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U.S.S. ENTERPRISE  
**NCC-1701**  
STAR TREK BEYOND  
SPECIAL ISSUE

CONSTITUTION CLASS

LAUNCHED: 2258

KELVIN TIMELINE

CAPTAIN: JAMES T. KIRK

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U.S.S. ENTERPRISE  
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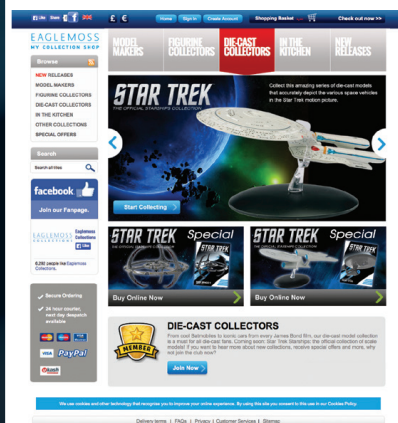
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# ***U.S.S. ENTERPRISE***

## SPECIFICATION



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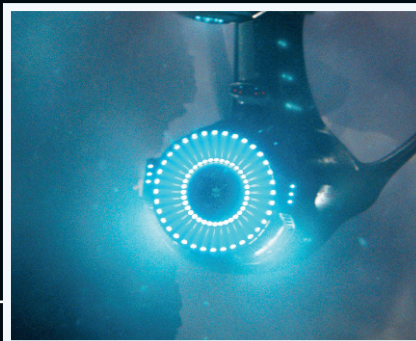
REGISTRY: NCC-1701

LAUNCHED: 2258

DESTROYED: 2263

CAPTAINS: CHRISTOPHER PIKE

JAMES T. KIRK





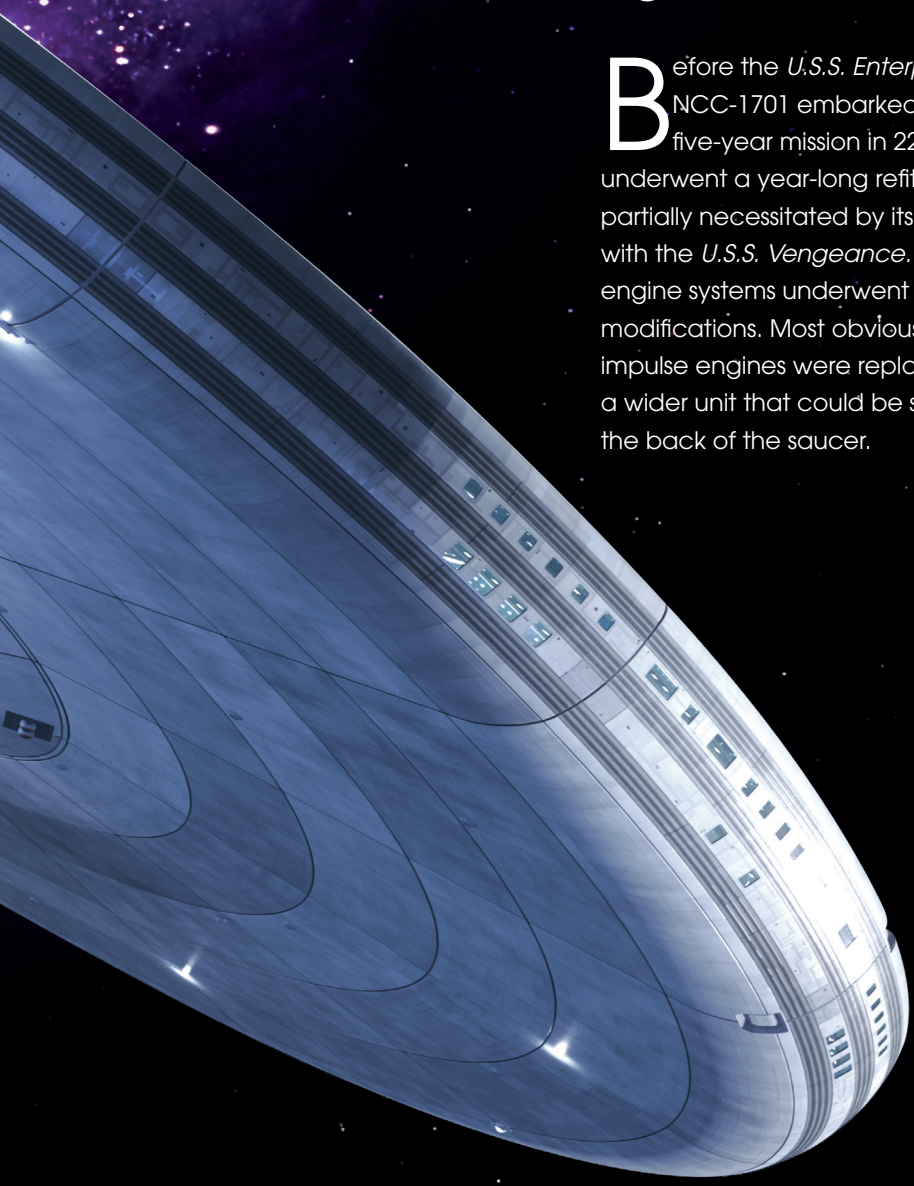
# U.S.S. ENTERPRISE NCC-1701 (2260-63)

