Arturis in order to exact revenge on the crew for their decision to throw in their lot with the Borg."

Since the plot depended on Janeway and her crew believing the ship could have been sent by Starfleet, Sternbach knew he had to create a design that looked as if it could have come straight out of the Starfleet shipyards. And, since it had cutting edge faster-than-light engines, he felt that it should feel more advanced than anything we had seen before. "It had," he explains, "to look as if it was built after ships like *Voyager*, *Equinox* and *Prometheus*, with no hints that an alien was behind it."

That dictated the styling and a lot of the surface. "Most of the shapes and details had to be consistent with known (Starfleet) designs right down to hull plating, thrusters and identifying markings like the name and registry number." But Sternbach still had to work on the basic shape, and the request for it to look fast presented a challenge. "Making it look built for speed was a bit of an issue. How do you make a ship look fast? I'm not even sure that Fed ships do look fast. They look cool but not fast exactly. In any sort of science fiction spacecraft design, like automobile or aircraft styling, there are certain shapes that say sleek and fast. Most of those shapes are simplified and pointy. Most Starfleet ships do not adhere to visually obvious aerodynamics shape rules, but once in a while we evolve the designs a bit to appear sleeker and faster. So the design for the *Dauntless* got smoother and pointier."

Sternbach came up with a design where the primary saucer section was reminiscent of an arrowhead, a little like the *U.S.S. Prometheus*. To make the outline as smooth and sleek as possible, he blended the two hulls together and tucked the twin warp nacelles under the engineering hull. As is standard on Starfleet ships, he put the bridge on top



▲ Brandon MacDougall built the 3D model of the *Dauntless* in LightWave. This intermediary stage shows the shape before all the textures were added.

of the ship. That just left the one new addition: a slipstream drive emitter, which Sternbach placed on the underside of the ship, where it looked like a large navigational deflector. "It would have been easy to try and do something new with the slipstream emitter, but at the end of the day it was nothing more than a device to get from point A to point B very fast."

Four days later, Sternbach handed over a variety of rough sketches of the exterior of the ship to supervising producer Peter Lauritson. One was duly chosen and returned to Sternbach with requests for alterations.

REFINING THE DESIGN

"The main change was the prominence of the bridge on the exterior," recalls Sternbach. "The producers wanted it shaved off at the top, so I smoothed it over. At the same time I roughed out a cross sectional view for the scenic artist to create some backlit graphic designs and then proceeded with the top view, bottom view, side, fore and aft views of the ship. I stepped the bridge in a couple of places, added thrusters and impulse vents and some little chevron shapes on the nacelles."

These more detailed drawings were sent to VFX supervisor Ron B. Moore and his boss Dan Curry. By this point, all of *VOYAGER*'s ships were being built in CG and on this episode Moore was working with Computer Graphic Imaging Director Adam 'Mojo' Lebowitz at Foundation Imaging.

"The sketches only showed us one angle of the ship," recalls Moore. "So I told Mojo to generate a 3-D computer model with some sort of skin on it. I didn't care what kind of skin but I wanted to see what the ship looked like rotating around."

VIRTUAL SCULPTING

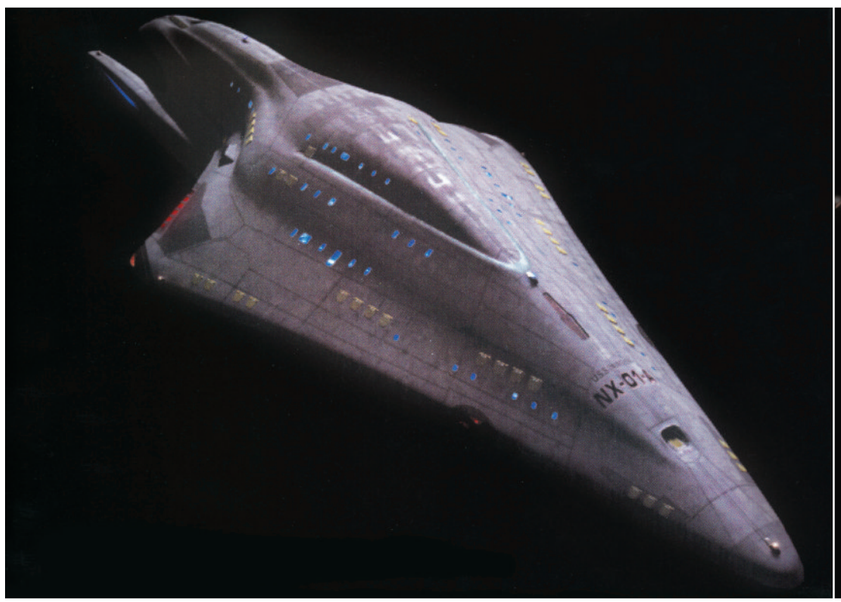
"Building a computer-generated model is the same as building a physical model kit," Mojo explains. "If you start with a block of wood, you start shaving off pieces until you've got a shape you're happy with. I used a cube and basically modified the shape, shaving pieces off or stretching it out until I had the shape Ron was happy with. Of course using the computer is better than assembling a physical kit, because I can use the 'undo' button!"

On screen the form slowly began to resemble Sternbach's drawings. According to Mojo, "the ship went from looking like a manta ray to looking like a garden trowel." Once that basic shape had been agreed on, it fell to Brandon MacDougall to build a detailed model in LightWave. "Then it was painted and detailed, just like a physical model," Mojo continues. "Details were added, it was airbrushed, windows were put in, lights added as well as big engines, which glowed."

That just left the color of the hull. This time the team took the opportunity to give a slight hint that the ship might not be all it seemed. Instead of the standard Starfleet blues and greys, the ship would have a warmer tone.

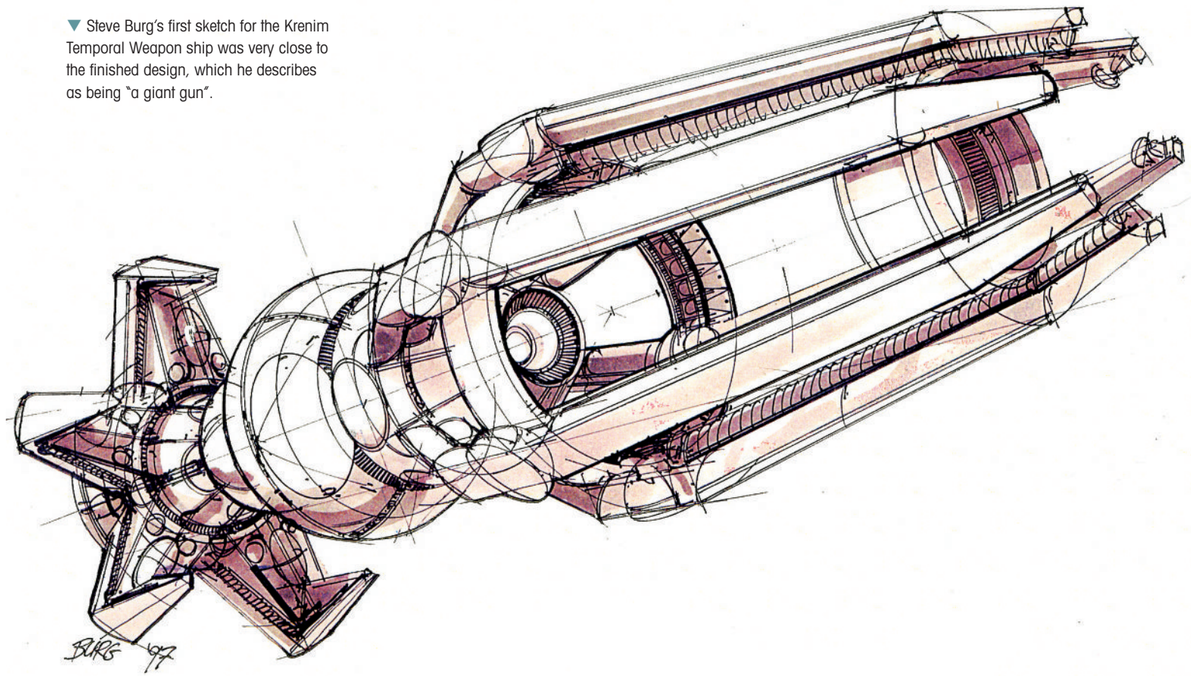
"We narrowed the choices down to five," Moore recalls. "Copper dark, copper gloss, copper light, grey gloss and grey. The grey gloss was the most traditional but I felt that the ship should be a bit more radical. After all, it was supposed to be a very, very modern Starfleet vessel, which was actually alien technology. I favored copper light, but the final color chosen was a grey with a copper hue."

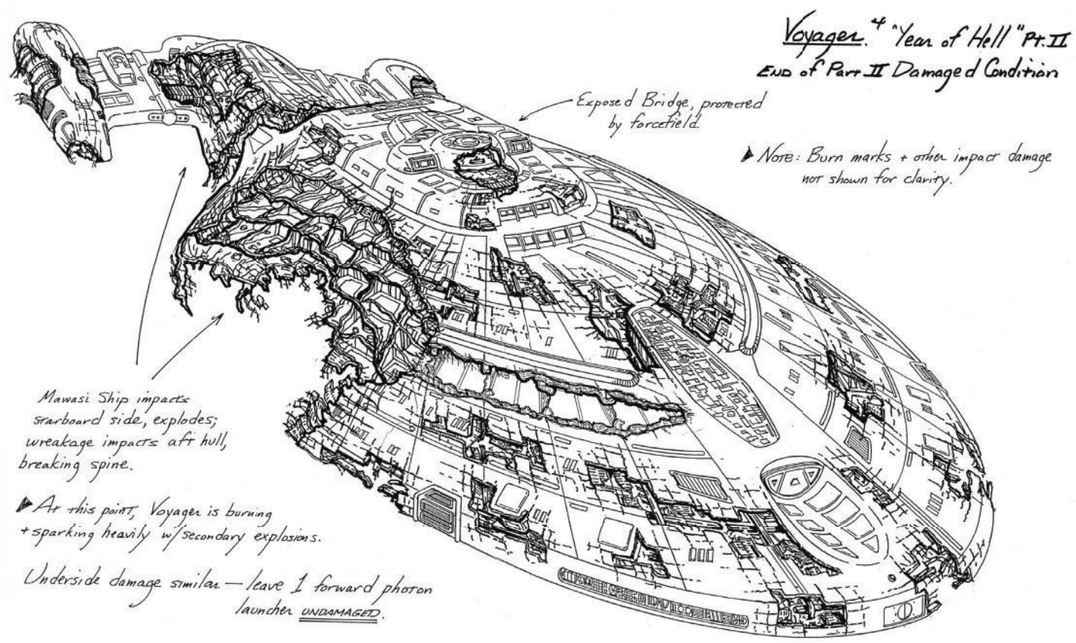
The final *Dauntless* is something of an oddity — the Starfleet ship that isn't a Starfleet ship at all. But to Sternbach's mind, the way it was designed means it provides a genuine glimpse of the future of Starfleet design.



◀ In order to give the audience the slightest clue that the *Dauntless* was actually an alien vessel in disguise, the VFX team experimented with different color schemes, from the traditional Starfleet blue/grey (far left) to different shades of copper.

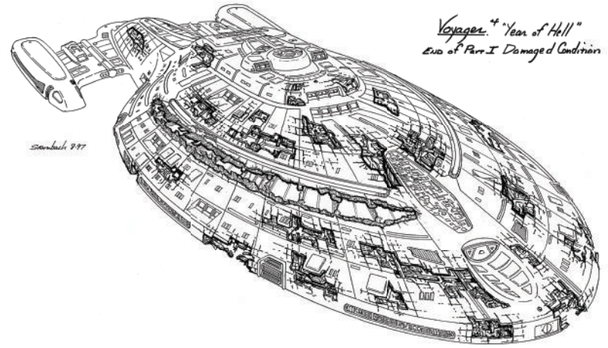
▼ Steve Burg's first sketch for the Krenim Temporal Weapon ship was very close to the finished design, which he describes as being "a giant gun".





DESIGNING THE III KRENIM WEAPON

▶ Rick Sternbach produced a series of drawings showing the different levels of damage *Voyager* would endure. Exactly how damaged it would be at each stage was discussed with the writers.



With the Krenim using their ship to play havoc with the timelines, the art and VFX teams had a chance to inflict some serious damage...

As with so many stories, 'Year of Hell' began with an image – *Voyager* is badly damaged, the hull torn and twisted by repeated attacks. It was something Ken Biller had written into the third season episode 'Before and After', which showed Kes travelling along the timeline. Along the way we glimpsed a damaged *Voyager* for a few seconds. The image and the expression "year of hell" had stuck in Brannon Braga's mind. When the writing staff were discussing the big, midseason story he returned to it.

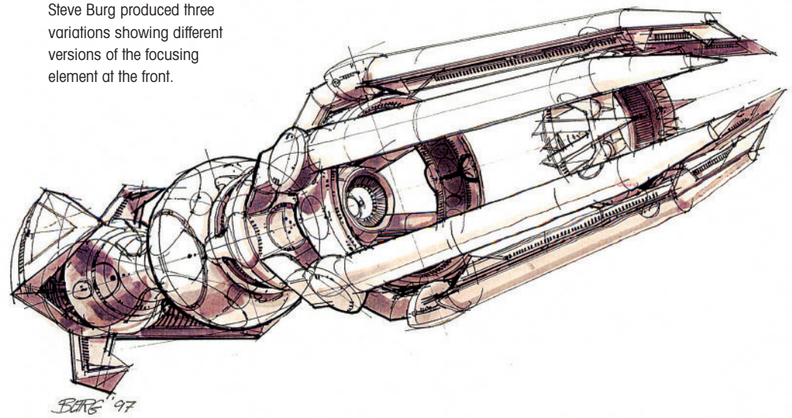
'Before and After' had also established that in the future *Voyager* would be attacked by a race called the Krenim, who used temporal weapons. No one was sure exactly what temporal weapons were so Braga and his co-writer Joe Menosky started to think about how time could be used as a weapon. Braga came up with the idea that the Krenim were using a "Death Star like weapon" which fired a beam that could wipe a planet out of history. The story they developed became the two-part 'Year of Hell' and the two ships – the Krenim Weapon and the damaged *U.S.S. Voyager* would be central to it.

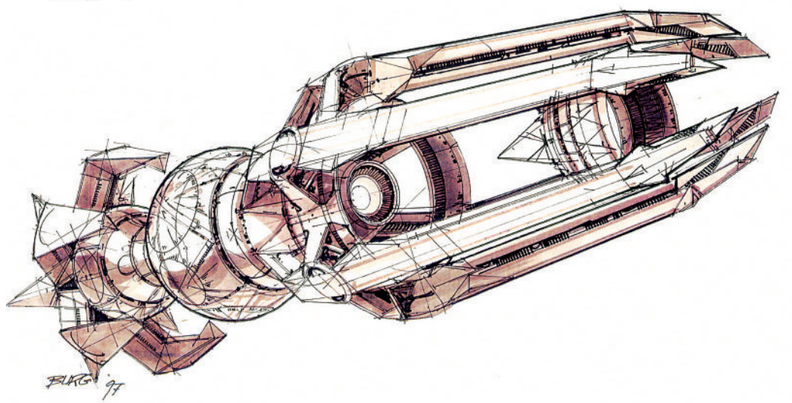
For Braga the central image of the story was a *Voyager* that had been torn to pieces. The task of working out exactly what this would look like fell to Rick Sternbach. Since the damage would involve tearing holes in the hull, it would reveal how Federation ships are constructed. Fortunately, this was something that Sternbach had already devoted a lot of thought to when he co-wrote the *STAR TREK: THE NEXT GENERATION Technical Manual* with Mike Okuda. "In general terms, *Voyager*'s construction is very similar to that of the *Enterprise*-D," Sternbach explains, "we pretty thoroughly worked that out in the tech manual. There's structural framing, outer and inner gamma-welded hull surface layers, room modules, utilities and consumables conduits."

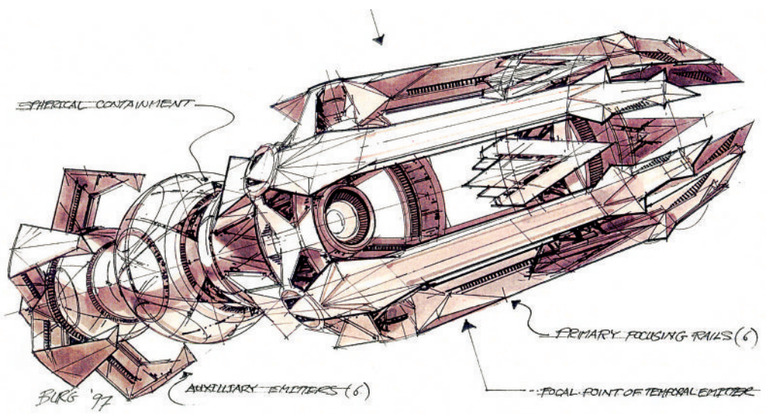
Sternbach produced a series of drawings that showed how *Voyager* would become increasingly damaged as the story progressed. "I made modified photocopy sketches to show the producers what the damage might look like, and give the CG modelers and animators some visual guides for their work. I seem to recall that we didn't completely break *Voyager*'s spine toward the end, though we certainly did tear the ship up quite a bit."

Sternbach's sketches were handed on to Foundation Imaging, where VFX supervisor Adam 'Mojo' Lebowitz headed up the team that would turn them into reality. "Dragging *Voyager* through the coals during an entire year of non-stop combat was music to our ears," he recalls, "but it also meant we

▼ After his initial drawing, Steve Burg produced three variations showing different versions of the focusing element at the front.







would also face our own month of hell, as we did all the work needed to get the two-parter finished on time."

Damaging *Voyager* was one of the biggest tasks the team had to tackle. It actually involved building several new models of the ship, each of which showed a different level of damage. "It fell upon our chief CG modeler Koji Kuramura to build all those versions of the ship. Ultimately we wanted the ship to look like it was ready to fall apart, and Koji's final stage of the damaged *Voyager* was a sight to behold, with interior deck work visible and destroyed crew quarters truly giving off the sense that just one more phaser blast would spell doom for all."

By the end of the second episode *Voyager* was so badly damaged that the roof had been torn off the bridge and the only thing keeping the crew alive was a forcefield. To achieve this the front wall of the bridge set was matted out and replaced by an Eric Chauvin matte painting.

GIANT WEAPON

The other main design challenge was creating the Krenim ship itself. To do this Foundation brought in freelance designer Steve Burg, the man who had designed the Species 8472 creatures and their ships. "Basically," Burg says, "it was a giant gun. It was a time cannon. My thinking was that there was a huge energy core at the back where they would generate power that would disrupt time itself. Then the front is like a giant rail gun that would focus the power."

Burg had started to use 3D software, but admits that at this point his skills were still very basic. He remembers mocking up the basic shapes of the Krenim ship in 3D then tracing over them to add details. As he recalls it, the design went through very few changes, and his drawings concentrated on details such as the shape of the pincers that focused the temporal energy.

▲ One of the damaged *Voyager* models created by Koji Kuramura, who had to build the structure underneath the hull, including the rooms and structural frame members specified by Rick Sternbach.

The model of the ship was built by Foundation's President Ron Thornton. "One of the most striking features of that ship," Mojo explains, "was the front-placed 'time jewel,' the main element that would wipe its victim from time itself. The jewel object was specially constructed as a true CG 'glass' object, so when light passed through it, through ray-tracing it would refract and distort what was seen on the other side, truly giving a sense that it was constructed from alien material."

