U.S.S. KOBAYASHI MARU
ECS-1022
SPECIAL ISSUE
U.S.S. KOBAYASHI MARU
SPECIFICATION

CLASS: KOBAYASHI MARU-TYPE
OPERATIONAL: 2258
OPERATOR: STARFLEET
UNIVERSE: KELVIN TIMELINE
DESIGNING THE KOBAYASHI MARU

The training scenario starship finally appeared on screen in 2009’s STAR TREK thanks to a talented team of designers.

The Kobayashi Maru is one of the most famous ships in STAR TREK but despite its fame it didn’t appear on screen until STAR TREK (2009). The ship is so famous because it is at the heart of a training exercise at Starfleet Academy. It’s a freighter that is trapped on the wrong side of the Klingon Neutral Zone. Every budding captain must work out how to rescue it, without being destroyed and provoking a war. The problem is that there is no correct solution - whatever path the trainee chose ended with
disaster. Only one man – James T. Kirk – ever worked out how to defeat the test.

The Kobayashi Maru was first referred to in the opening scenes of STAR TREK II: THE WRATH OF KHAN when we see Saavik taking the test. But the film was made on a very tight budget and there wasn’t enough money for the team to build a model of the ship. Instead, it simply appears as a tiny blip on a graphic before it is destroyed by three Klingon battle cruisers in a clip that was reused from STAR TREK: THE MOTION PICTURE.

The first time we saw a semi-official design for the ship was in 1989, when Pocket Books published a STAR TREK novel called The Kobayashi Maru, which detailed how Kirk, Scotty, Sulu and Chekov had dealt with the test. The cover art showed a version of the ship.
When Alex Kurtzman and Robert Orci were working on the script for the 2009 movie, they embraced the opportunity to show taking the test at the Academy and wrote the Kobayashi Maru into their script, and, since the 2009 movie had a much larger budget than THE WRATH OF KHAN we would eventually get to see the ship.

The first concept artist to take a pass at the design was John Eaves. He was only supposed to be working on props but towards the end of Eaves's time on the movie, production designer Scott Chambliss asked him to take a pass at both the Kobayashi Maru and the Klingon battle cruisers that were attacking it.

FREIGHTER DESIGN

Eaves remembers that he was given the cover of the Pocket Books novel and a set of speculative blueprints that had been produced by Roger Sorensen in 1983. He produced two concepts that were loosely inspired by these sources. The script described the Kobayashi Maru as a freighter so Eaves's initial idea was that a relatively conventional Starfleet ship with a similar layout would have a cargo unit suspended underneath it. On his second pass, he suggested that the Kobayashi Maru could have twin cargo pods underneath that mirrored the design of the warp nacelles on the top of the ship.

After Eaves had left the production, the producers asked Ryan Church to take a pass at the design. Church had been working on the design of the Enterprise and of the Kelvin. He took the design
John Eaves's two original concept designs showed the U.S.S. Kobayashi Maru as a cargo freighter.
Ryan Church used the basic shape that John Eaves had established for the Kobayashi Maru and combined it with aesthetic he had applied to his designs for the U.S.S. Enterprise and Kelvin.
Parts of the design for the U.S.S. Kobayashi Maru inspired other Starfleet ships in the film, such as the U.S.S. Excelsior and U.S.S. Armstrong, as seen here in John Eaves’s concept art.

Church’s concept drawing was sent to ILM, where the ship was built. The team at ILM decided that although the ship only appeared in a simulation at Starfleet Academy, it should look completely realistic. Alex Jaeger remembers that once they had built the Kobayashi Maru, he would take parts of it and the U.S.S. Kelvin and use them to kitbash the basic designs for the rest of the Starfleet Armada that warps off to Vulcan where they are wiped out by the Narada. In particular he remembers the Kobayashi Maru had a lot in common with his version of the U.S.S. Excelsior, a Starfleet ship that appropriately enough had three nacelles, just like Rick Sternbach’s original design for the Tritium class.

In the end the Kobayashi Maru can barely be seen in the film. It appears in a handful of shots during the simulator sequence and we never get a chance to see all of it.
Industrial Light & Magic was founded by George Lucas in 1975, specifically to produce outer space visual effects for the original Star Wars film. Charged with creating believable starship battles of a kind never seen before on film, the original ILM team raised the bar for movie special effects, reviving and refining classic techniques, and inventing whole new technologies when their ambition outstripped conventional wisdom.

ILM and STAR TREK first crossed paths in 1981, when the firm was hired to provide the effects for STAR TREK II: THE WRATH OF KHAN. This involved much of the same kind of starship model filming that ILM had mastered for Star Wars, but also saw the team pushing boundaries with its first ever completely computer-generated (CG) sequence: the “Genesis effect” shown in Carol Marcus’s Project Genesis presentation.