Three years into Kirk's first five-year mission, the *Enterprise* had undergone significant changes.

**B**efore the *U.S.S. Enterprise* NCC-1701 embarked on its five-year mission in 2260, it underwent a year-long refit that was partially necessitated by its battle with the *U.S.S. Vengeance*. The ship's engine systems underwent significant modifications. Most obviously, the impulse engines were replaced with a wider unit that could be seen at the back of the saucer.

Later in the mission the ship underwent further modifications. At this point, the warp nacelles were replaced with shorter versions, which were positioned further away from the saucer on redesigned pylons. The architecture of the ship also underwent subtle modifications, with the neck being extended. The armaments were upgraded and the number of phaser emitters on the saucer was almost doubled.

The *Enterprise* was destroyed in 2263, when it was attacked by a swarm of adapted mining vessels, under the command of former Starfleet Captain Balthazar Edison. The mining ships tore through its defenses before literally cutting the ship to pieces. It was replaced by a modified version of the *Constitution* class, the *U.S.S. Enterprise* NCC-1701-A.





# REDESIGNING THE ENTERPRISE

For *STAR TREK BEYOND* the *Enterprise* was rethought and redesigned to make it more elegant and more fragile.

The casual viewer could be forgiven for thinking that the *Enterprise* in *STAR TREK BEYOND* is the same as the version in the previous two films. In fact, it was subtly redesigned and completely rebuilt. Director Justin Lin wanted the film to be about literally tearing *STAR TREK* apart and then putting it back together again, and the *Enterprise* would be the symbol for that. Because

he wanted the *Enterprise-A*, which makes its debut at the end of the movie, to look stronger and tougher than its predecessor, he told the art department and the visual effects team to redesign the earlier version of the *Enterprise* to emphasize its fragility.

Concept artist Sean Hargreaves would be tasked with designing the A but he also had some



input into the redesign of the version of the *Enterprise* that we see in the first third of the film. He's quick to point out that he didn't produce any drawings, but he did discuss how the design could be modified with the team, creating the animated storyboards, also known as previs.

"That original *Enterprise* before it crashed on the planet was designed by the previs team," Hargreaves explains. "They were already placing the ship in the opening scene and they needed to get those modifications done ASAP. I talked with Alex Day, who was the previs supervisor - Justin was

there as well. I didn't do any physical stuff, it was all done verbally. We'd just say, 'I'd like to move this here.'

#### A NEW ENTERPRISE

"We all agreed on the modifications that needed to be done. It was mainly the engines. In my view the existing *Enterprise* was a nice ship that had engines that were too big and were too close to the dish. They just needed a little bit of room and to be pulled back and apart, which is what Alex did. That little movement made a big difference.



▲ The *Enterprise's* impulse engines had been redesigned for the end of *STAR TREK INTO DARKNESS*. The team now altered the proportions and position of the nacelles and extended the neck.

▼ Justin Lin wanted the redesigned *Enterprise* to look fragile and to provide a contrast with the more robust *Enterprise-A*, which appeared at the end of the film.

People who did not like that ship at all loved it once that was done. It was amazing.”