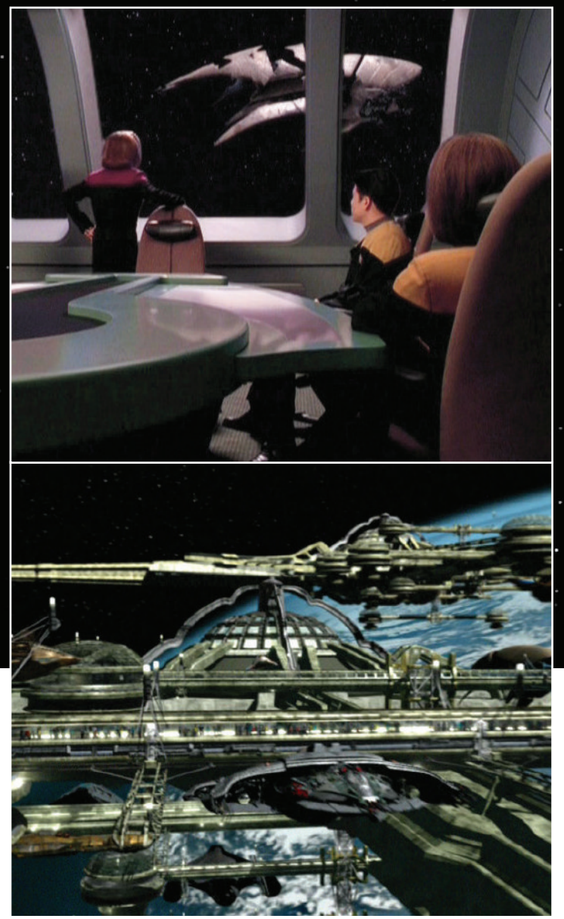
FINAL COLLISION

The finale of the show called for these two ships to crash into one another, wiping the Krenim's actions out of the timeline. "The final battle was one of the most ambitious in the show's history," Mojo recalls. "The ships literally collide, scraping alongside one another and doing damage never before seen. This was one of the most complicated and difficult FX shots we ever attempted, but it started off quite differently. I originally staged the shot as a shocking, fast moment, with the alien vessel literally striking *Voyager* from below and going right through the hull, taking half of it with it. The producers had a different vision for the shot – they wanted to see two massive, Titanic-like vessels slowly scraping up against one another. So it was back to the drawing board.

"With hardly a week left in the schedule I spent a very long day restaging the shot using the low resolution previz models, then it was handed over to top animator Emile Smith. He spent the next week in hell creating the final, truly epic version of the shot, complete with shards of metal and sparks flying in all directions.

"I think this is easily the money shot of the entire episode and the one that put the whole thing over the top. But was it worth a month of sleepless nights for the crew? Well, it resulted in something totally unexpected – the very first Emmy nomination Foundation Imaging would receive for its work on *STAR TREK*."

▶ The Romulan drone was an adapted version of a mysterious ship that *Voyager* encountered in a region of chaotic space. The original design shown here only appears on screen for a handful of seconds.



DESIGNING THE ROMULAN DRONE

▶ The design informally known as 'the flea' made two brief appearances on *VOYAGER* – the crew find a ruined version floating in chaotic space in 'The Fight' and eagle-eyed viewers spotted it docked at a space station in 'Natural Law'.

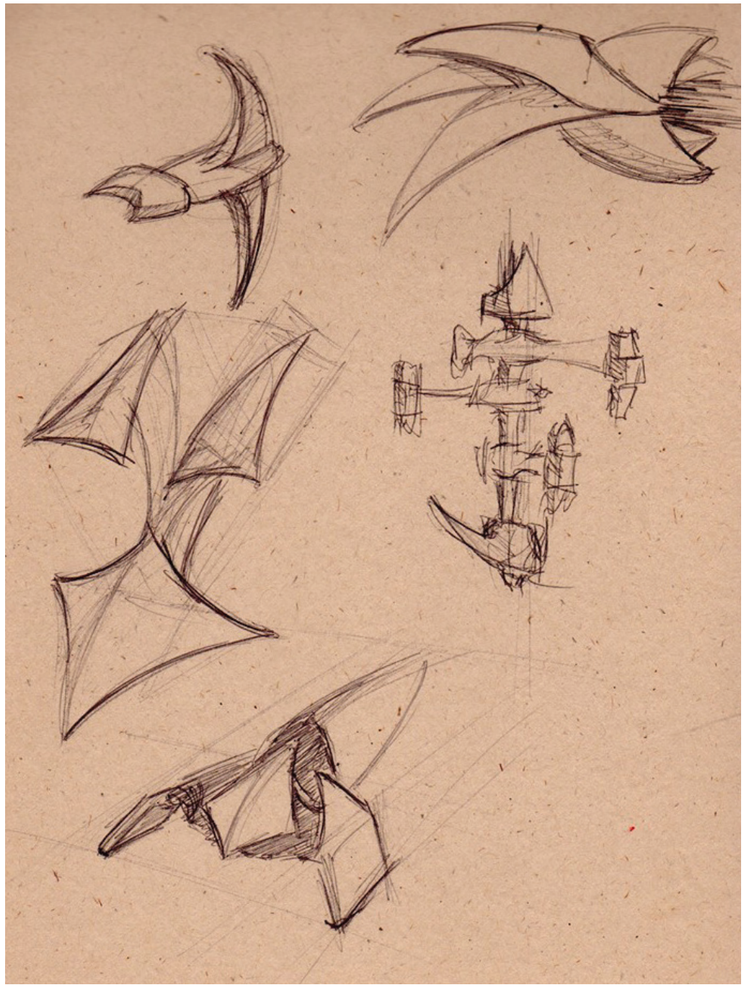
The strange 'flea-like' ship that became the Romulan drone, had a long and complicated journey to the screen...

The Romulan drone started life one Christmas as the VFX team struggled to come up with several different designs for the fourth season *STAR TREK: VOYAGER* episode 'Vis à Vis.' Back then it was rejected, but months later it got finished and used for another *VOYAGER* episode, 'The Fight,' before finally being converted into a Romulan ship in *ENTERPRISE*'s fourth season. It wasn't even designed by the *STAR TREK* art department. Every now and again, the VFX house, in this case Digital Muse, would take on the design of a ship themselves. As Muse's David Lombardi explains 'the flea' was one of ten or so designs that he came with for 'Vis à Vis.' As he remembers, he was excited to be given the chance to design a ship himself, and, from the very beginning, he was very clear about what he didn't want to do. "We always wanted to get in a more alien looking spaceship that didn't look like something that was made by a different human culture – something really, really truly unusual."

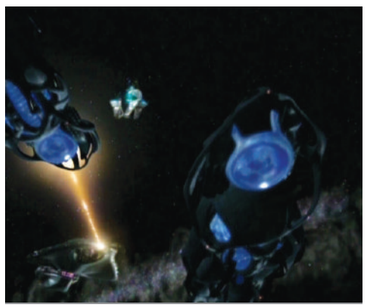
Although he was a CG artist, Lombardi started the process by sketching out some rough ideas on a piece of paper. "I was just kind of playing with shapes until I got to a point I liked. When I got to the one in the upper right corner of the page I went 'Oh there's something here.' It has what I think of as a kind of anime armor shape. There was something about it that was a little bit insecty, but also I really wanted to break away from a traditional nose. I didn't like the idea that almost very ship looked like it was aerodynamic. I remember thinking 'You know the Borg cube wasn't aerodynamic and everyone really liked that!"

Lombardi was also very conscious that a spaceship doesn't need windows. "I'm a big fan of form follows function. The front was going to be this entire array of antennas and sensors instead of a window because why would you have a window in a spaceship when you're using monitors for everything anyway?"

Lombardi went on to produce a couple more sketches that developed the design a little more, one of which



◀ David Lombardi's original sketches for 'Vis a Vis' were produced over Christmas 1998. The version in the top right would go on to become the 'flea'.



▲ The 'flea' was originally going to be one of the ships that tracked down the shapeshifting Steth in the episode 'Vis a Vis'. In the end the design that the producers picked was very different.

want to call them, splay out and it was difficult to work out how they'd look in 3D."

TOO ALIEN

The 'flea' design had been greeted enthusiastically by VFX supervisor Ron B. Moore and his boss Dan Curry, but before Lombardi could finish the design the approach was rejected by their boss, *VOYAGER*'s supervising VFX producer Peter Lauritson, "It was something that didn't fit in the *STAR TREK* universe," Lombardi remembers, "I know Peter Lauritson liked to avoid having ships that look too much like life forms. *STAR TREK* has a very established history of styles of ships, and there are very good reasons for having that consistency."

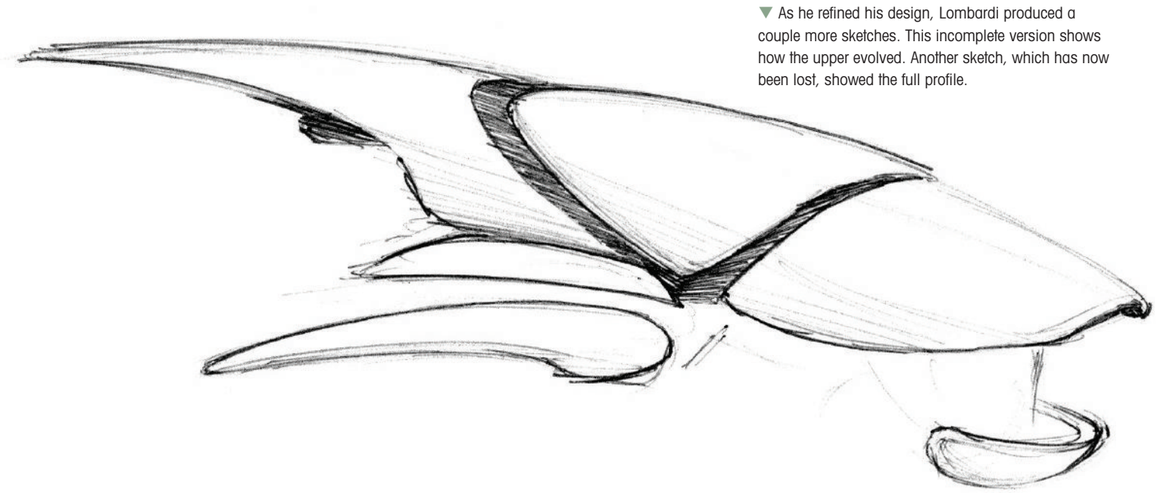
However, the design was revived the following year for 'The Fight' a script that saw *Voyager* trapped in a bizarre area of space that threatened to destroy the ship. "We always figured we'd be able to use the design at some point," Lombardi says. "In 'The Fight' there was supposed to be something that was truly bizarre locked in this strange part of space. You weren't going to see it very clearly – I think it ended up in about four or five shots – so we thought we can kind of get away with it!"

BACK TO THE COMPUTER

Of course, Lombardi had never actually finished building the ship so he went back to his model. "If I recall correctly," he says, "the main body panels had been done and maybe a few little details, but there was no texturing. We decked out all the little kind of little nurnies as we call them – the little spikes and bits and engines pieces and vents and things like that. It was supposed to look like it had had a rough go of it, so the texture had to look a little more corroded on the surface, that sort of thing."

was reasonably detailed. "I remember very clearly taking a brown sheet of paper and doing a profile view of the fully designed flea ship."

But, being a CG artist, it's not surprising that Lombardi turned to his computer in order to finish his design. "I scanned that sketch in and used it as a back drop to trace over and start modeling. I wanted to rough out the build because I think that helped me in the design process a little bit by seeing where things would kind of lay out. In particular the tentacles or the legs in the back, or whatever you



▼ As he refined his design, Lombardi produced a couple more sketches. This incomplete version shows how the upper evolved. Another sketch, which has now been lost, showed the full profile.

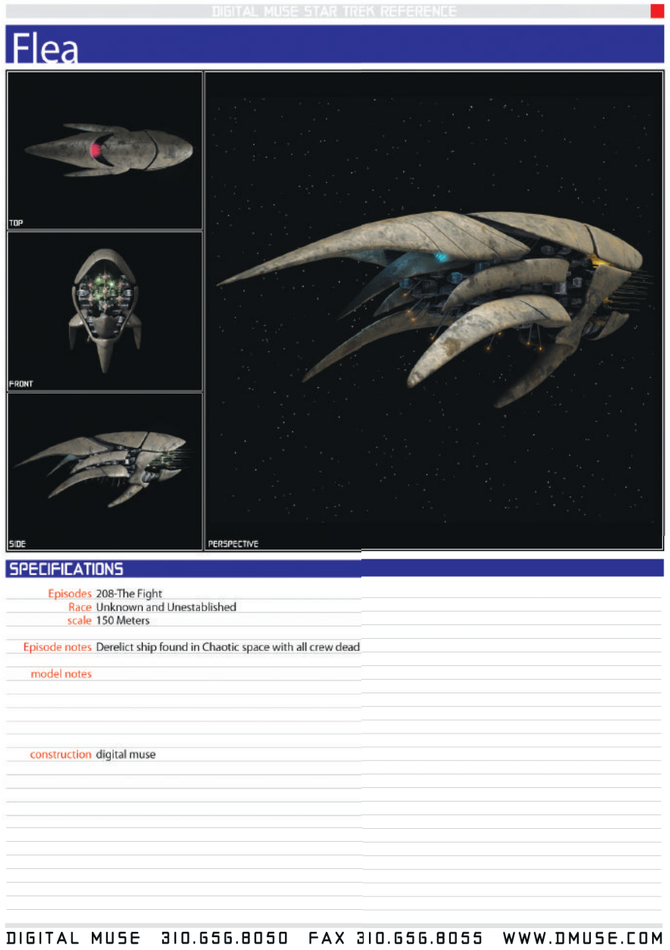
The ship was never even given a name. The files were simply labeled Episode 208 alien ship. It actually made a second blink and you'll miss it appearance in another episode, when it was seen docked at a space station in 'Natural Law.'

Obscure ships that have only made brief appearances always stood a chance of making a comeback in *STAR TREK*. Budgets were always tight and the VFX team would always push to get as much out of them as they could. By the time *ENTERPRISE* was in production, *TREK*'s two favored CG houses, Digital Muse and Foundation Imaging, had merged to become Eden FX. They kept a book that showed all the models they had access to. Whenever the team met to consider what could be done for a new show, it would be pulled out and the producers would look at the models to see what, if anything, they could reuse.

This is exactly what happened when it came to the Romulan drone. Mike Sussman, who came up with the idea of a camouflaged ship, had imagined that it would be a modified Romulan bird-of-prey but the producers wanted something a little different. They figured that since the 208 Alien ship had only been on screen for a few seconds more than six years ago, they could adapt and reuse it.

The art department produced a drawing showing it with a Romulan color

▲ The design was completed for the episode 'The Fight.' The script now called for it to be a dead and battered ship, which influenced the color scheme and texturing.



◀ Obscure ships like the flea always stood a chance of making a comeback because they were preserved in a catalogue that was started by Digital Muse and then maintained by Eden FX. Each ship had a sheet that showed what it looked like, who it belonged to, and where it had been used. If it was sufficiently obscure the producers would suggest modifying the design, changing the colors and giving the ship to another race.

scheme and with the surface covered in holographic emitters. Once this was approved, the drawing was passed on to Rob Bonchune at Eden FX, who pulled out Lombardi's original model and modified it. The way he remembers it, this is where the ship got the name by which it is best known, "I got a sketch of that ship as a Romulan ship. John Eaves (I think) wrote 'FLEA' on it and that's what it became known as. But officially it was the Romulan drone and that is it."

Bonchune could see the logic of using the design for the episode: apart from the fact that it only been on screen for a second or two, the 'flea' looked very different to the ships we had seen before and this was important because the script relied on us not knowing that it was a Romulan ship the first time we saw it.

ALIEN SECRET

"It does have a very organic, alien looking design. When you find out that it's Romulan everyone is pretty surprised, because it looked like something the Romulans wouldn't have, and we made it move in a very different way. It could do these weird flips and turns. It can move the way UFOs do."

The reason for reusing the ship in the first place was to save money so, as Bonchune explains, Eden FX didn't spend too much time modifying it.

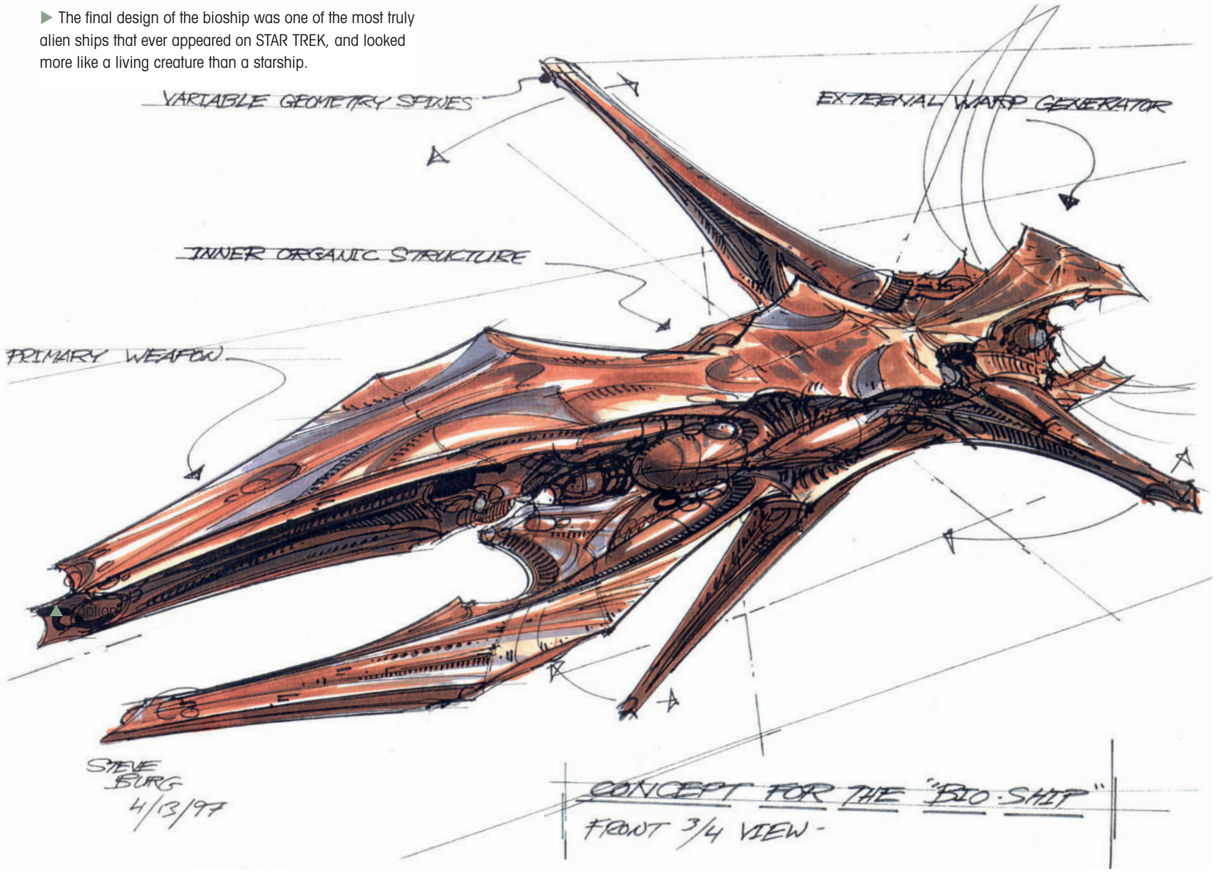
"I could have had our modelers Pierre or Koji do it, but that would have just added to what was on their plates. I was changing colors, adding antennas, and rebooting the lights, without rebuilding it, so I decided to do it myself. All those things were in place. It was really just changing colors. I illuminated some antennas I didn't like and changed the internal lighting."