Over the next 15 years, ILM would supply visual effects for every new STAR TREK film except for STAR TREK V: THE FINAL FRONTIER, with digital effects becoming an ever more prevalent part of their repertoire. By the end of the 1990s, a new trilogy of Star Wars films was in production, precluding ILM’s involvement in either STAR TREK: INSURRECTION or STAR TREK NEMESIS, while also paving the way for the next visual effects revolution: one that was almost entirely digital.

When J.J. Abrams was named as creative lead on the rebooted STAR TREK in 2006, he was still some years away from creating his own Star Wars trilogy. He was, however, a huge admirer of the original Skywalker saga. For him, part of its appeal versus the prequels was its lack of digital technology, and he sought, wherever possible, to use traditional, physical effects on the set of STAR TREK (2009).
Abrams even considered using miniatures for the outer space scenes, inspired by memories of the striking model work in STAR TREK: THE MOTION PICTURE, but eventually accepted that this would be a “vanity choice” given what could now be achieved digitally. The most important thing, he decided, was not to forego CG, but to make it as visceral and believable as the practical footage.

Abrams had no doubt that ILM was the right team for this job. Having just wrapped on Mission: Impossible III, he had first-hand experience of working with the company on a series of heart-stopping effects, and appointed that film’s visual effects supervisor, Roger Guyett, to the same role on STAR TREK, as well as making him second unit director. Guyett began by reviewing every one of the 10 previous STAR TREK films and various other sci-fi epics before work began apace on redefining the franchise for the 21st century.

**STAR SHIP**

One of ILM’s first challenges was realizing the updated U.S.S. Enterprise NCC-1701, as designed by concept artist Ryan Church and production designer Scott Chambliss. Though it clearly belonged to the same lineage as the ship seen in THE ORIGINAL SERIES and the early movies, this new digital model had a number of interesting differences – many of which were much more subtle than the newly bulked-up warp nacelles.

For instance, ILM modeled the translucent bridge dome atop the saucer section to include shapes suggesting sensor arrays underneath, and the main deflector dish was designed to open up “like a flower” (in Guyett’s words) when the ship went to warp. The nacelles themselves were also built with some minor mechanical movement visible along their length, and were brightly illuminated at the rear – rather than illuminated vent-like sections on the end of each nacelle shifted position whenever the Enterprise went to warp, giving the otherwise fairly static design more of an on-screen presence.
having the traditional red-orange glow at the front. ILM art director Alex Jaeger presented Abrams with more colorful options, but they were all dismissed as looking too “magical”.

The scale of the ship changed once the ILM team started to combine it with other elements and environments. With the dimension of Starfleet shuttlecraft established by full-size physical props built for the San Francisco hangar bay scene, it became clear that the Enterprise’s own shuttlebay was simply not as big as it needed to be. To solve this issue, ILM significantly increased the size of the Enterprise relative to other objects, and took the opportunity to add an extra layer of detail.

To make the massive ship look as realistic as possible, texture artists studied some of the largest vessels in the real world, and set about imitating their surface imperfections. Another touchstone was the gleaming, newly refitted Enterprise model from THE MOTION PICTURE, which reflected light in unexpectedly detailed and pearlescent ways. Using software called Viewpaint (which ILM developed for Death Becomes Her in the 1990s and perfected for Jurassic Park), the texture artists were able to map interference patterns across the entire hull, introducing lifelike rippling light effects.

Ironically, this was almost exactly the opposite of what ILM had done to THE MOTION PICTURE model when they got hold of it for THE WRATH OF KHAN – dirtying it down to make it far less reflective and much more suitable for effects photography!

MINER THREAT

If the Enterprise posed a challenge in terms of honoring the STAR TREK legacy from a 21st-century perspective, then the movie’s other key ship gave ILM the opportunity to do something completely new and uninhibited. Conceived by concept artist James Clyne as a once unremarkable mining ship that had accumulated its scythe-like spires as a side effect of its mission, Nero’s Narada was built with a simple digital shape at its core, and then layered up with sweeping curves to create a creepy, organic, cocoon-like shape.
Unlike the Enterprise, where ILM had relatively little involvement with the interior, the Narada also called for the digital wizards to create cavernous spaces and the illusion of multilevel walkways. This was achieved using digimattes – a modern take on the 100-year-old technique of matte painting, whereby the partial physical set is photographed as a ‘plate shot’ and the plate is then overlaid with elements created by an artist.

In order for the Narada to have the greatest visual impact on its first appearance, it was pitted against the small and submarine-like U.S.S. Kelvin. As with the other ships in the movie, this was built by ILM under the watchful eye of digital model supervisor Bruce Holcomb, and its movement on screen was overseen by animation supervisor Paul Kavanagh, based on storyboard animatics. However, when Abrams changed his mind about exactly what he wanted from the opening shots of the Kelvin during principal photography, ILM took on extra duties: creating their own previsualizations on the fly. As filming continued, Kavanagh and Abrams devised a brand new 720-degree camera move around the ship – revealing it with greater drama and mystery than originally planned.