Although the model used for the previs work established the basic principles of the redesign, it too simple to be used to create visual effects. The final design of the *Enterprise* would be defined as the full resolution version was built at visual effects house Double Negative (DNEG).

#### ELEGANT AND VULNERABLE

As Raymond Chen, DNEG's VFX supervisor, recalls, they were handed the previs digital storyboards and the existing ILM models that had been used in *STAR TREK: INTO DARKNESS*. After suffering massive damage at the hands of Admiral Marcus and the *U.S.S. Vengeance*, the *Enterprise* had been rebuilt at the end of that movie. "I think the idea," Chen says, "is that the one you see at the end of *INTO*

*DARKNESS* is what we started with. Because you only see that in that last shot, there was some flexibility.”

Rhys Salcombe, DNEG's build lead for the project, takes up the story, saying that Lin told them to push the design in a direction that made it look fragile. "One of the things they wanted to do was to emphasise any weak points, so when the *Enterprise* got destroyed it was clear *why* it got destroyed. That involved making the neck longer and thinner, and making the nacelle pylons much longer and much thinner. And the pylons got more swept back.”

"The director said more elegant!" Chen interjects, laughing. "He made it very clear that he wanted to have obvious differences between the very elegant thin structures for the *Enterprise* we see at the beginning of the film and the kind of







◀ Double Negative produced concept art showing the redesigned *Enterprise* in action. This painting shows it travelling through the debris field that hides Altamid from the rest of the Galaxy.



◀ The VFX team also redesigned the warp effect, which had never been shown from this angle before.



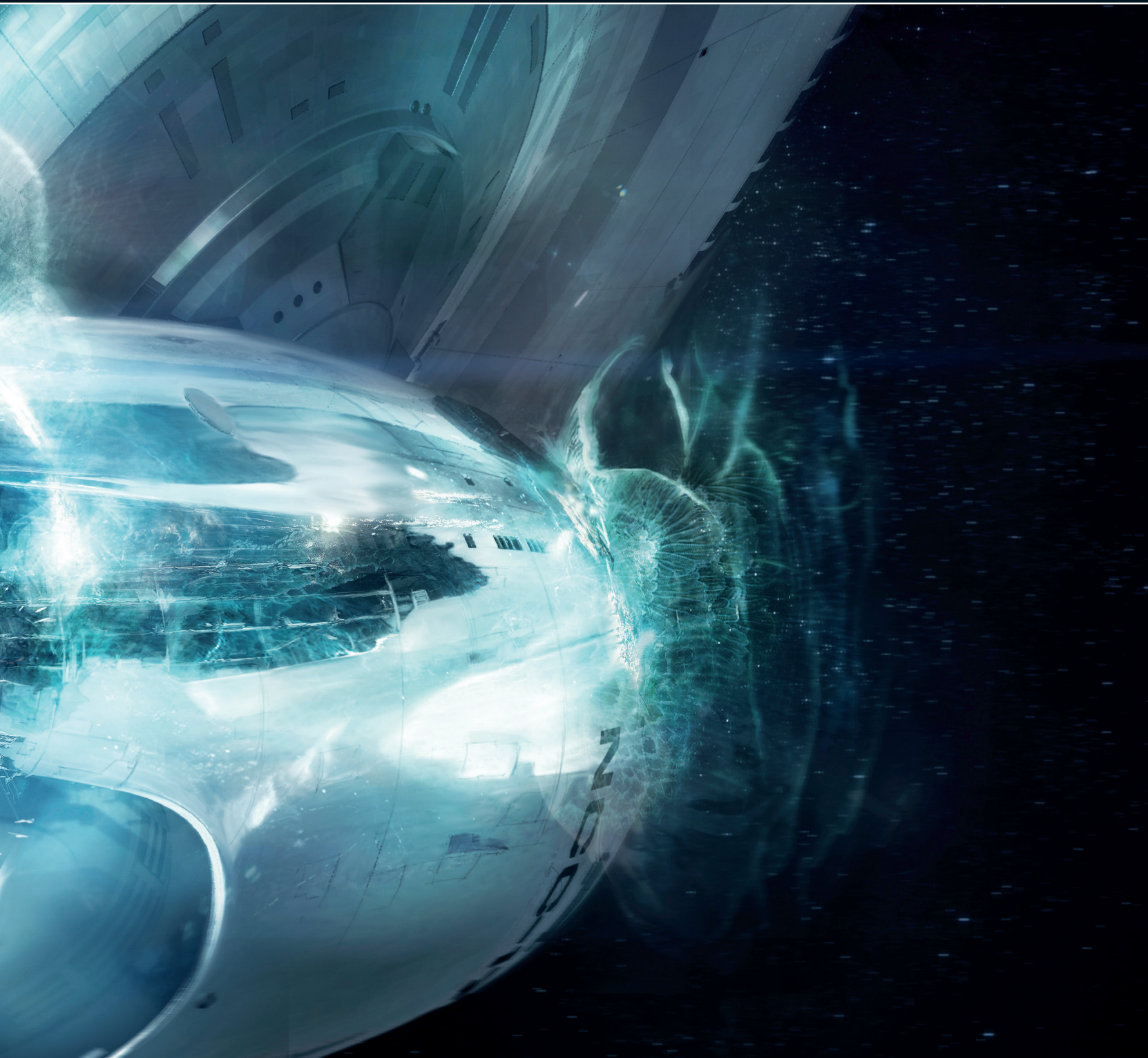
◀ This concept shows the *Enterprise* travelling at warp, with the stars streaking because the ship is travelling faster than light.