MORE POWER

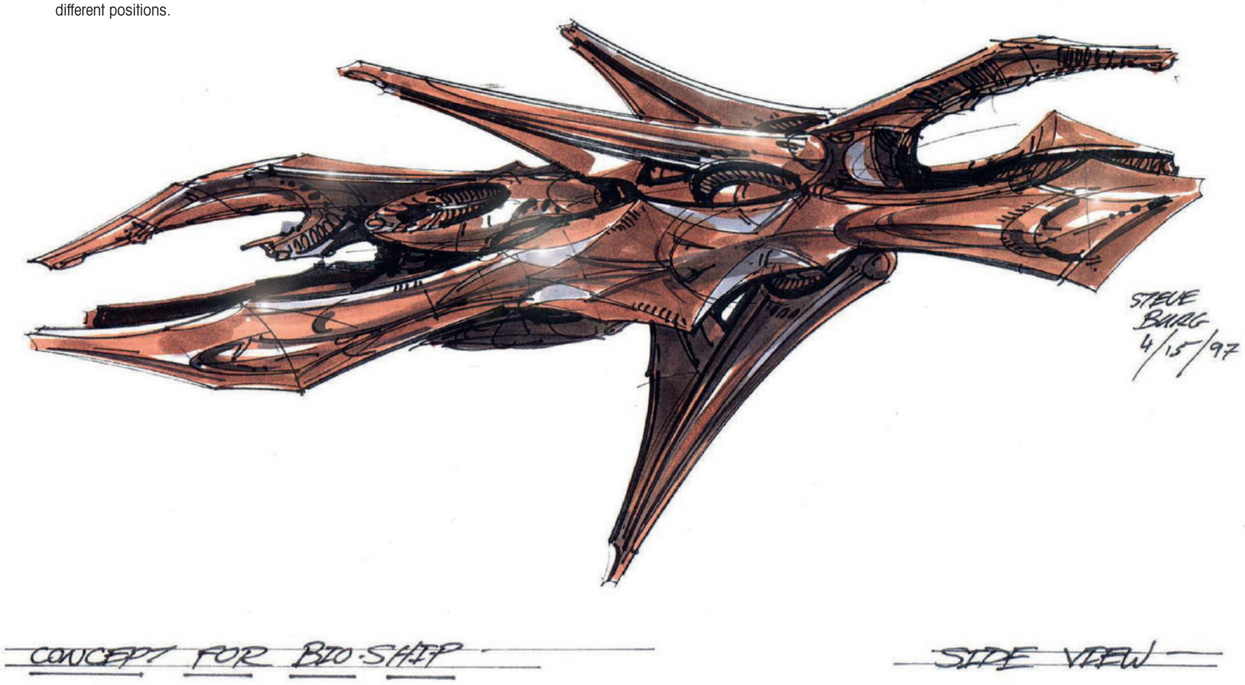
The biggest differences came about because in the six years since the original CG model had been built, processing power had gone through the roof. This meant that Bonchune could go as far as he wanted with the holographic projectors that covered the ship's hull. "On *VOYAGER* we didn't have the render power to turn on ray-tracing lights. By *ENTERPRISE* we could do that so I upgraded the lighting. I put some interactive light in for the holoprojectors and we could have them glowing, and I made some changes to the point lights at the end of the bigger antennas. It didn't take long. We gave them exactly what they wanted – a ship that cost virtually nothing."

◀ Rob Bonchune took Lombardi's original *VOYAGER*-era model and converted it into a Romulan vessel by changing the color and adding holographic projectors to the hull. The antennae made perfect sense for a ship that was remote controlled and projected an illusory field around itself.

▶ The final design of the bioship was one of the most truly alien ships that ever appeared on STAR TREK, and looked more like a living creature than a starship.



▶ Steve Burg produced drawings that showed the ship from a variety of angles with the 'spines' in different positions.



DESIGNING THE III SPECIES 8472 BIO SHIP

From the beginning Species 8472 was going to be a radical departure for *STAR TREK*. They wouldn't involve makeup or practical models, but would be completely computer-generated. They were the next generation of aliens, and, as a result, the brief given to the designers was to take full advantage of the technology to make them look genuinely strange and different. Everything we knew before was off the table and in its place were the least human creatures we'd ever seen. The same applied to their ships, which were freed of the need for familiar technology like warp nacelles.

SOMETHING DIFFERENT

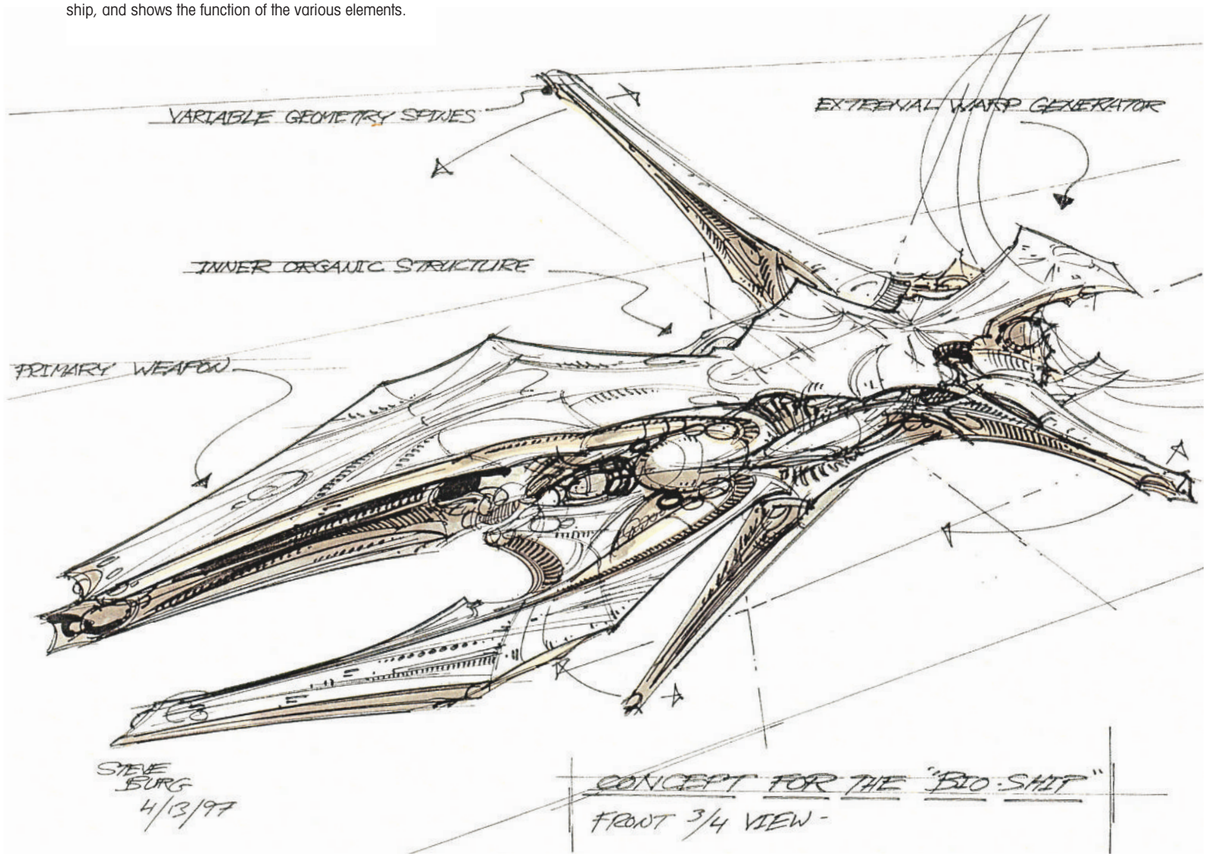
The creatures and their ships were both designed by Steve Burg, a concept artist who had a long history with one of *STAR TREK*'s VFX houses, Foundation Imaging, but had never worked on the franchise before. As he recalls, the first priority was coming up with a design for the creatures themselves, but the ideas behind the creatures, and the eventual design that the team settled on would have an enormous influence on what their ships looked like. "I remember reading the script," Burg says, "and finding that it was pretty vague about anything to do with the creature, except that it was large, powerful and pretty scary. But one thing it did make clear was that it existed in what was described as fluidic space – a dimension literally filled with fluid material and very little else, not even stars or planets."

This idea instantly led him to think about Species 8472's ships as being some kind of aquatic creatures, which he knew, could look very alien.

▼ The design of the bioships drew a lot of inspiration from the design of Species 8472 themselves.

"I've always taken inspiration from real sources and in this case I started looking at the ocean and in particular the crustaceans that inhabit the mid water. They exist their entire lives neither on the surface nor anywhere close to the bottom. If there was a dimension where planets as we understand them didn't form but yet had some kind of structure then that mid water point

▶ Burg's first design established the basic shape for the ship, and shows the function of the various elements.



would be a good comparison."

Burg eventually came up with a design for a tripedal, five jointed creature, whose skeletal like body was connected by soft tissue. Once the producers had signed off on it, he was able to turn his attention to designing the creatures' ships.

ORGANIC SHIP

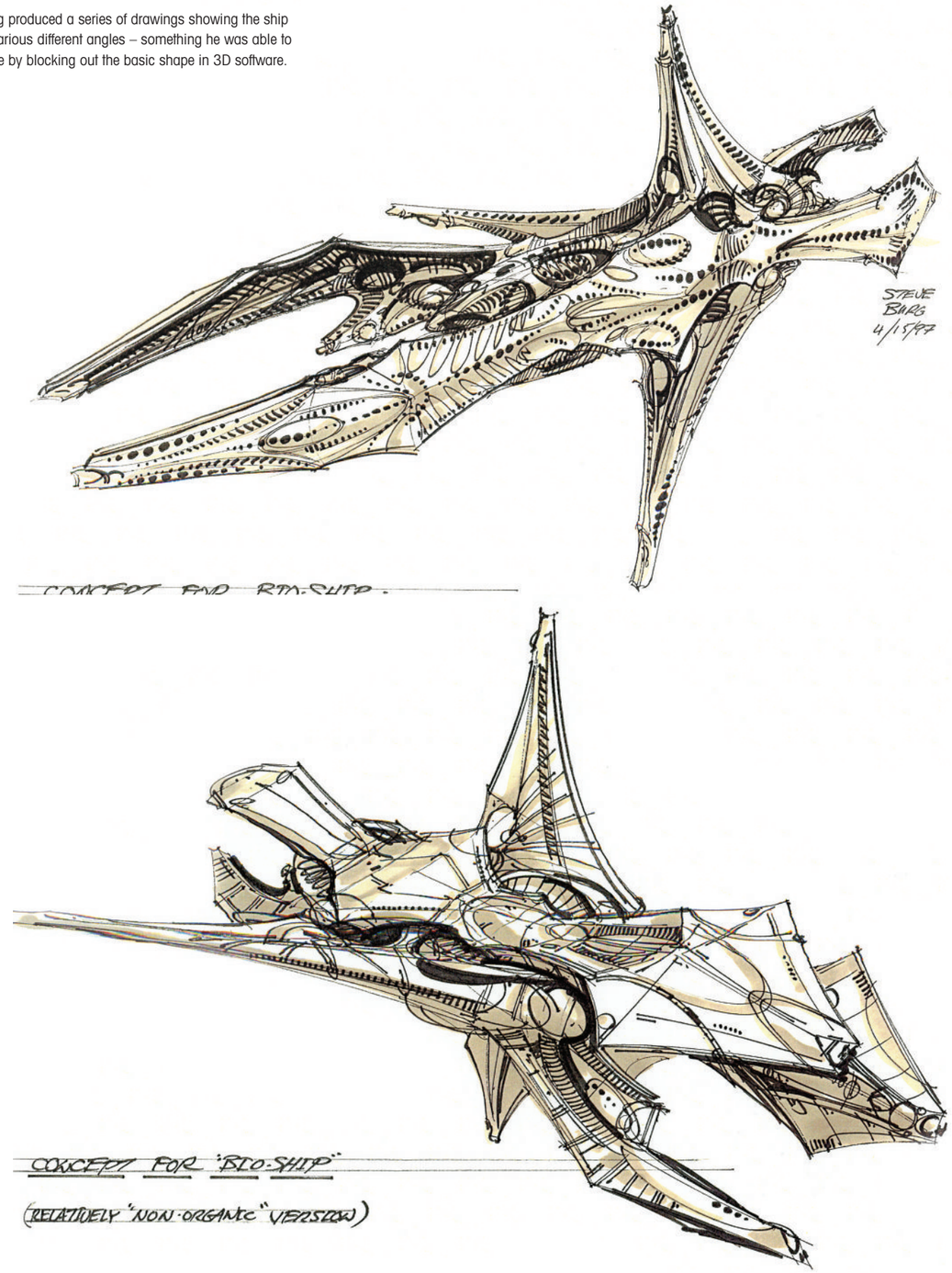
"Again, as far as the script went there wasn't a whole lot to go on," recalls Burg. "At the time it wasn't even called the bioship. What we did know from various scenes in the script was that the craft could attach itself to the Borg cube, kind of like the way a bacteria will attach itself to the outside of a cell, which I thought was pretty cool, and that the creatures' technology was derived from organic life. That meant that their spaceships were supposed to look like they'd actually been 'grown' rather than manufactured. I thought it was interesting that it was not obvious that it was a spaceship. It looks like more of an organism, like a giant face hugger or something has attacked the cube."

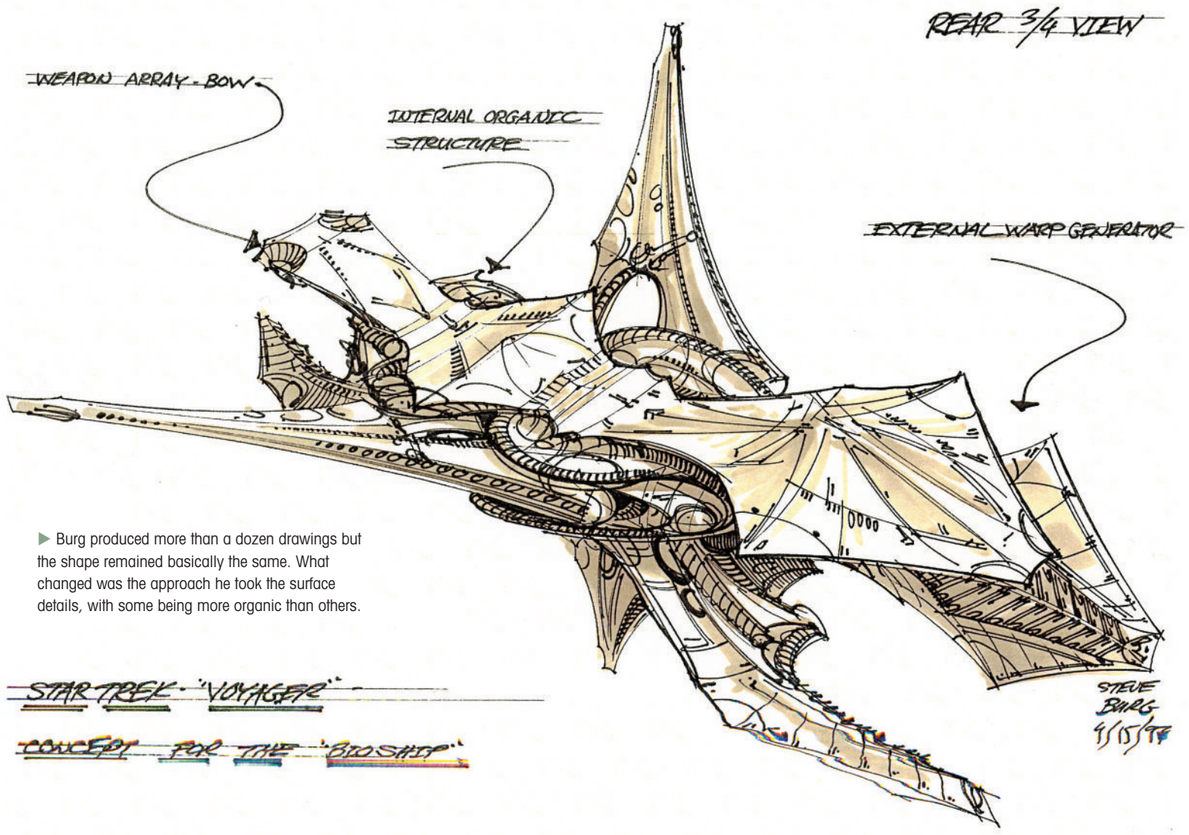
The producers also told Burg that later on in the story there would be scenes showing swarms of the ships in action so they needed to look good in a group. He also felt strongly that a good design for any ship involved coming up with a simple silhouette that could be identified at a glance, and he knew that the ships should instantly look as if they belonged to the newly designed creatures.

ALIEN SYMMETRY

"I hit on the basic approach of a three-way symmetrical kind of thing. I thought the symmetry would be a good way to start, particularly as I was working on pretty random shapes, like a bone or a piece of driftwood and then making it come across like a deliberate machine," explains Burg. "It would have been very easy to go

▶ Burg produced a series of drawings showing the ship from various different angles – something he was able to achieve by blocking out the basic shape in 3D software.





▶ Burg produced more than a dozen drawings but the shape remained basically the same. What changed was the approach he took the surface details, with some being more organic than others.

with the idea of it looking like a blob or an amoeba in keeping with the characteristics of the creature's environment, but I thought that as it was supposed to be a warship it should have more of a character than that."