beefier, more battleship-like, reinforced structures of the *Enterprise-A* at the end.”

Another major influence on the design was Lin’s desire to create the most dramatic action sequence possible. “On a normal show,” Salcombe explains, “you might design the ship first and then make the sequence fit around it, but

because *BEYOND* was very action driven, Justin very much wanted to make the sequence work first and make the ship fit that so the key beats of the action sequence dictated what the ship would look like. For example, there’s a moment where the neck gets severed by the swarm ships. In order to frame that shot so we could show exactly what



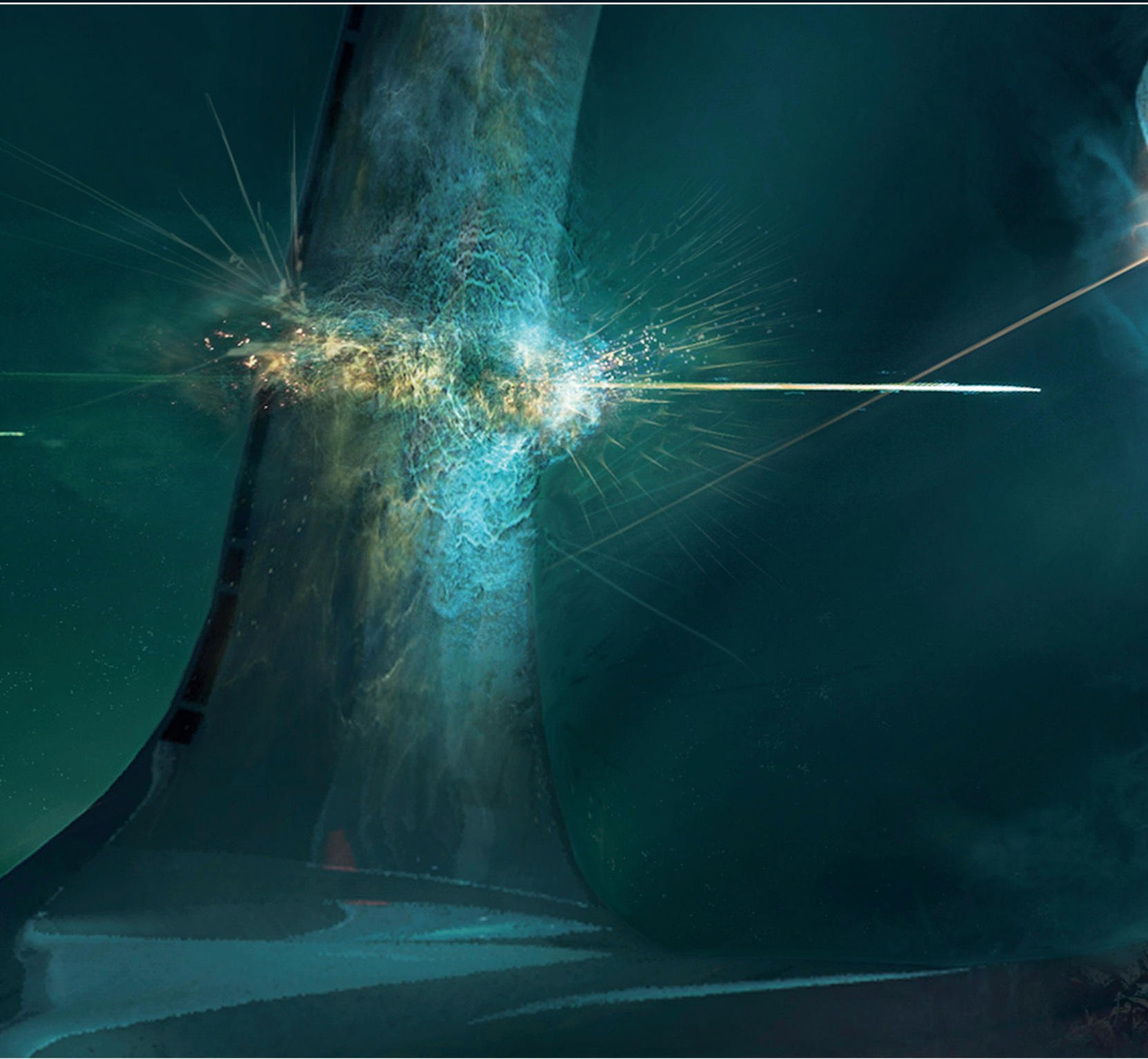
Justin wanted, we elongated the neck. That was something that was driven by the needs of the shots, which were supplied to us by previs.”