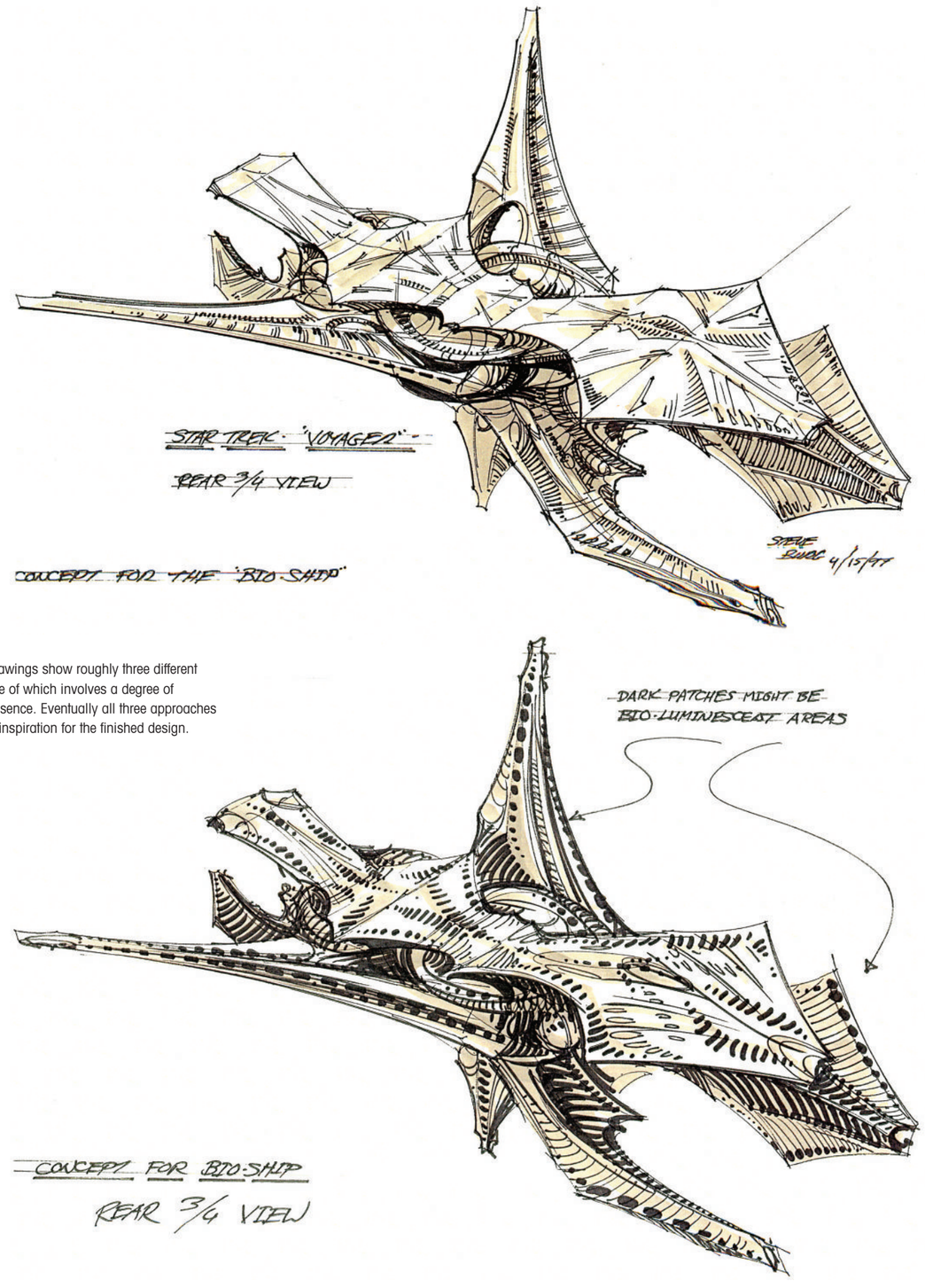
At least in part because the shape he was working with was both complex and random, Burg blocked out the basic design as a very simple 3D model that he then traced over to produce conventional drawings. At the time, the 3D software was far from sophisticated so he never considered creating a 3D model that he would have shown to anyone else. What this approach allowed him to do was produce very accurate drawings that showed the ship from different angles without having to make some kind of physical model that he could refer to.

TECHNOLOGY OF THE FUTURE

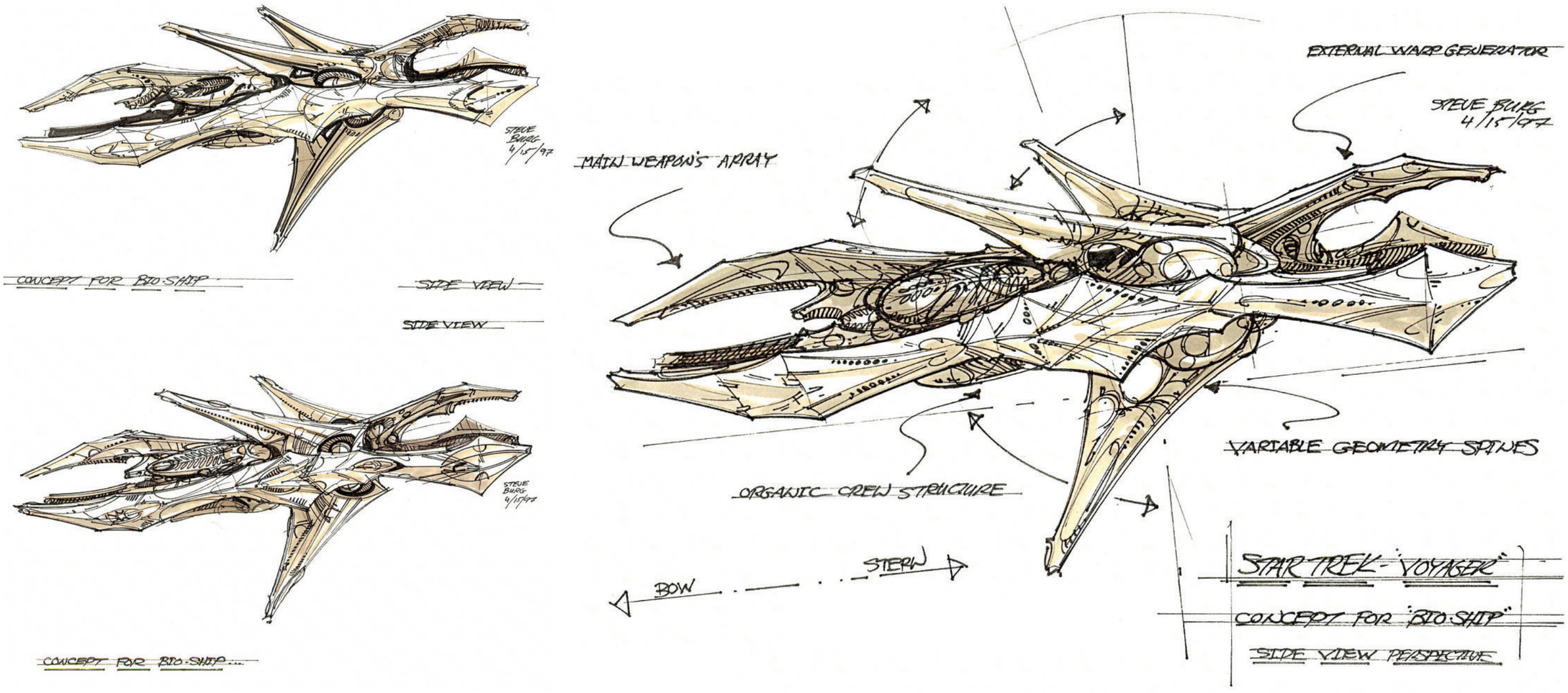
One of the questions Burg considered as he was designing the ship was exactly where to draw the line between something organic and something mechanical. It was clear that the ship should look like some kind of creature, but he theorized that it might involve an armature made of metallic material that would then have had an organic material grown over it.

"In my view, if we go way into the future the difference between organic and manufactured technology is going to be a gray area," explains Burg. "I think they'll be able to grow a lot of the things that we think of as coming out of a factory. As it is, the human body already has nano technology. It has a system in place to fight off attacks in the form of bacteria and viruses and we are always under attack. It would be easy to make a case that life is a sort of technology. So using that as a foundation I started exploring the idea of it being a living ship."

The producers were clear that like their new aliens the bioship should be both alien and deadly. Despite its strangeness, Burg was careful to think about how it might work and the function of the different elements. "It's not super huge," he says. "I guess they're one-man ships. They wanted a large amount of it to be one big gun



▶ The drawings show roughly three different looks, one of which involves a degree of bio-luminsence. Eventually all three approaches provided inspiration for the finished design.



with the back third of the ship reserved for propulsion," he explains. "So the occupant or pilot would operate from and live in the front half of the ship just under the spines."

LIVING TECHNOLOGY

Ultimately Burg had the three front limbs fold together to focus a beam that came from inside the ship, and the drawings show that a similar group of three limbs at the back housed some kind of alien propulsion system.

Burg's drawings also show that he was putting a lot of thought into different looks for the exterior of the ship, from a relatively conventional smooth finish to a surface texture that was covered with the kind of detailing found on crab shells. He experimented with replacing the pistons you would see on something mechanical with more organic looking structures that closely resembled the white tendons found in King Crab legs, while the central area that the creature used to operate the ship looked like an exposed muscle or some kind of organ.

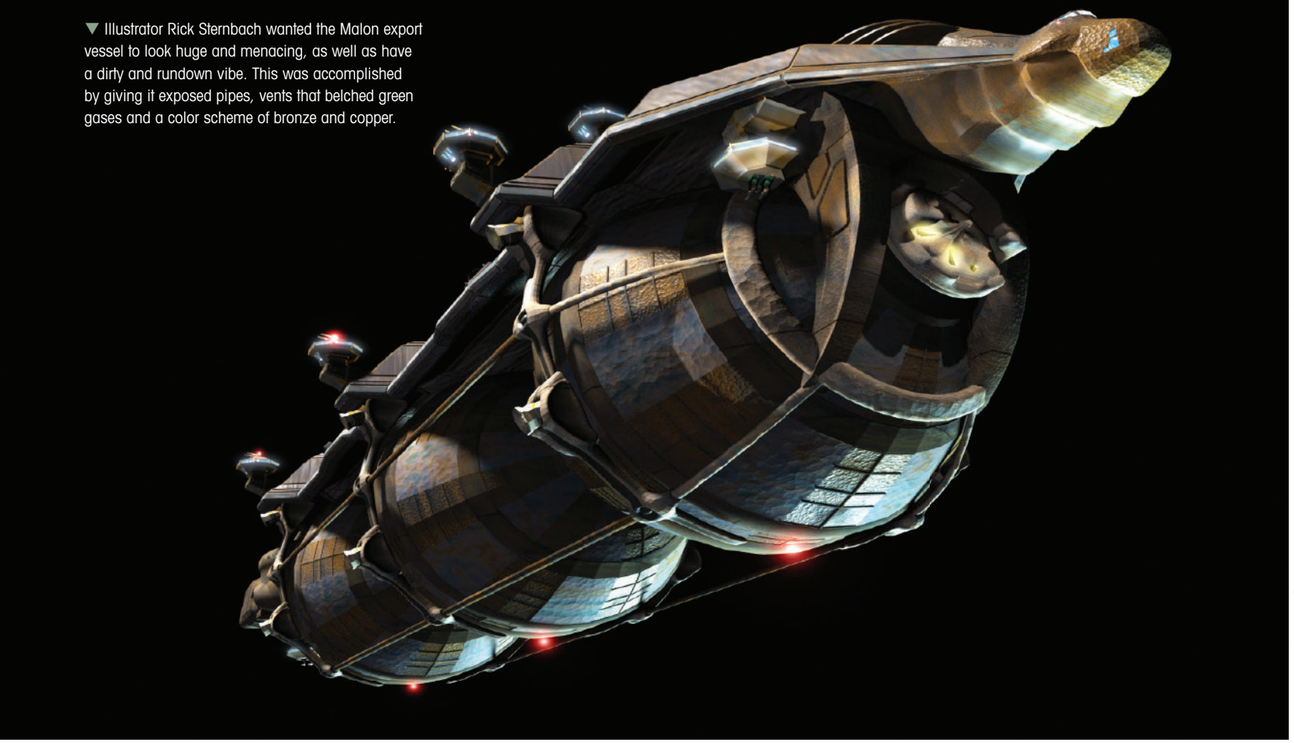
MOVING PARTS

From the beginning the producers had also been clear that they wanted to take advantage of the bioship's computer-generated nature to give it as much articulation as possible. Burg added spines to the front of the ship that could fold back like an umbrella when the ship detached itself from the Borg cube and prepared to attack *Voyager*.

Burg produced more than a dozen sketches, but looking at them he says they weren't necessarily intended as alternatives to one another but rather to show different approaches to different details. "Most of the sketches I did were various treatments of the same design," says Burg. "Some had more of a sort of seashell like break up on the surface while others were a bit smoother. There were a couple which looked more clearly like a machine, albeit an organic one. There were also some that looked more like a squid or something. Then there were different areas or degrees of luminous patterns that were explored."

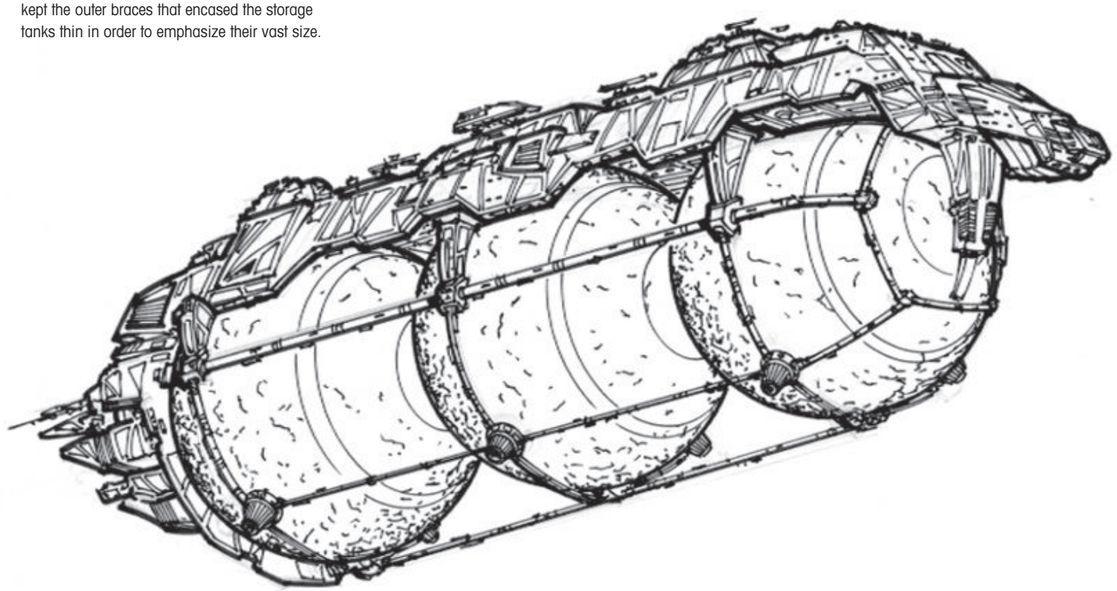
As a final step, Burg took two of the drawings and colored them up before handing them on to the modelling team at Foundation, who actually built the ship, which made a spectacular and terrifying debut in Scorpion Part 1. He's pleased to find himself discussing the design nearly 20 years later – proof that it wasn't just a novelty but has lasting value.

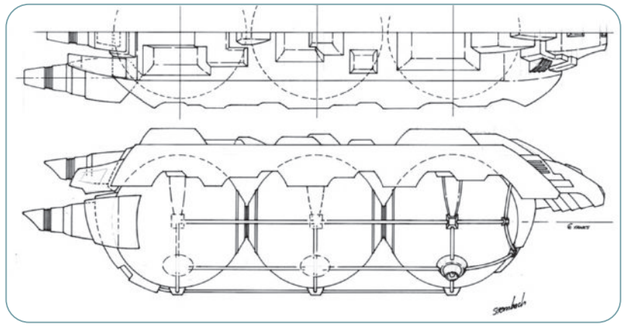
▲The drawings show the different kinds of surface detail from all angles, explaining the function of the different elements and suggesting how parts of the ship might move.



▼ Illustrator Rick Sternbach wanted the Malon export vessel to look huge and menacing, as well as have a dirty and rundown vibe. This was accomplished by giving it exposed pipes, vents that belched green gases and a color scheme of bronze and copper.

▼ It was a key plot point in the Malon episodes that their vessels were carrying huge quantities of toxic waste. Sternbach therefore kept the outer braces that encased the storage tanks thin in order to emphasize their vast size.





DESIGNING THE III

MALON EXPORT VESSEL

Starting with huge spherical storage tanks, Rick Sternbach came up with a suitably industrial-looking design for a Malon freighter.

When word came through to senior illustrator Rick Sternbach that a Malon toxic waste tanker was required for the episode 'Night,' he was not aware that it would make more than one appearance. For Sternbach, it was another 'ship of the week' that had to be designed with some alacrity to keep to the punishing schedule. For recurring ships, Sternbach would have weeks, or even months in the case of the *U.S.S. Voyager* NCC-74656, to carefully think through the design, but in the case of 'ships of the week,' time was very much of the essence.

From the preliminary script for 'Night,' Sternbach knew the Malon ship had to be a freighter of some kind, and he knew it was full of toxic waste.

"I wanted it to look massive," said Sternbach, "and the large spherical tanks seemed to accomplish that. I knew from the script that the tanker was dangerous and could leak, so I put some big obvious vents on it that spew out some kind of discharge. There was also a strong back to it, a structural spine, parts of which I thought could be inhabitable."

DETACHABLE PARTS

From the illustrations, it looked as if the spherical waste tanks might be separate elements that could attach or detach from the central supporting spine, but this was not something that Sternbach had thought about at the time. "If people want to make the case that the lateral supports opened up so the tanks could be picked up by the spine, then terrific," said Sternbach. "The truth is that we never had the time on the production to flesh everything out perfectly. I'd put notes on the illustrations while I was doing them if anything about the design occurred to me, but most of the time the visual effects guys were on to me to hurry up so they could start their work on the ship."

When the Malon returned later in *VOYAGER*'s fifth season, in the episode 'Juggernaut,' it gave Sternbach the opportunity to elaborate on ideas for their ship a little more. This time the Malon ship was to be a larger 'supertanker.'

"The first tanker had three tanks," said Sternbach, "and the supertanker had nine tanks in three groups of three, with a very similar looking structural spine holding it all together. The intent with the mega-freighter was that the tanks were the same size as the ones in the original tanker. Stylistically, the two ships were similar to show that the same race of aliens had built them, but I definitely added a few more retro elements to it."

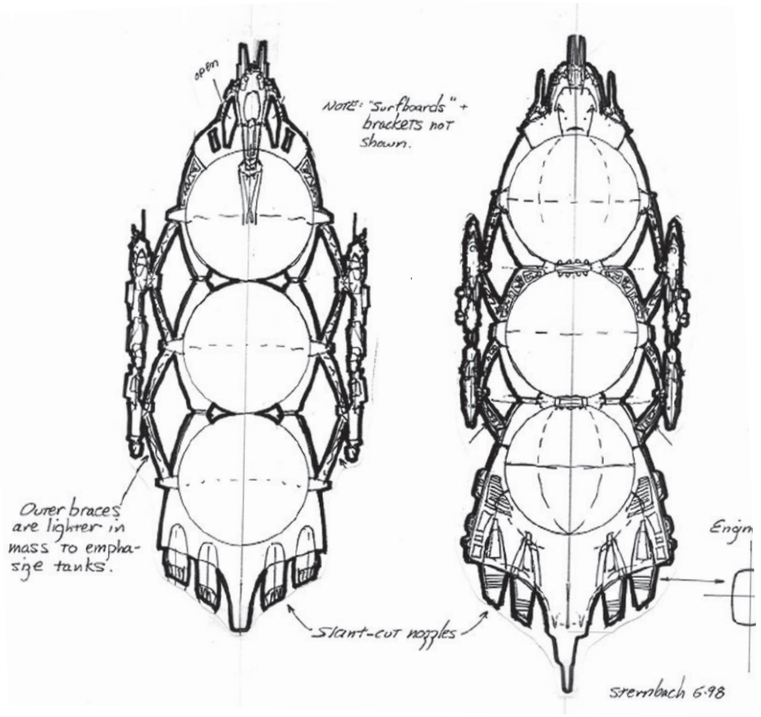
ART DECO STYLE

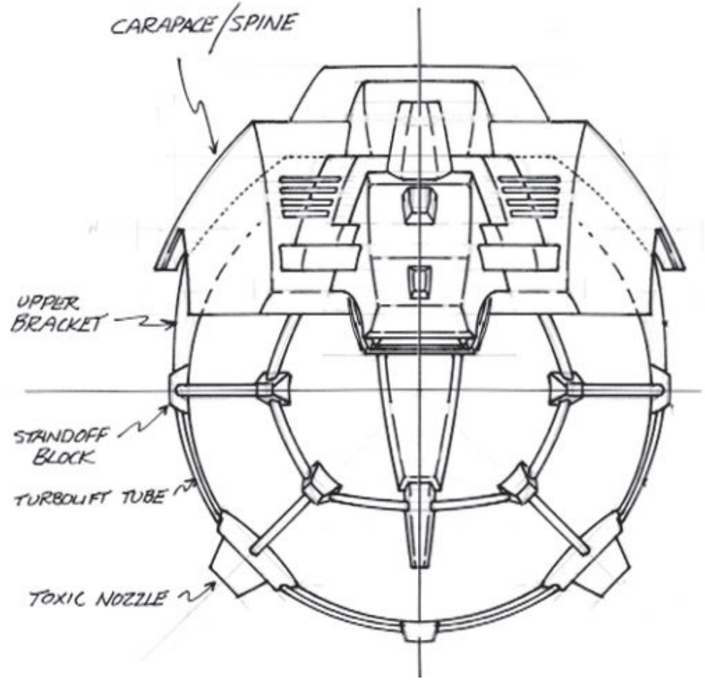
For inspiration, Sternbach turned to some of the streamlined train designs from the 1930s. It is perhaps more evident in his illustrations than on the final CG ship that the front was very train-like. It also had an art deco look, influenced like so much science fiction design has been from the first Superman comic books. "That

▶ Sternbach drew up various views of the Malon export vessel so that the modelers at the visual effects house Foundation Imaging had a clear idea of how it all went together when they were creating the CG model.

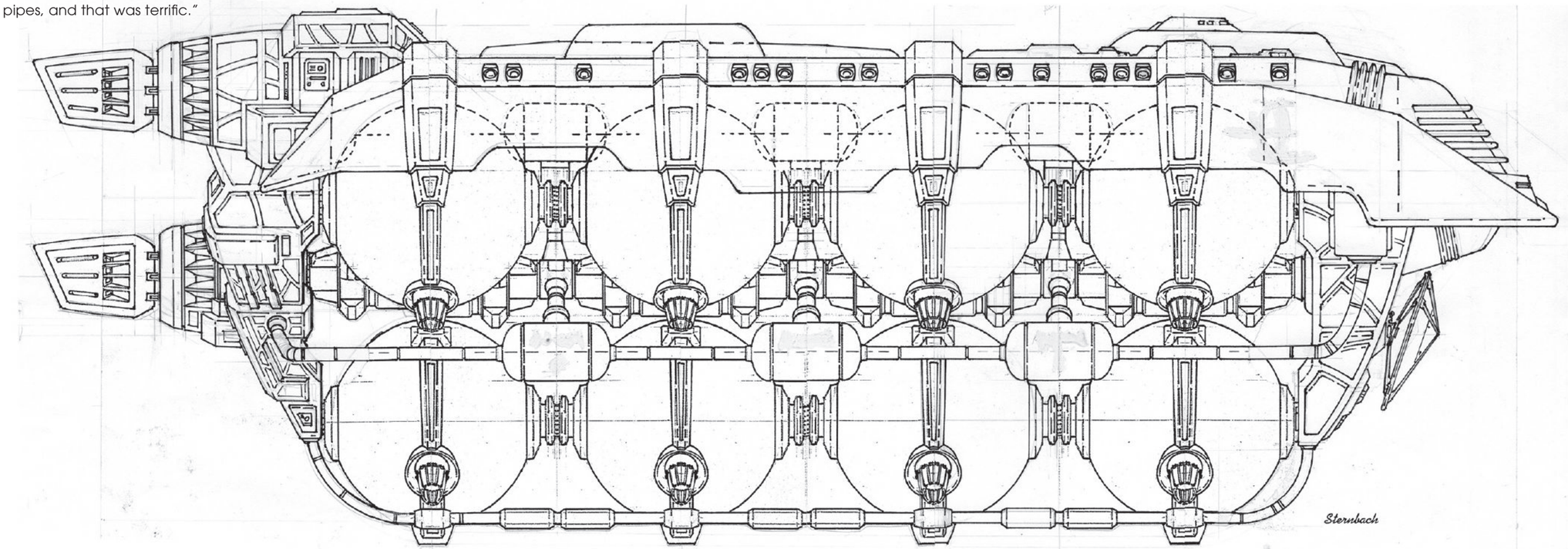
retro-styling was probably the most important thing for me," said Sternbach. "Yes, it had to look like a big ugly tanker, but I didn't develop a real style for the shapes until the later mega-tanker, which relied heavily on slightly streamlined and repeating parts with a good old retro feel."

Sternbach's design was then built as a CG model at effects house Foundation Imaging by Brandon MacDougall, while the noxious vapors of green gas were added by Kevin Quattro. "Some of the stylistic elements and texture that got applied to the basic shape were done by the CG guys," said Sternbach. "I think they added a bunch of stuff, including some defensive armament and some more pipes, and that was terrific."

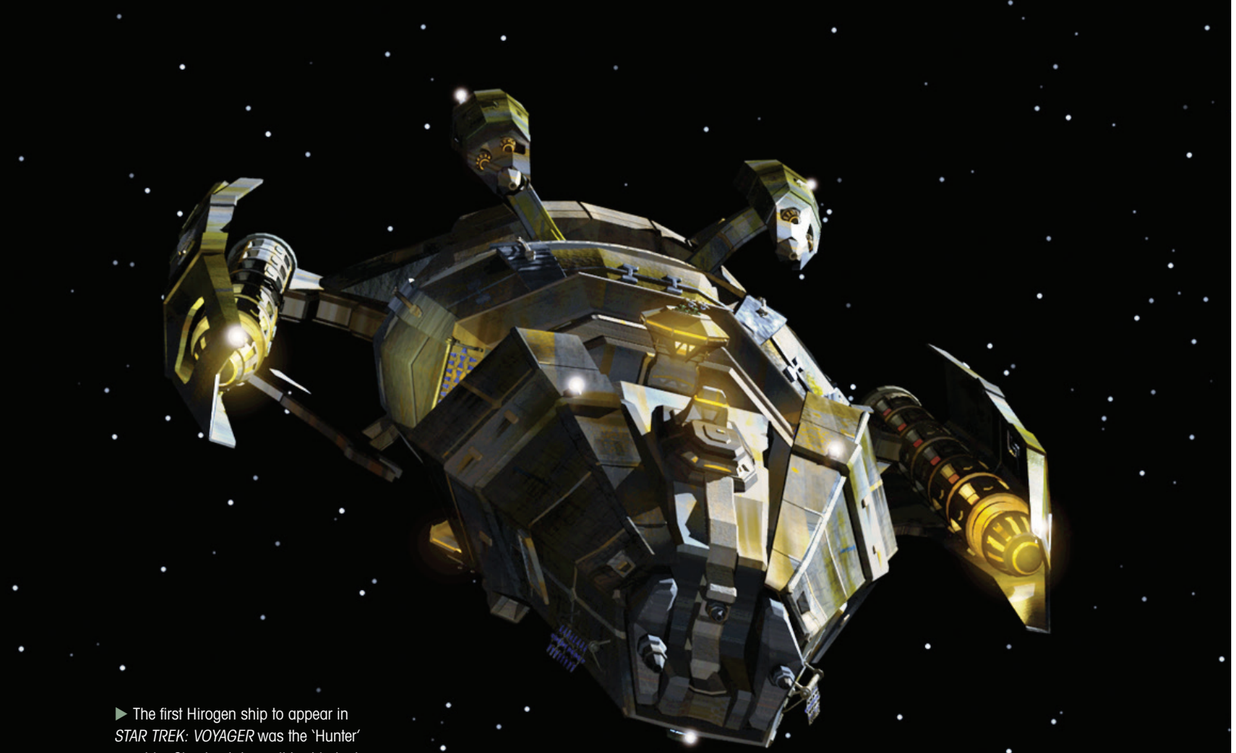




◀ Sternbach added annotations to his illustrations, pointing out the main features of his design. This was to give the CG modelers a clearer understanding of the functional purpose behind some of the stylistic elements, such as the toxic nozzles.



◀ When designing the larger 'super tanker' for the episode 'Juggernaut,' Sternbach was able to add more stylistic elements. It is clear from this illustration that the front of the structural spine above the storage tanks has a look inspired by the streamlined trains from the 1930s.



▶ The first Hirogen ship to appear in *STAR TREK: VOYAGER* was the 'Hunter' warship. Sternbach knew it had to look threatening and menacing to reflect the Hirogen's predilection for violence.

DESIGNING THE III HIROGEN WARSHIP

Senior illustrator Rick Sternbach describes the creative process that went into designing the aggressively-styled Hirogen warship.

Plenty of *STAR TREK* aliens made only one appearance and were never seen again, so they only needed a single 'ship of the week.' However, there were other races that made repeated appearances and, by the time computer-generated models were reasonably affordable, they could end up with a whole fleet of ships. On *STAR TREK: VOYAGER* I found myself making several Hirogen ships, a space station, and a holographic decoy, but I began with the Hirogen 'Hunter' warship that was needed for the fourth season episode 'Hunters.'

Designing ships for new alien races was always a challenge; the goal was to come up with shapes and colors that these aliens could use on several different ships and space stations. The scheme you came up with had to be distinct from any other alien culture we had seen in *STAR TREK* before, and the whole thing had to look cool.

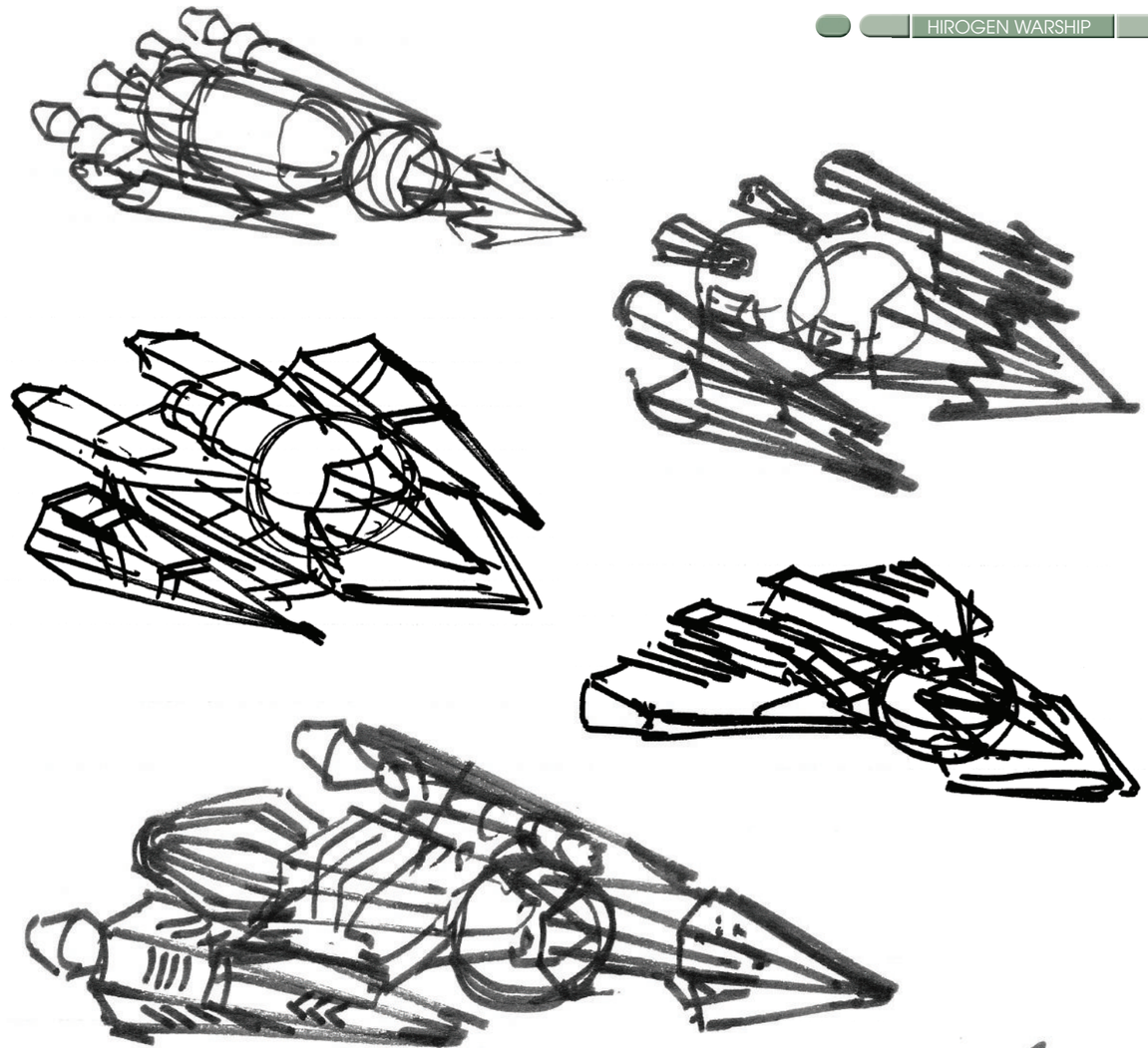
I began work on the Hirogen warship, as I always did, by sketching a group of basic masses that would say something visual about the Hirogen themselves or that were somehow reminiscent of the sets that were being designed for the interior of their ships.

For me, at this point, many different rules came into play simultaneously: I had to make it look like it worked; make it fit the style of the users; make it so the visual effects vendors could actually build it; make it according to what the script said; and make sure it looked interesting. Changes could – and did – come along the way, but this was a good start.

COSTUME AND SET INSPIRATION

The first few pages of yellow-pad doodles set the tone for the final look. I remember that I was inspired by elements from the costume helmet worn by the Hirogen and parts of their control room set, particularly a row of large plastic tanks and tall triangular wall columns.

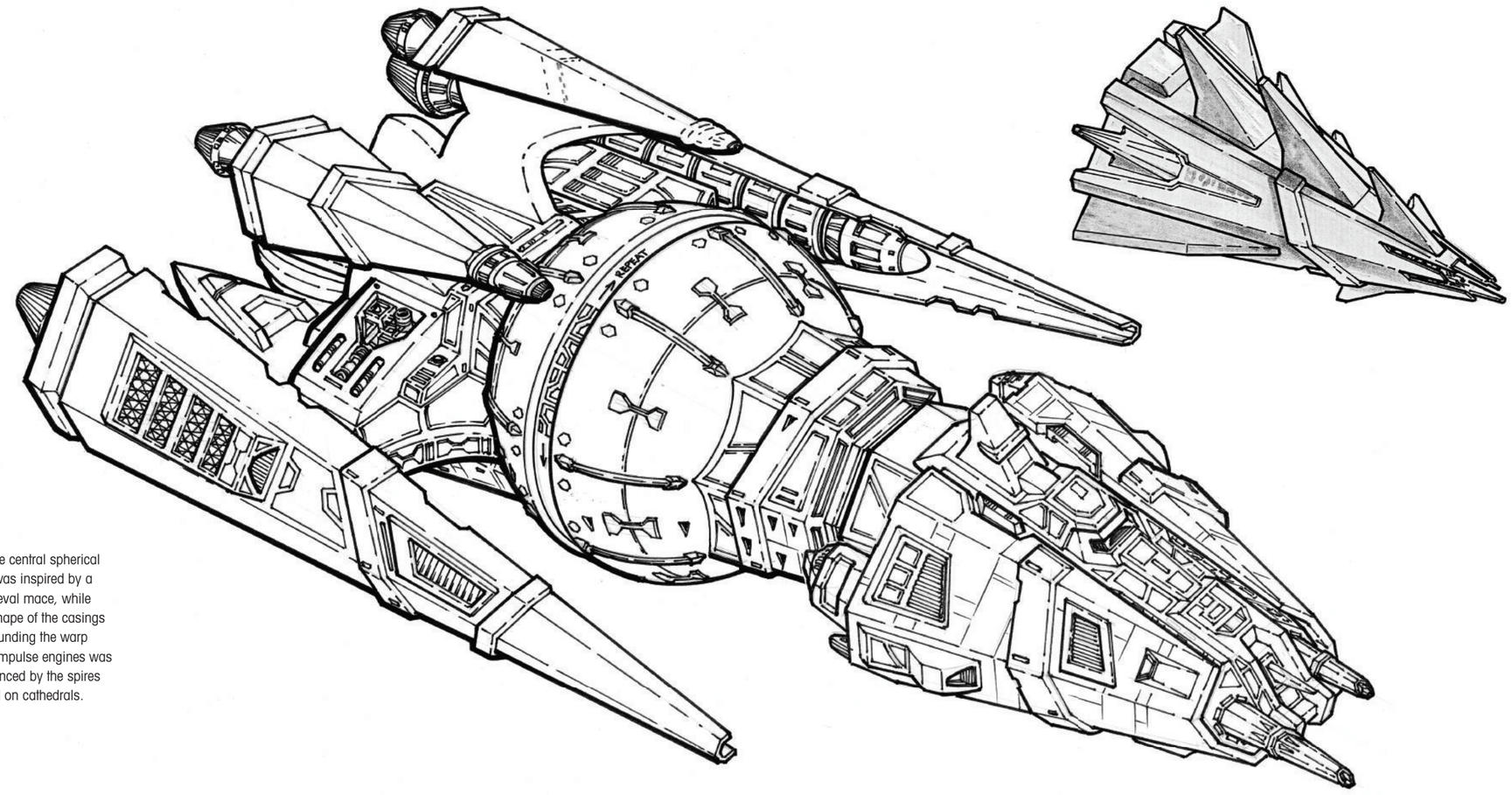
The basic hull of the warship was defined by a mace-like spiked sphere, pointed nacelles and a pointed nose section, followed by a ribbed impulse engine module that capped off the tail. Interior and exterior shapes didn't always need to reinforce each other, but I decided to make the connections here. Triceratops horns came to mind,



▲ Sternbach always began by sketching out a few simple shapes on a legal pad in order to get a feel for an appropriate design. For the Hirogen warship, he tried to incorporate ideas and shapes that were reminiscent of the warship's interior control room set that had already been built.

mixed with the crushing iron of medieval weapons and a dash of the spires found on the Notre Dame and Salisbury cathedrals.

A bit more doodling to move pieces and parts around, and then it was onto the computer to see how all the masses worked in three dimensions. Given that we had shifted almost entirely to CG, ship designs no longer had to accommodate motion control mounts or electronics hatches. The beauty of a program that rendered even simple polygons was that it allowed you to extrude and replicate shapes, play with positions and proportions, and rotate the design around. This let us see where interesting details could be added or whether certain angles might not look right to the camera; it also let us find some really good angles, too!



◀ Sternbach originally sketched out an extremely aggressive forward module for the warship. The producers wanted a less 'pointy' front end, so it was replaced with shapes that echoed the engine casings, while an assortment of weapon barrels projected from the nose.

▶ The central spherical hull was inspired by a medieval mace, while the shape of the casings surrounding the warp and impulse engines was influenced by the spires found on cathedrals.

PLAYING WITH SHAPES

The nice thing about building shapes with polygons was that you could interpenetrate different solid objects and let the computer handle shading the areas where they joined. The preliminary warship model was a set of some 12 objects that were pushed into each other, something you couldn't easily do with foamcore or plastic. The impulse pods were scaled copies of the warp nacelles, attached to pylons and canted away from center.