Chen goes on to say that the digital storyboards they were given had been carefully worked out, but inevitably, as they created the sequence, things changed. “There were new shots and

changes to shots. We tried to replicate what previs had done but it was a dynamic process. Our layout process is the first step; sometimes the story changes, sometimes the shot changes, shots get taken out, there are new shots, shots get shifted around.”

As that process happened, the design of the

▲ The major action sequence involved the swarm ships tearing the *Enterprise* apart so DNEG produced several concepts showing what this would look like.



*Enterprise* evolved to give Lin exactly what he wanted. The basic principles of Hargreaves' and Day's redesign stayed the same, but the details were worked out in response to the needs of the story. "For example," Salcombe says, "we had almost double the number of phasers that the *Enterprise* had in *INTO DARKNESS* because of the

requirements of the swarm sequence. It looked better if the ship was firing in all directions – it was more random and chaotic. Having more phasers made that easier to do."

DNEG's original intention had been to adapt ILM's *Enterprise* model, but as they worked through the shots that were needed, it became clear that



this wasn't realistic. "The needs of the shots drove what we had to build," Salcombe says. "We knew the neck had to break, the pylons had to break. There were quite a few stages of destruction. I think there were 15 or so throughout the whole takedown sequence and when the saucer crashes on the planet that needed custom elements too.

"The *INTO DARKNESS* model of the *Enterprise* was not built to be destroyed. The original ILM model had a shuttlebay, but it didn't have anything inside the saucer. When you build these things to be destroyed you have to build them in a different way. We knew from the outset that the *Enterprise* was going to get thoroughly smashed.

▲ In this artwork, the swarm ships shoot through the *Enterprise* like bullets. Lin wanted the nacelle pylons and the neck to look thinner so they would look more vulnerable to this kind of attack.



▲ Eventually, the *Enterprise* would be almost completely shredded, leaving the structure underneath exposed.

▼ The finished sequence involved more than a dozen stages of damage. As a result the VFX team had to completely rebuild the model so that it had an interior that could be revealed as it was torn apart.

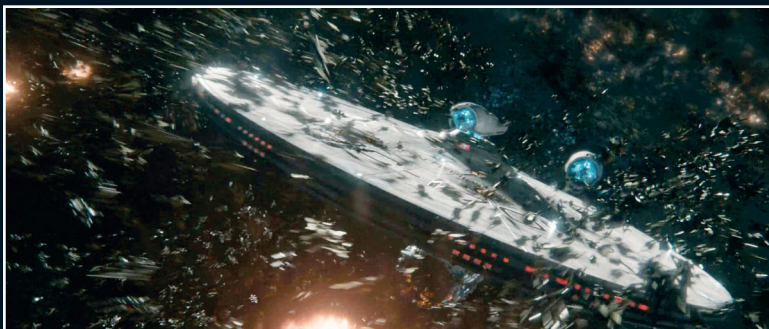
That sequence was across 15 minutes so it was going to get smashed a lot and in a lot of different places. We could have made some new elements and appended them to the original model, but because it was pretty much the whole thing, it was simpler to make a whole new model."

#### INSIDE THE ENTERPRISE

At this point, Chen says it was important to take a step back and think about exactly what they were building. "There was a danger of designing it in production. We started building this model knowing that the design wasn't quite locked

down. So we made sure we did a fair amount of 2D conceptual work using the orthographic views of the models that we had. We had a couple of concept artists working with us at the early stage of the project. They would paint over the renders in Photoshop to show the director. We'd go back to Justin and ask, 'Is that long enough? Is that thin enough? Are these nacelles too high now?'"

The destruction of the *Enterprise* called for the swarm ships to tear off its skin, revealing its interior. Since the inside of the ship had never been shown before, the team devoted a lot of energy to working out what it should look like.





◀ DNEG followed The digital storyboards closely. The shots that Lin had designed in previs dictated what the finished *Enterprise* would look like, and the model was adjusted to make sure that he got the exact shot he wanted.

“We had to do a lot of work conceptualizing what the interior looked like so you could make some sense of where things were,” Chen remembers. “It was a combination of recreating physical sets and retrofitting previous *Enterprise*

deck designs into this new larger ship. There were hallways that had been built on set; they were on a curve and had Y-shaped junctions. We tried to incorporate them into the interiors. The other thing was the bridge. You had to see into that.”





The team also copied the practical version of the turbolift that had been built on set, but inevitably this only provided part of what they needed. Chen explains that they were determined that the interiors shouldn't just be a random selection of rooms.

#### A SENSE OF ORGANIZATION

"We wanted to show some reasoning behind how we were constructing things. What we did was we went back to schematics of previous *Enterprises* and used those as a basis for what we were doing. We had our concept artist do some schematics showing the layout of the decks. We tried to provide a little kind of organization to the interior - these decks are engineering decks and so on. We didn't necessarily build all the decks but that gave people a framework to work with."

Salcombe adds that they didn't just build a series of rooms, but they also thought about the

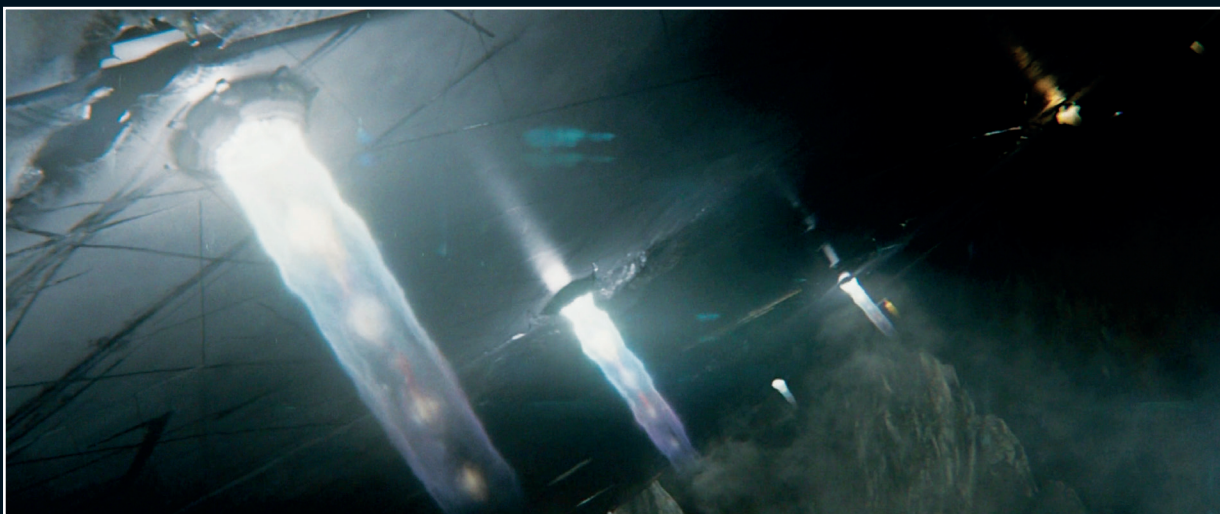
underlying framework that made up the structure of the *Enterprise*. "Because of the smashing element we also built a lot of structural stuff that wasn't just corridors and rooms and so on. The saucer in particular had a ton of that. If you took the outer skin off you would see a skeleton underneath."