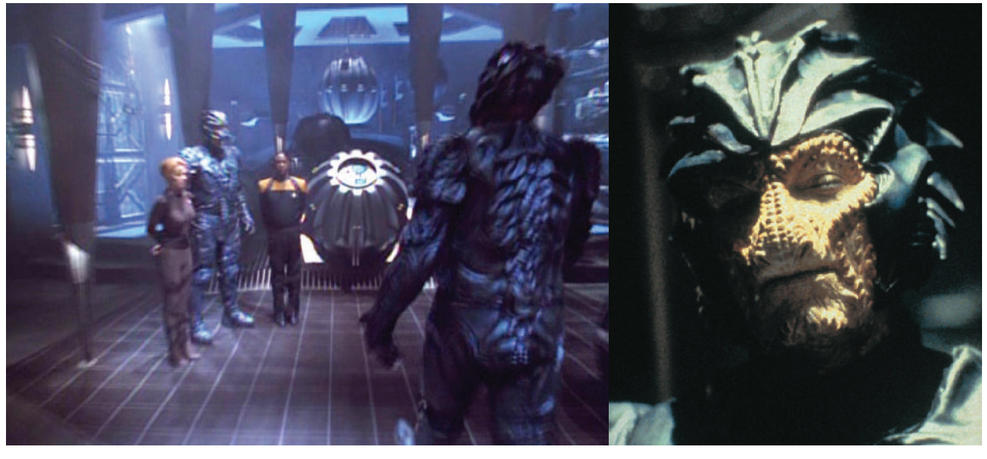
The nose section underwent the most changes, as the producers asked for a less pointy version, and we settled on a forward module made from two slightly chopped spires. The space between them would be filled with an assortment of energy weapons.

On a clean 11"x17" sheet, I traced over the basic CG perspective sketch in light blue pencil and drew in the nearly-final details. To do this I studied photos of the Hirogen set, with its netting, columns, weapons collections and specimen tanks, for ideas. People often asked how I knew what shapes to draw and where, and I usually explained that it was a process involving memories of almost everything I've seen or experienced, with some very specific stored visuals in the areas of art history, industrial and space vehicle design, aeronautics, biology and physics.

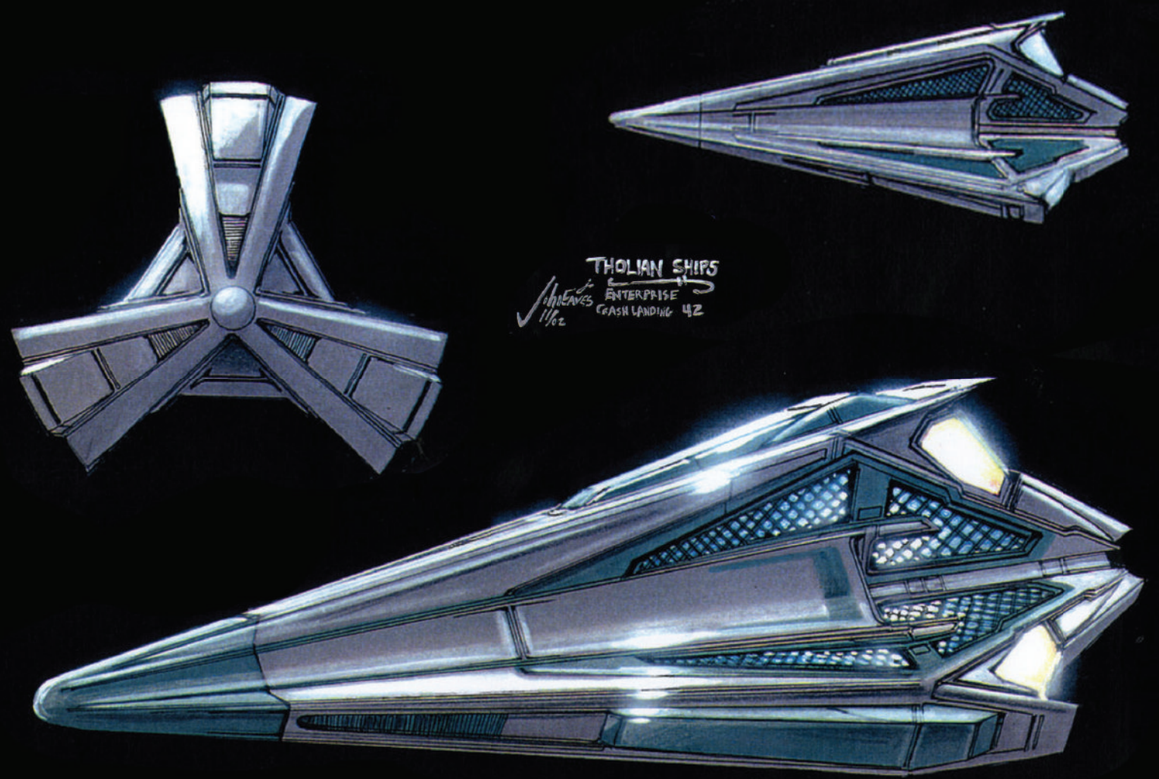
Many details were an exercise in the aesthetic breakup of a larger blank space, with a pinch of engineering logic thrown in (the best science fiction hardware designers I know do understand how the real stuff works). And the 'Hunter' warship surfaces followed that same process.

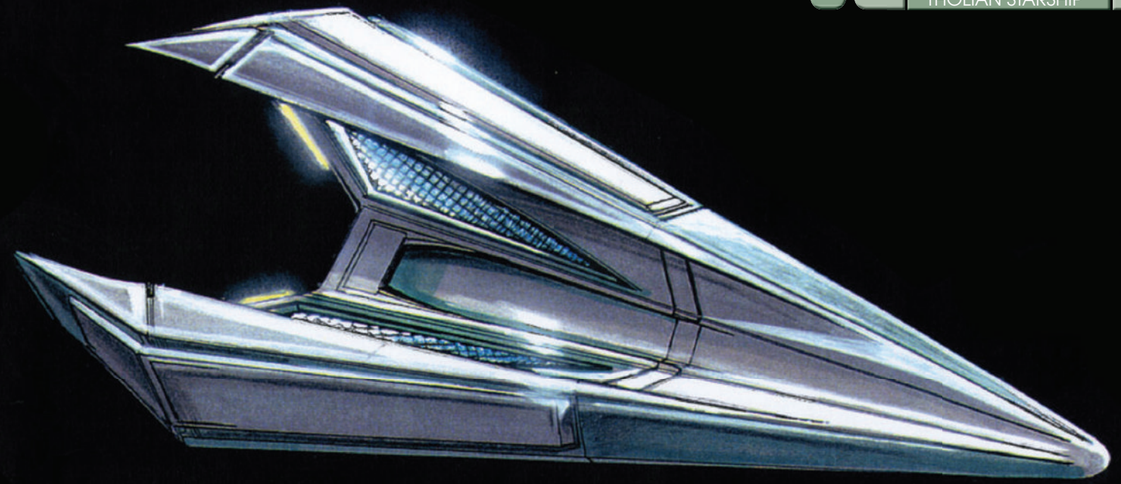
CG MODEL

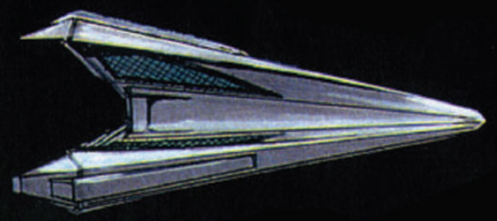
Foundation Imaging was given the inked line art, along with orthographic views of the CG sketch model, and proceeded to build the model that would be used in the final show. A few elements changed in the process, such as the sphere flattening a bit and the addition of gun turrets, but the overall result fitted the bill. Foundation then gave it the finishing touch of dark, imposing metallic colors and textures.



◀ Some of the shapes and surface detail on the warship were evocative of the design of the helmet worn by the Hirogen, while the triangular wall columns and the globe-shaped console on the interior set also provided inspiration for the overall aesthetic of the design.



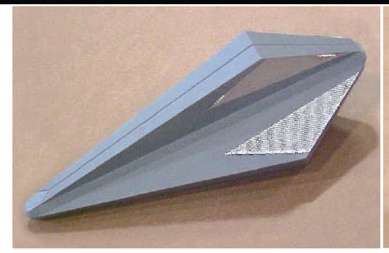


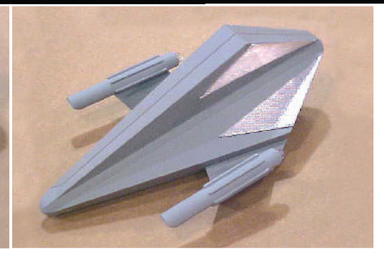


◀▶ John Eaves hit on the right design direction for the 22nd-century Tholian vessel straight away with two alternatives. Eaves was especially pleased with the design on this page and its use of negative space at the rear, but the version on the left was the preferred choice of the producers.

DESIGNING THE III

THOLIAN STARSHIP





▶ The studio model of the Tholian starship that appeared in *THE ORIGINAL SERIES* had clean lines and was constructed almost entirely from wood. The model was later fitted with nacelles for its appearance as the *Aurora* in the episode 'The Way to Eden.'

The return of the Tholians gave concept artist John Eaves the perfect opportunity to retro-out one of Matt Jefferies' original classic starships.

One of the joys for fans of setting *STAR TREK: ENTERPRISE* in the 22nd century was that it offered up the prospect of revisiting some iconic aliens that had not been seen since *STAR TREK: THE ORIGINAL SERIES,* nearly 35 years earlier.

There was tremendous anticipation to see how *ORIGINAL SERIES* aliens and their ships would be reinterpreted with modern visual effects technology. Production illustrator John Eaves was certainly thrilled about the chance to reimagine designs that had inspired his choice of profession. "One of the great things about *ENTERPRISE,*" said Eaves, "was that every now and then we would get to work on a vessel that we loved from *THE ORIGINAL SERIES.* This was a great assignment to retro-out the Tholian ship."

Of course, it was the legendary art director Matt Jefferies who designed the Tholian ship that made a single, unforgettable appearance in *THE ORIGINAL SERIES* in 1968.

SIMPLE BUT EFFECTIVE

As ever costs had to be kept down, so Jefferies designed a vessel that would be simple and inexpensive to construct. Two studio models were built almost entirely from wood with just the addition of reflective inserts embedded near the tails. With the use of some clever multi-colored lighting during filming, it gave the Tholian ships a mysterious, spooky alien glow that was in keeping with the creepy appearance of the non-humanoid race. The visual effect of these ships spinning their web of energy around the *U.S.S. Enterprise* NCC-1701 certainly made an impression on the TV audiences of the 1960s, and the special effects for this episode were nominated for an Emmy Award.

As an aside, one of the Tholian studio models did make another screen appearance in *THE ORIGINAL SERIES.* It was modified with Constitution-class nacelles and Klingon *D7*-class battlecruiser pylons taken from their respective AMT model kits. With the addition of these parts the Tholian ship

became the *Aurora*, the ship stolen by Dr. Sevrin and his followers in the episode, 'The Way to Eden.'

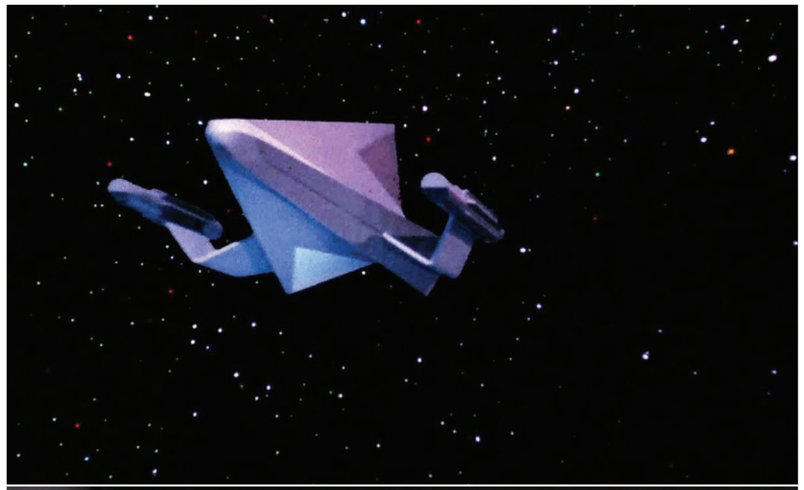
While the *Aurora* may have been quickly forgotten, the Tholian ship certainly was not – and it was always going to be a tricky task to design an earlier version of it for *ENTERPRISE*. There is a fine line between creating something new, but which also incorporated the design language that Matt Jefferies had established for the Tholian ship. For John Eaves, the solution was to keep aspects of Jefferies's original design, while making the styling look a little older. "I wanted to keep the front view of the Tholian ship the same," said Eaves, "but I felt the profile view was a little stark and harsh in *THE ORIGINAL SERIES*. I thought it would be good to elongate the ship so that it appeared sleeker, but also make it look like it could be a forebear of the original design."

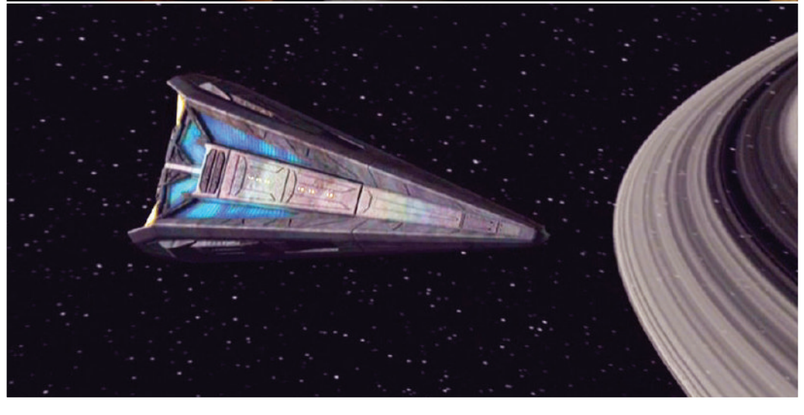
One person that Eaves knew he could trust for good advice was *ENTERPRISE* scenic-art supervisor and technical consultant Mike Okuda. "I talked to Mike a lot about ship ideas," said Eaves. "He was the go-to guy if I had questions. He was always there to make sure I was keeping the design in the vein of the original. I liked to try and push it right to the edge until he'd say, 'OK, that's kind of borderline, but I think it will still be approved.'"

POWER SOURCE

One new element that Eaves incorporated into his design for the Tholian ship was the glowing, patterned screen panels that ran along the side of the ship. The idea behind this was to show where the energy and power originated from inside the ship.

Normally, Eaves liked to come up with at least four or five alternative designs before he submitted them to the producers for approval. In this case, though, Eaves hit on a design direction that impressed straight away and he offered up just two designs, which can be seen in the main picture. "The version on the left was the one that got chosen," said Eaves, "even though I liked the one on the right a bit better. I liked that negative space on it. But it wasn't a hardship or a problem. I was happy with either one of these designs."

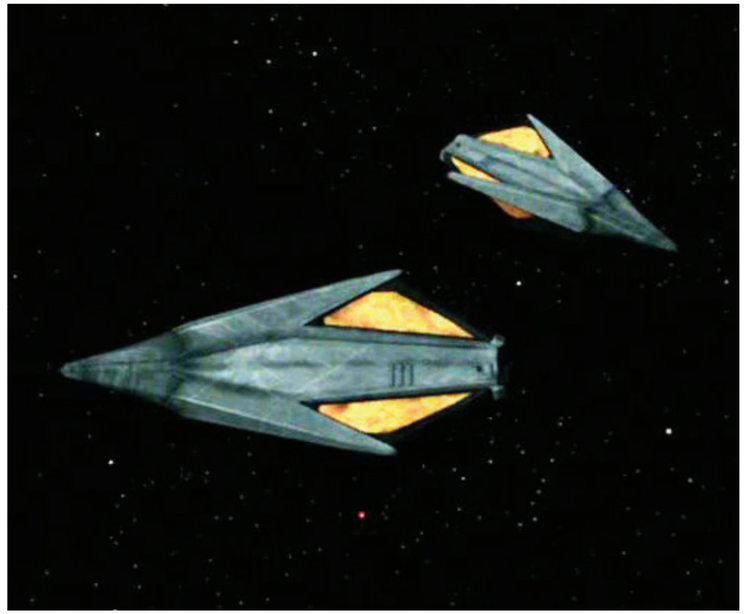




◀ The 22nd-century Tholian starship benefitted from modern visual effects, but was obviously still related to the design of Matt Jefferies' original.

◀ The use of multi-colored lights during filming helped to give *THE ORIGINAL SERIES* Tholian ships a strange, iridescent glow.

◀ The Tholian model appeared on screen again as the *Aurora* disguised with parts taken from commercially available model kits.



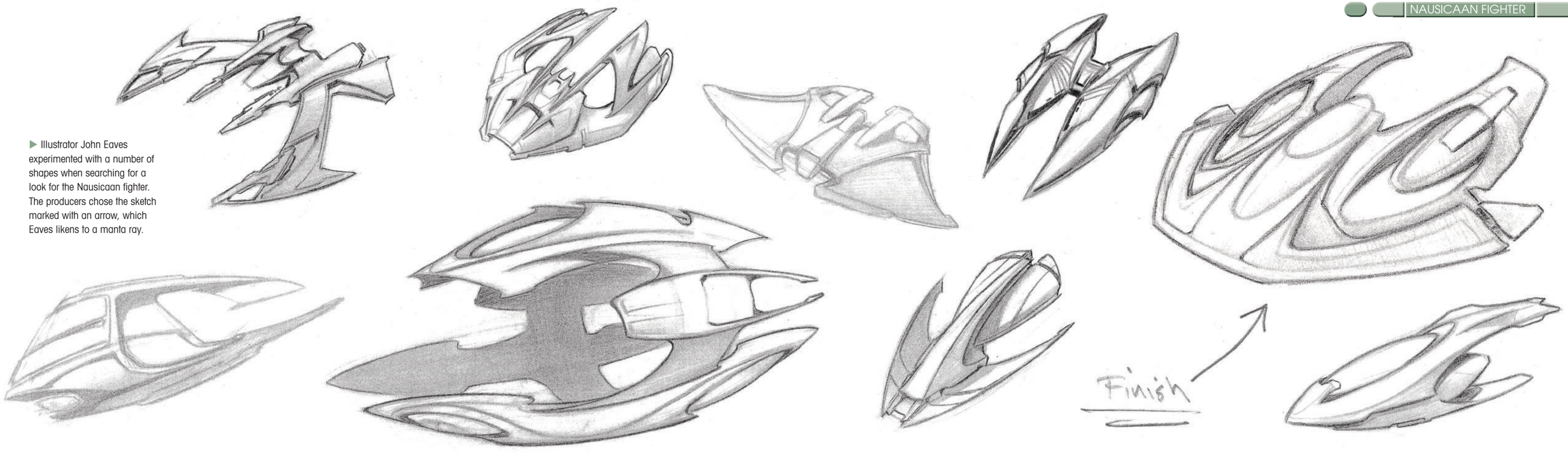
◀ The remastered version of 'The Tholian Web' that was first broadcast in 2007 featured an updated look for the Tholian starships. They retained the essential design elements of the original, but extra detail was added.