Chen goes on to say that while the insides of the outer part of the saucer were relatively detailed, they didn't build every single room. "With most of the destruction stuff you don't see interiors; you see structure rather than actual hallways. We built a kind of shell structure, with wires and piping. We can talk about whether it makes sense to have piping, but it looks good when you destroy it!"

Salcombe adds that again what they built was driven by the needs of the shots that Lin wanted to see. "It was meant to look like chaos, so a lot of it is just random bits and pieces flying past the camera. If we had reference we'd match to that. For the

◀ The saucer was built as a separate element. Under the skin, the outer edge was built in some detail, with rooms, corridors, wires and piping.

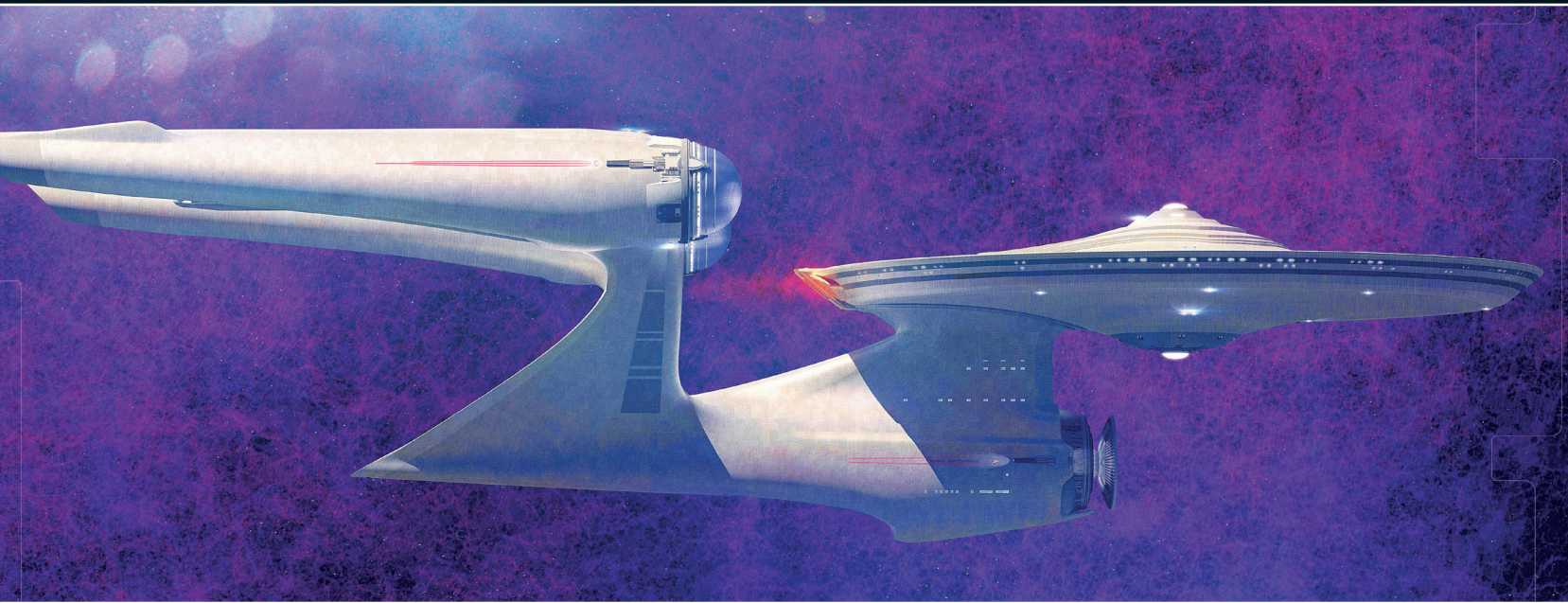
▶ DNEG produced concept art showing the sequence on the planet's surface where Kirk flips the saucer over by activating the thrusters on the underside.