SHIP SCALE

Viewers have always been puzzled about the size of the Tholian vessels. It's obvious that they are small ships, but it was never clear just how small. The quandary is not surprising, given that Eaves himself is unsure. "I was basing my design on the size of the original," said Eaves, "but we didn't have a scale chart for many of the old ships. I didn't know if the Tholian ship was piloted by one guy, or two guys, or even a whole crew. The scale of a ship would often change depending on who was the effects supervisor. I wouldn't put a scale on it unless I absolutely had to. I sometimes did a rough sketch showing the scale of a ship next to the *Enterprise*, but most of the time the decision about size would be made by whoever was doing the CG rendering of the ship or the visual-effects supervisor. Normally, I'd just give them the shape and they'd determine the size later."

Eaves knew he did not have to be too exact with the finer details, as he was confident that his designs were in safe hands with the animators working at special-effect house Eden FX. By this point, they had worked together for a number of years and developed a great working relationship.

In fact, Eaves was keen for the animators to add their own creativity to the process. This meant that Eaves often did not see the final version of the ship until it aired on TV. "It was always really fun to see what the final piece would be," said Eaves, "and usually I wouldn't see it until the show had come out. So I was like, 'Wow! I love all the stuff that these guys are doing!'"



▶ Illustrator John Eaves experimented with a number of shapes when searching for a look for the Nausicaan fighter. The producers chose the sketch marked with an arrow, which Eaves likens to a manta ray.

DESIGNING THE III NAUSICAAN FIGHTER

▶ The final CG version based on Eaves' illustration was created by Pierre Drolet at Eden FX.

The first season of *STAR TREK: ENTERPRISE* was an incredibly busy time for everyone who worked on the show, but particularly for the production design team who had to envisage a whole new design aesthetic for the 22nd century.

In order to cope with the enormous workload, production designer Herman Zimmerman recruited three illustrators – John Eaves, Jim Martin and Doug Drexler – all of whom had experience of working on past incarnations of *STAR TREK*. Together, these talented illustrators came up with hundreds of concepts for the show in the first year, including designs for starships, space stations, interior sets, and props.

WORK OVERLOAD

As John Eaves explained, there was an incredible amount of work to be done. "It was definitely a movie workload," said Eaves. "There were so many sets just in the pilot – the crew went to a trade center, an ice planet, and then there were all of the bad guy ships and their sets. Each script that we got after the pilot was equally adventurous and epic. There were so many drawings compared with *STAR TREK: DEEP SPACE NINE* or *STAR TREK: VOYAGER*."

Amid the maelstrom of work that engulfed the production design team in the first season was an instruction to design a small attack fighter for the Nausicaans. This species had previously appeared in *STAR TREK: THE NEXT GENERATION* and *STAR TREK: DEEP SPACE NINE*, where they were depicted as frightening, thuggish creatures always spoiling for a fight. While Nausicaan starships had never been seen in the 24th century, the species' reputation as belligerent troublemakers demanded that their vessels should have a suitably aggressive and threatening appearance.

As with most of the ships that John Eaves conceptualized, he started by sketching out a number of basic shapes. "I just threw a whole bunch of stuff together," said Eaves. "Normally, the producers would ask for between two and five different ships on each show and a lot of them would get rejected. I liked to try and get some of these designs back in later. The ship near the middle (bottom right of p.146 of the main illustration) was originally a Vulcan concept that I had drawn earlier."

This concept, with its blade-like curves, provided Eaves with a design direction, which he expanded upon in the other illustrations. As the inspiration started to flow, Eaves felt that the look he was after was somewhere "between the bottom of a shovel and a manta ray."

RIGHT FIRST TIME

Normally these types of sketches would allow the producers to choose elements that they liked, and the illustrator would then work up a more complete version based on their comments. In this instance, however, they approved one of these designs as the final version.

"On this one, they chose a ship right off the first pass," said Eaves. "The one with the arrow next to it (see main illustration). That's why there's only that one drawing. It was a busy show so I didn't get to flesh it out a little bit more, but I didn't need to as those guys on the CG staff knew what to do."

Indeed, lead CG artist Pierre Drolet at visual effects house Eden FX took Eaves' illustration and turned it into a stunning 3D model. Drolet blended his own ideas into the design, giving the Nausicaan fighter an earthy color scheme, and added detailing such as the plasma cannons to the front. All these finishing touches really helped to bring the ship to life and gave it the aggressive look suitable for the Nausicaan pirates.

▼ Despite the Vulcans being the earliest and most established alien race on *STAR TREK*, the *Surak* class was the first major Vulcan ship ever to appear on screen.

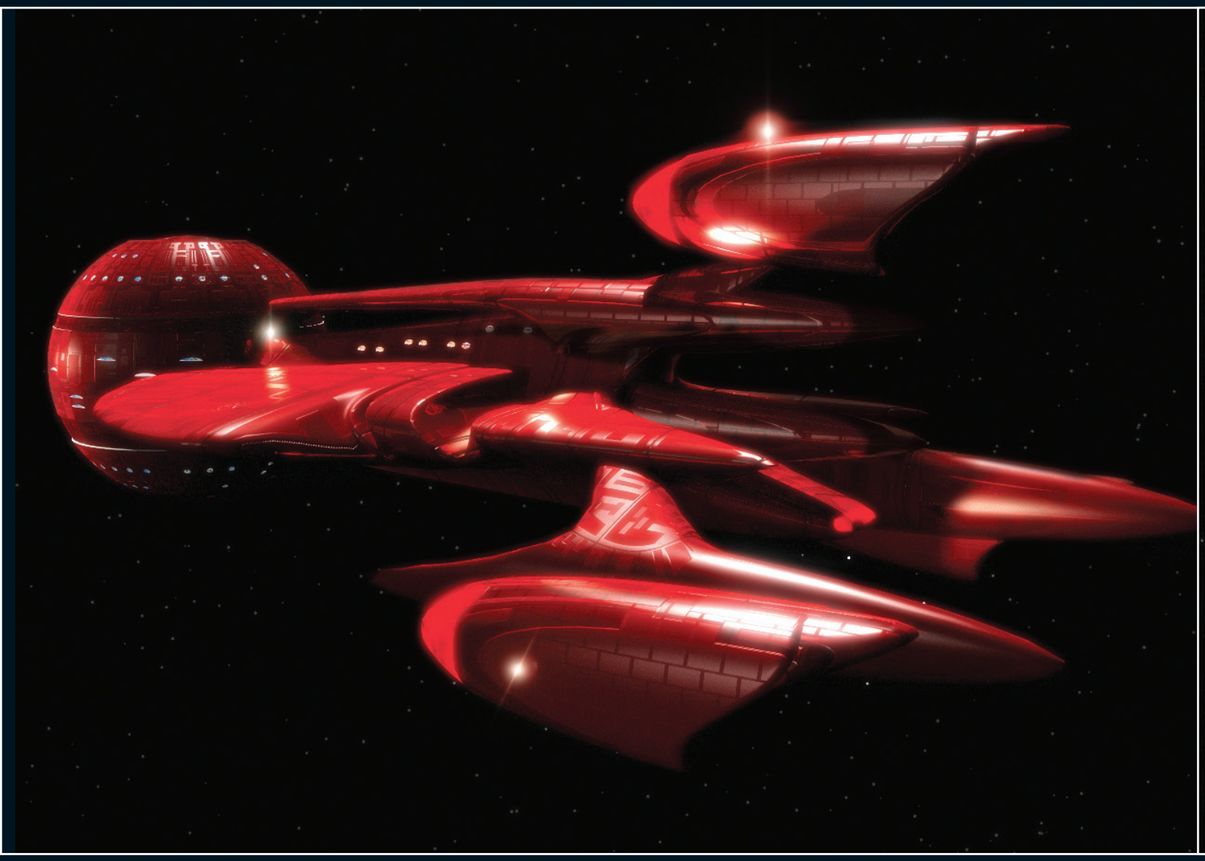
◀ One early design that Doug Drexler came up with was directly inspired by the *T'Plana-Hath* that appeared in *STAR TREK: FIRST CONTACT*.

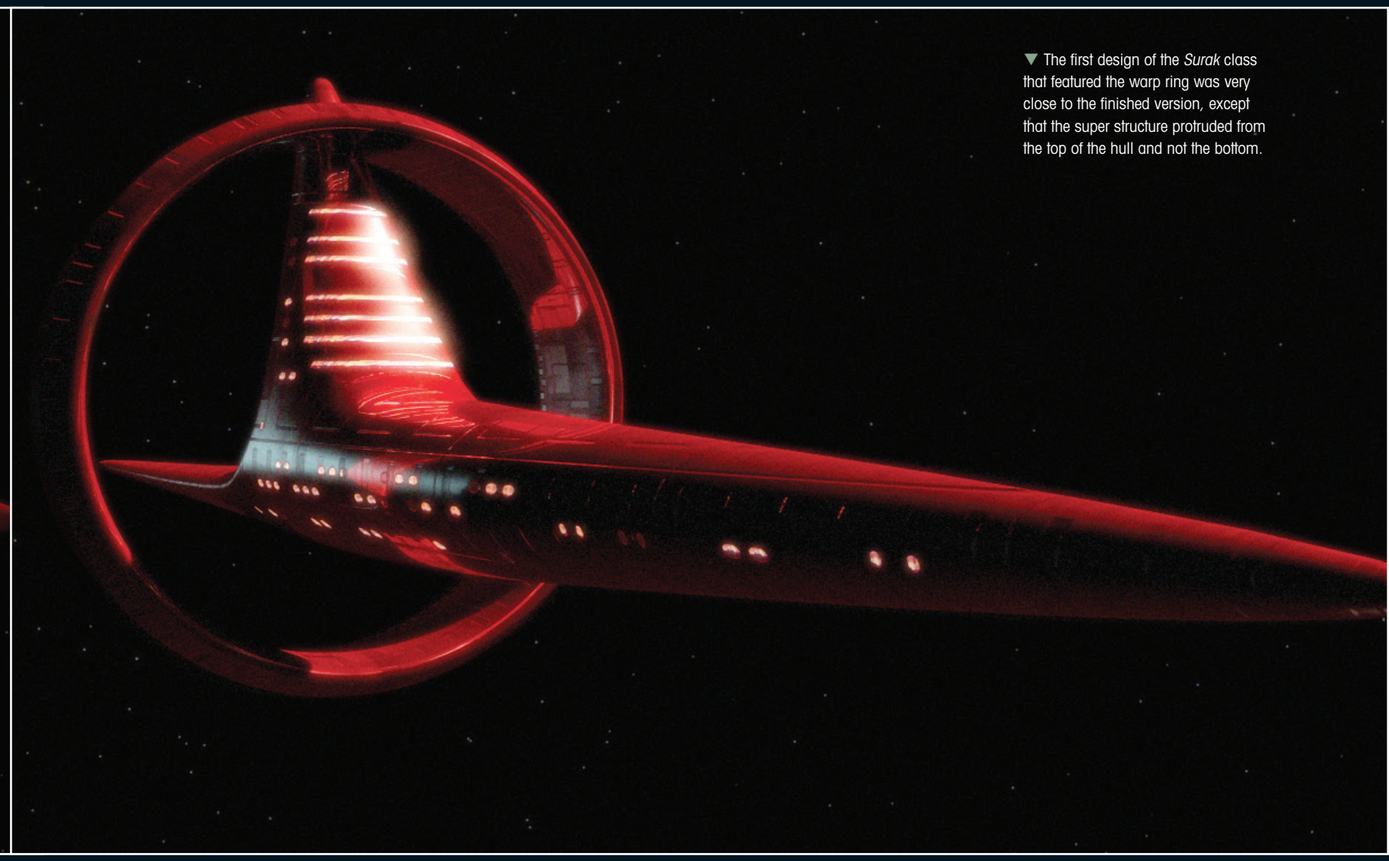
DESIGNING THE SURAK CLASS

The *Surak* class was designed by Doug Drexler to be distinctive and instantly recognizable as a Vulcan ship.

Despite a long and distinguished history in *STAR TREK*, the Vulcans have had remarkably few ships. The audience didn't see a single one in *STAR TREK: THE ORIGINAL SERIES*, and in seven years of *STAR TREK: THE NEXT GENERATION* they glimpsed only a solitary group of Vulcan ships in the episode 'Unification, Part II.' The Vulcans, however, were an essential part of *STAR TREK: ENTERPRISE*, and, since they hadn't shared all of their technology with humans, it was obvious that they would have their own ships. And, sure enough, the script for 'Breaking the Ice' featured a Vulcan ship called the *Ti'Mur*. Because production illustrator John Eaves was busy working

SURAK CLASS





▼ The first design of the *Surak* class that featured the warp ring was very close to the finished version, except that the super structure protruded from the top of the hull and not the bottom.

▲ Drexler illustrated an alternative look for the *Surak* class that featured conical engine pods and a sphere instead of a saucer section. This design was also inspired by an illustration that Matt Jefferies had experimented with when creating the original *U.S.S. Enterprise.*

on the new movie, *STAR TREK NEMESIS,* the task of designing the *Ti'Mur* fell to his colleague and senior illustrator Doug Drexler.

HISTORIC VESSEL

Drexler knows *STAR TREK* inside out, so he was all too aware of the responsibility he was being given. "When I was asked to come up with a design for the Vulcan ship, it was a little bit daunting," said Drexler. "After all, here was undoubtedly one of *STAR TREK*'s most important and influential extra-terrestrial civilizations, yet we knew very little about the Vulcans."

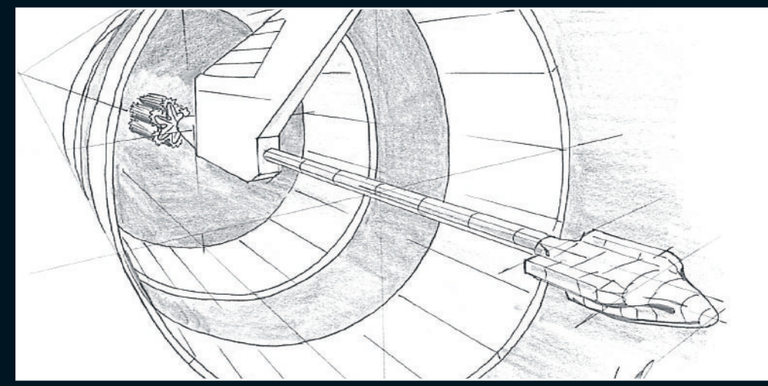
Drexler went on to explain that the task was even more daunting because, in more than 600 episodes, *STAR TREK* had never really established a design ethic for Vulcan ships. "Their background had been shrouded in secrecy and antiquity," said Drexler. "Also, because they had played such an important role in *THE ORIGINAL SERIES,* Gene Roddenberry had made a conscious decision to keep them out of the limelight on *THE NEXT GENERATION.*"

Given that the new Vulcan ship was likely to make many appearances on *ENTERPRISE,* Drexler wanted to be sure that it was as memorable as possible. "When you were designing ships for *STAR TREK,*" said Drexler, "it was smart to note that the starship designs that have endured and flourished since *THE ORIGINAL SERIES* were the distinctive Federation cruiser, like the original *Enterprise,* and the classic Klingon battle cruiser, both of which were invented by original *STAR TREK* design bard Walter 'Matt' Jefferies.

"What was it that made Matt's designs so striking and enduring? In my opinion, the answer lay in their simplicity and distinctive profile. If you looked at his sketches for *THE ORIGINAL SERIES,* you could see that they were not overworked; the design was clear, clean, and recognizable, even when you squinted, or if the vessel was the size of a quarter on screen. Sometimes ships of the week looked like potatoes when seen from a distance. A hero ship for a hero race needed to pass the squint test."

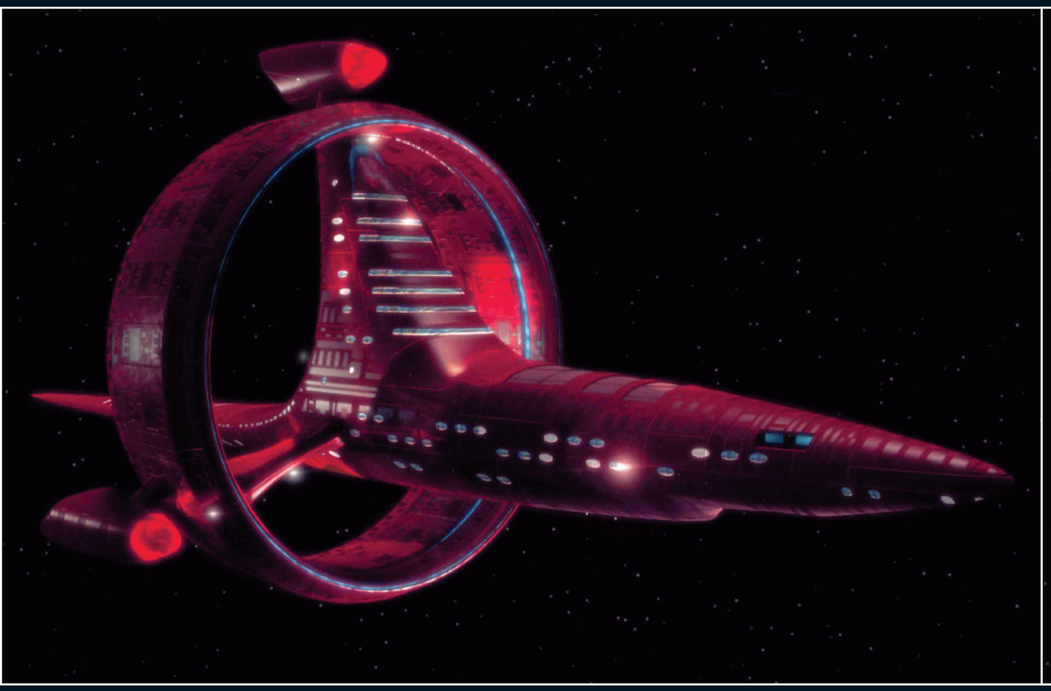
ORIGINAL INSPIRATION

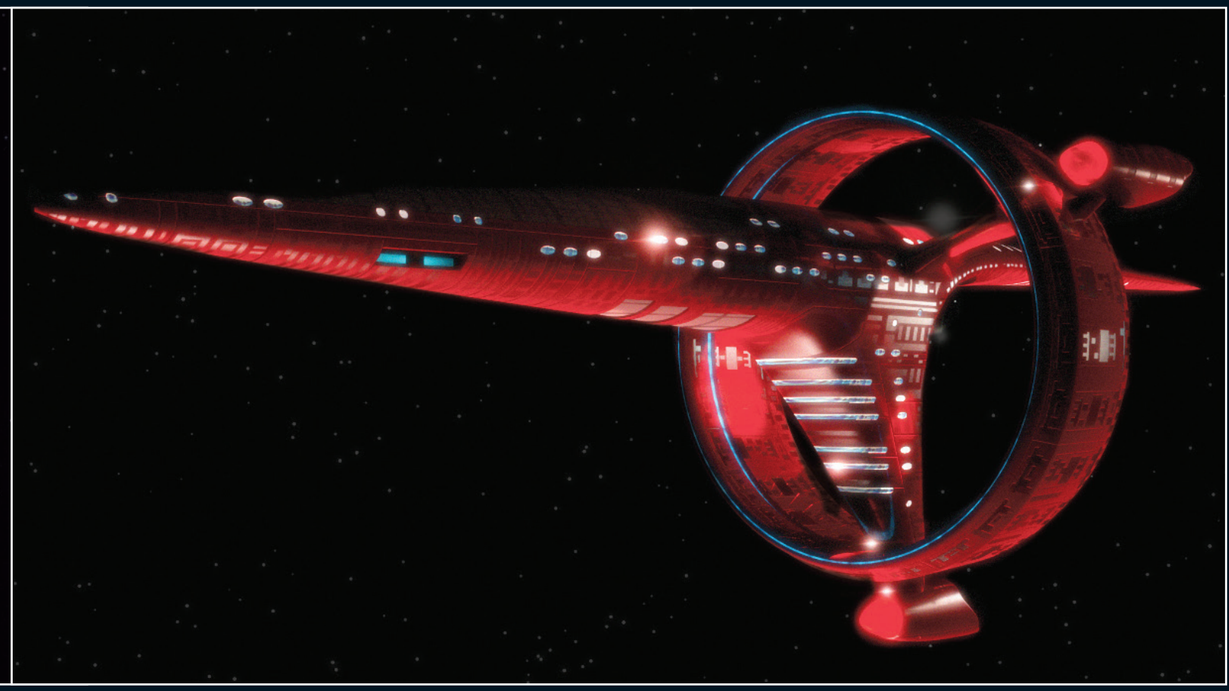
Of course, Jefferies had never designed a Vulcan ship, but Drexler knew that he had developed something that might work for him. When Jefferies was designing the original *U.S.S. Enterprise,* he experimented with a distinctive shape that consisted of a long, thin ship with a large, hoop-shaped engine. Jefferies had rejected it as impractical, but Drexler said he was intrigued by it.