◀ The exact number of thrusters and their positions were altered after the model of the *Enterprise* had been built. The original layout didn't show enough thrusters so the ship was redesigned to make the shot work.







▲ The *Enterprise-A* was designed by Sean Hargreaves, who provided DNEG with concept art and his own CG model of the ship. They then completely rebuilt it, modifying the design to make it look as good as possible from every angle.

new stuff we tried to make it look as if it came from the same world.”

Even after the model had been all-but finished, the team found that Lin’s approach to creating shots involved more changes. “One of the things we needed to work out after we had designed and built the model,” Chen recalls, “was the shot when they are firing the thrusters to flip the saucer.

“There was a thruster layout we struggled with. The previs had assumed that there would be a certain number of thrusters and where they were placed. When it came to looking at our shot, it didn’t work. Our thrusters were too spread out and as a result you couldn’t get enough thrusters into the shot. When Justin saw it, the response was ‘How many thrusters can we see in this camera angle? You guys need to create more of them.’ So we had to create additional rows of thrusters. This is Justin’s way of working. He has a shot in mind, so rather than move the camera around, we rebuilt the model to add more thrusters.”

### COMPLEX SURFACE

One of the most important aspects of any visual effects model is the way it is painted, and this is particularly true of the *Enterprise*, which has a much more complicated surface than it appears at first sight.

“We had a completely new set of textures,” Salcombe explains. “Justin wanted it to look very clean. He felt that it shouldn’t look scuffed or

weathered or dirty looking, despite the fact that it had been in space for five years. It should be more sleek and clean and manufactured and space age rather than worn, oiled or corroded. Some of that was the influence of the *TOS* stuff, where the ships from the 60s do look very clean. Justin liked that aspect of it and wanted to reflect that in the texturing.”

In order to stop the *Enterprise* from looking like a simple, crude block of color, it has an unusual pearlescent texture. This is created by a pattern of squares on the surface, which stops it from looking as if it is painted a single color. That pattern is very subtle, and it isn’t just a case of painting different squares different colors. Those squares are given varying degrees of reflectiveness so they catch the light in different ways. As Salcombe explains, the team at DNEG soon discovered that ILM had been prepared to play some tricks with this.

“One thing that was challenging on both *Enterprises* we built was the shading. In *INTO DARKNESS* the look of the ship changes from shot to shot. That’s because ILM would push the shading to do specific things in one shot that it doesn’t do in others. It has this pearlescent effect, and in some shots they’d make it very reflective but in other shots they’d turn it right down. It looks beautiful, but because our primary reference for the shading of our *Enterprise* was their shots, it was very hard for us to match. We tried to make it a little more unified so that it always reacted the



same way. I think there was a lot of shot tweaking in the end, but probably not as much as ILM's one. Ours was probably a bit more consistent."

Finally, DNEG got a chance to build a completely new *Enterprise*. Having torn Kirk's ship to pieces they gave him a new one. This time they were given a set of drawings to work to, which were produced by Sean Hargreaves. But the decision to build the *Enterprise-A* was taken very late in the day and Salcombe's team at DNEG had to produce the ship in almost record time. "What we got from Sean was a 3D model as well as some 2D artwork," Chen remembers. "There

wasn't time for a lot of back and forth. I think we did talk to him once or twice just to get some clarification, but it was more a case of us taking over where he had got to. There were quite a few variations from Sean's concept but we had to preserve the spirit of his design. The proportions were probably tweaked on top of what his concept was."

That *Enterprise* is literally built before our eyes, with DNEG taking everything they had learned about the ship's interior to the next level. As the movie ends it sets off, as a renewed Kirk heads out into the final frontier.

▲▼ The sequence at the end of the movie shows the *Enterprise-A* being built from scratch. Because so much of the interior was shown, the team at DNEG had to think about the ship's underlying structure and what function each part of the interior served.



***STAR TREK***<sup>™</sup>