"In my mind, that was a classic design," said Drexler. "It had an unmistakable profile; it couldn't be confused with anything else. It was actually seen once as a fleeting background portrait of

▲ Drexler's design was inspired by one of Matt Jefferies' concepts for the original *U.S.S. Enterprise.*





◀ [Far left] Once the basic design had been approved, Drexler experimented with another version that included engine pods inspired by the *T'Plana-Hath* from *STAR TREK: FIRST CONTACT*.

◀ [Near left] One of the last changes involved flipping the ship upside down. Drexler felt that this looked better, and he later removed the pods so it appeared as if the warp ring was just hanging in place without support.

a starship in *STAR TREK: THE MOTION PICTURE*. 'All these ships were called '*Enterprise*,'" Decker told Ilia, which, by the way, established that there were starships called *Enterprise* apart from those on the wall in Picard's observation lounge. That portrait also established that Earth's starship designers were going to flirt with a configuration that dramatically deviated from the standard saucer with nacelles.

▼ Decker showed Ilia the ships that had been called *Enterprise*, including the one with Jefferies' hoop design.

"*ENTERPRISE* had established the Vulcans as our guarded mentors," continued Drexler. "We were slightly annoyed at them, while at the same time admiring these aloof, analytical, and strangely beautiful people. 'Ah,' I thought, as I mulled over the Vulcan ship design question for *ENTERPRISE*. 'This was the perfect place to fit the hoop ship.'"

VULCAN INSPIRATION

"The script stated that Trip would be ga-ga over this *Surak*-class starship. After laying eyes on it, there was no question in my mind that he went to bed that night puzzling out the exotic shape. We humans would certainly have to build one of these – if you get a minute, go on the Internet and look at the Soviet space shuttle. I figured that was what happened, but obviously it was a brief flirtation, because we ended up sticking to our very human saucer-nacelle configuration."

Having decided to work with Jefferies' design, Drexler made some modifications to make it look more Vulcan. He gave it curves and peaks that were inspired by the Vulcan temple and clothing that were seen in *STAR TREK III: THE SEARCH FOR SPOCK*, and John Eaves' design for the Vulcan scout ship that appeared at the end of *STAR TREK: FIRST CONTACT*.

ALTERNATIVE DESIGNS

Although Drexler was in love with the hoop design, he wouldn't have been doing his job if he hadn't provided production designer Herman Zimmerman and executive producers Rick Berman and Brannon Braga with some alternatives. Consequently, he worked up two other designs to show them. "One echoed some of the shapes seen in the Vulcan lander," said Drexler. "The other foreshadowed the giant sphere of the *U.S.S. Pasteur*, which was inspired by another Matt Jefferies concept for the *Enterprise* that he'd labeled the *U.S.S. Independence*. Needless to say, I was delighted that Rick and Brannon went for the exotic hoop and arrow, and I felt that the *Surak*-class ship would enjoy a longevity if only for that certain Jefferies 'je ne sais quoi.'"

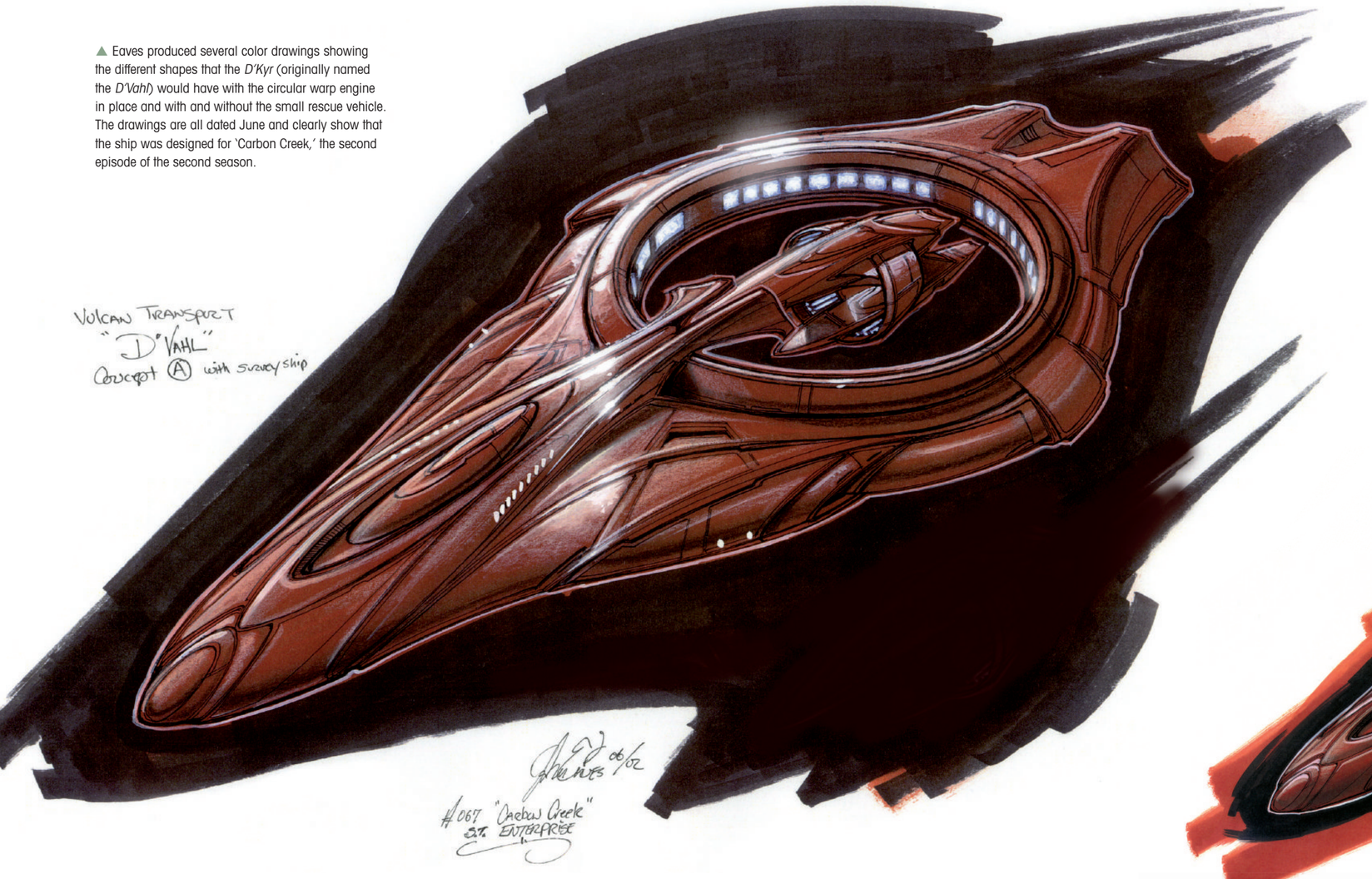
The next stage of the process involved refining the shape of the ship; Drexler started by turning out some variations that showed it with subtly different body shapes and engine pods. One change involved turning the ship upside down.

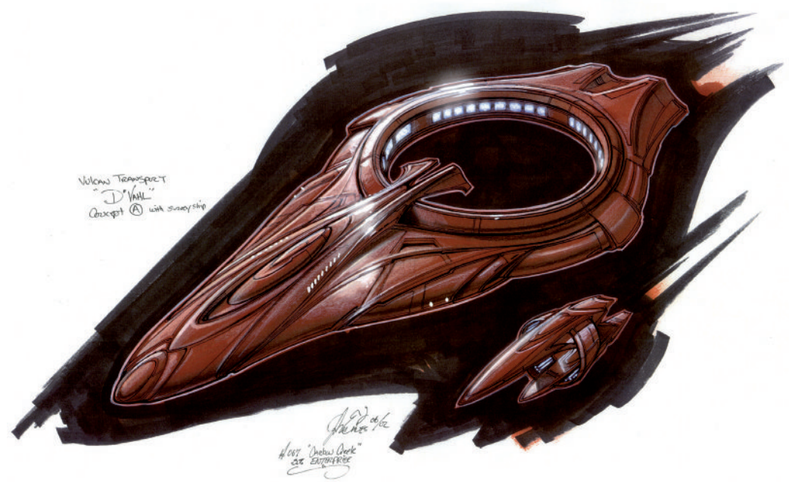
"I just realized that it looked better defying gravity rather than hanging from the hoop," said Drexler, "and Herman, Rick, and Brannon heartily endorsed that approach." The other change involved eliminating any physical connection between the body of the ship and the hoop, so they are actually separate elements.

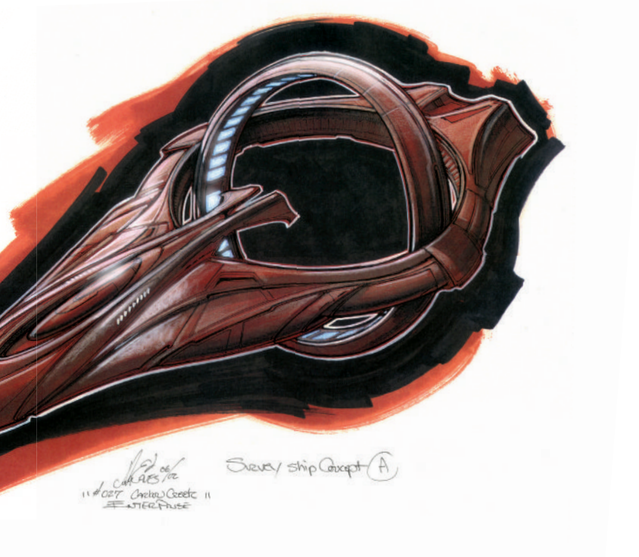
"We liked the defiance of conventional structural support," Drexler explained. "It made the Vulcans look like they controlled powers beyond human ken. This was true of the original *Enterprise*. The struts that supported the nacelles defy what we understand today. It said that these people were masters of technologies that we didn't yet understand. It speaks volumes for the technology at play."

Finally, once the design was approved, Drexler's design was sent to Eden FX, who put it into action in the episode 'Breaking the Ice.' After that, it made several more appearances alongside the *Enterprise* NX-01, another ship that was directly inspired by Matt Jefferies' original designs.

▲ Eaves produced several color drawings showing the different shapes that the *D'Kyr* (originally named the *D'Vahl*) would have with the circular warp engine in place and with and without the small rescue vehicle. The drawings are all dated June and clearly show that the ship was designed for 'Carbon Creek,' the second episode of the second season.







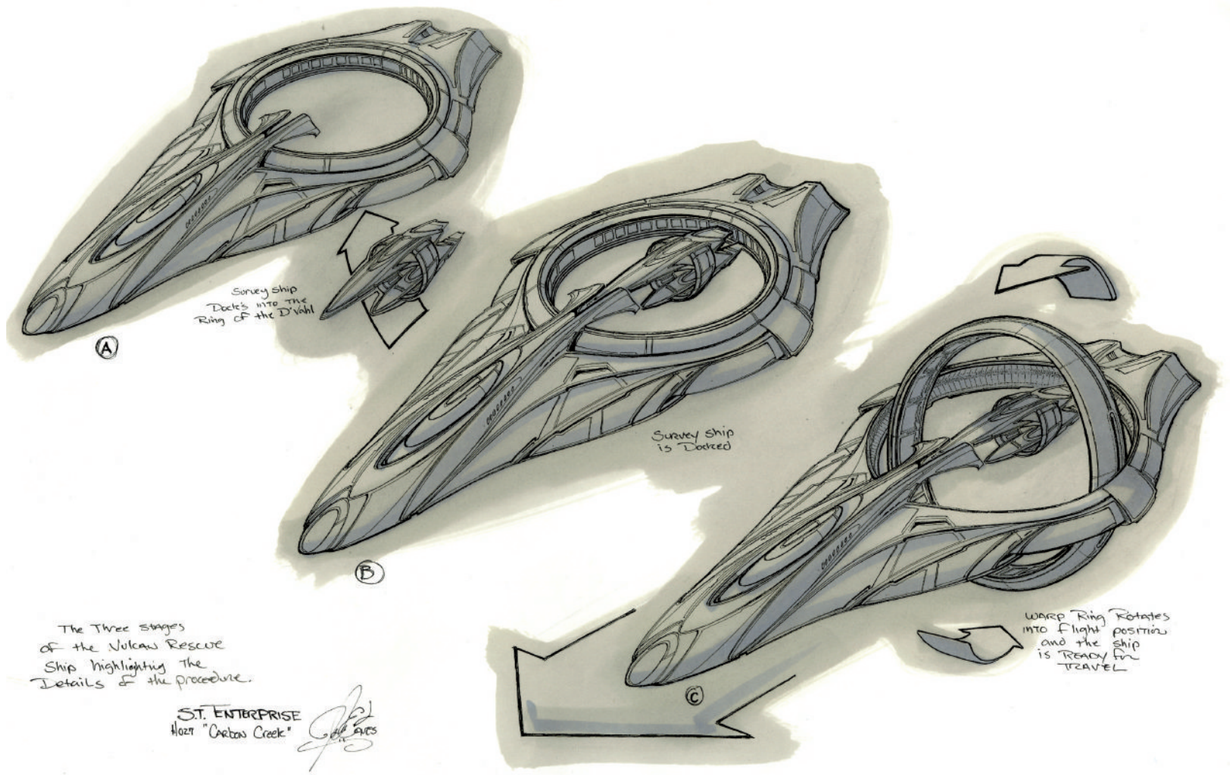
DESIGNING THE III VULCAN D'KYR

The *D'kyr* actually started life as a different Vulcan ship, complete with a tiny Deep Space Rescue Vehicle.

In *ENTERPRISE's* second season the episode 'Carbon Creek' called for a new design of Vulcan ship that could rescue three Vulcans who had been stranded in middle-America during the 1950s. Since the transporter hadn't been invented yet, a small rescue vehicle would go down to the surface and return to a mother ship. John Eaves was given the task of designing both the larger ship, which was originally known as the *D'Vahl* and the smaller vessel. He saw a direct parallel between the Vulcan ships and US Navy submarines such as the LA-class *USS Dallas* that carry small Deep Sea Rescue Vehicles (DSRVs) on their backs and started thinking about how the two ships might fit together.

By this point certain things had already been established about the design of Vulcan ships. Eaves's own design for the Vulcan survey ship in *FIRST CONTACT* had provided their distinctive red color and a slightly organic, rounded feel to the design while Doug Drexler's design for the *Suurok* class, had given them ring-shaped engines, inspired by one of Matt Jefferies' rejected designs for the original *Starship Enterprise.*

Eaves started with the small Vulcan ship that would go down to the surface. Influenced by the red Vulcan color and by the ring around the middle in Drexler's existing design,



his first drawing drew inspiration from an American football, which, he says "had been cut open like a sandal." A second drawing showed a more contained design, that still had echoes of the football shape, but had a simpler design with two hulls joined together by a circular engine. It was this version that got the nod from the producers.

MOVING PARTS

Turning to the main ship, Eaves produced drawings showing the *D'Vahl* with and without the rescue ship in place. He also took advantage of the fact that the ship would be computer generated to suggest that Drexler's circular engine design could be turned horizontally when the ship was "parked" but tilt up to a perpendicular position when it went to warp. A single pivot point provided several different interesting silhouettes.

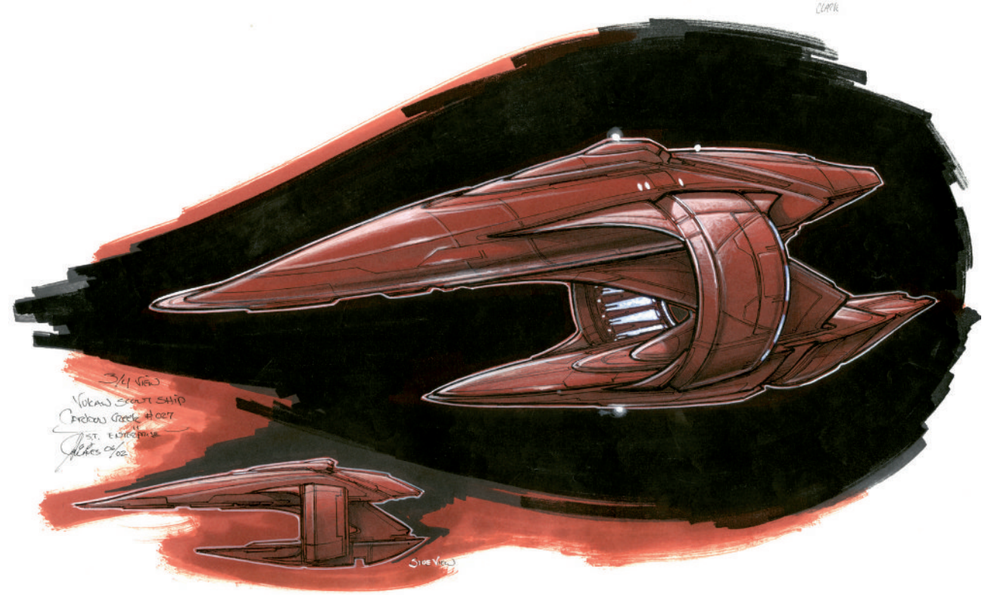
Eaves then produced a series of drawings that showed how the rescue ship would dock with the larger vessel before the engine swung into place. When the first concepts had been shown to the producers, Eaves had sensed that they weren't all entirely sure which way the ship was supposed to fly, so this time around he added a very definite arrow showing the direction.

CHANGE OF DIRECTION

Although, the ship was designed specifically for 'Carbon Creek,' with its small rescue ship, it actually made its debut in the episode before, 'Shockwave, Part II,' which called for the *Enterprise* to rendez vous with a large Vulcan ship called the *D'Kyr.*

In the end, a totally different design was used for the *D'Vahl* and the idea of a small rescue ship was completely abandoned. Eaves's design for the *D'kyr,* would go on to appear in several other episodes, playing a prominent role in the final season, where it was part of the fleet that threatened Andoria. It was even occasionally seen without the small rescue vessel, though the fact that it was designed to be two different ships was never referenced on screen.

◀ Eaves first design for the small rescue ship that was docked in the center of the ring at the back of the ship. He describes it as being like a football that had been cut open like a sandal.



◀ The final design had a lot in common with the rejected 'football' version. It was actually built as a completely independent model and can even be glimpsed in the distance in some episodes, but was never seen up close.