When the Narada opens fire on the Kelvin, ILM was again on hand to create the missiles and explosions that tear through the Starfleet ship.
Guyett and the team were keen to create effects that realistically emulated the vacuum of space, and experimented with controlled blast shapes and burn times. Digital artist Raul Essig took charge of this process, finding the right balance between accurate physics and exciting spectacle. Each explosion was built up from several effects layers (including flame, smoke, debris, and sparks) that expanded radially until they collided with another digital artifact, at which point they branched off in unexpected ways.

**IT'S A TWISTER**

Physics and fantasy collided once again in the black hole that heralds the arrival of the *Narada* at the start of the film, and which eventually consumes it at the end. For this effect, Abrams asked ILM to revisit the apocalyptic tornadoes they had created for the 1996 disaster movie *Twister*, having been... blown away by their frightening scale at the time.

Jaeger struggled to convey the scope of this through traditional concept art, and so set about creating a simple computer animation using Adobe After Effects. To simulate a real camera filiming the CG effects in a real environment, for example, the team would add tiny particles of dust and dirt to the virtual lens (what ILM co-visual effects supervisor Russell Earl calls “lens schmutz”). This would result in subtle lighting effects that are not distracting, but which are subconsciously familiar for a movie audience.

The digital artists would also mimic the effects of glare on a real camera, replicating the distinctive lens flare effect that Abrams uses in live-action footage throughout the movie (achieved on set simply by holding a powerful flashlight just out of shot). Once considered a flaw by filmmakers emulating the real world, it can now serve to convince the viewer that something entirely computer-generated is taking place in a recognizably true-to-life environment.

The most challenging element of Abrams’ filming style to recreate, however, was not a property of the technology itself, but the director’s propensity for vigorously shaking the camera during filming to produce random, dynamic movements. By comparison, a standard ILM camera move would look smooth and stately - and obviously artificial.

To overcome this jarring mismatch, the effects team invented a simple but effective tool. Consisting of a small motion-capture sensor mounted on a tripod, the device was duplicated at several ILM desks and fed its input to the virtual camera in the digital environment. Once the basic visuals were in place, the animators could then simulate the organic movement of a real shaking camera simply by drumming their fingertips on their desks - a solution that proved far more cost-effective than sending Abrams into space!
a 3D quality, sequence supervisor Jeff Grebe and his team added layers of particles in a spinning vortex, and developed new tools that gave a higher degree of control over their movement than had been the case with previous similar effects.

Despite having the appearance of a 3D object, however, the effect was still built into the digital environment as a two-dimensional plane. This meant that as the “camera” passed beside the black hole, it disappeared when viewed side-on, before a near-identical vortex was revealed on the other side. This physics-defying use of space emphasized the portal as a time-warping and universe-splitting anomaly.

VISIT TO VULCAN

Of course, ILM’s involvement in STAR TREK was not limited to the outer space sequences, and more than a third of the 860 shots they created for the film depicted scenes on or above Vulcan. Based on designs by Ryan Church, the team realized the planet’s dynamic architecture, which saw asymmetrical skyscrapers reaching up to meet descending towers built on the underside of gigantic rocky outcrops. The idea of intersecting, irregular angles was also carried through to interior spaces, where ILM provided digital set extensions based on a philosophy of “no 90-degree angles”.

No sooner had ILM created Vulcan than the time came to destroy it. Working with location footage of dummy rock falls and dust whipped up by wind machines, the team multiplied the boulders and created whole new peaks that would crack apart when subjected to “digital fracture technology”. That meant digital artist Frank Losasso Petterson applying stress effects to the cell structure of the digital landscape, controlling the strength and epicenter of the waves vibrating through them. On top of that, other digital artists then added lava plumes and debris clouds.

INDUSTRIOUS ILM

Other digital effects created for the film included...

- Kirk’s uncle’s Corvette plunging into a chasm, and the digimatte chasm itself (on set, the real car was swung out over a 12 ft trench).
- The Enterprise under construction on Earth, which combined a live-action long shot of a California power plant with digital artwork.
- The subtle elimination of wheel spokes on Kirk’s BMW motorcycle, giving the physical prop an additional futuristic edge.
But by far the biggest task for ILM was creating the cause of all this destruction: the Narada’s tethered drill platform, lowered into Vulcan’s lower atmosphere. Built as a partial set with greenscreen all around, the platform needed roughly 150 ft of its 190 ft circumference to be created digitally, as well as the entire 360-degree environment around it – stretching up into space and down to the planet’s surface. The team also created digital doubles of the Enterprise away team for long shots of them hurtling towards the platform by means of a vertiginous ‘space jump’.

For closer shots of the cast, ILM composited the actors into the CG environment and added shadows and reflections to their jump suits to simulate realistic movement. For their high-speed approach to the platform, these lighting effects were applied with very rapid transitions – plus added vapor trails – transforming footage of the actors actually standing on the spot to create a believable sense of free-fall in the shadow of the platform’s tether.

For the total destruction of the planet, seen from space, Jaeger previsualized the implosion using a NASA photograph of Mars. Then, the creature development team – more usually associated with digital beasts – took the reins for the organic inward collapse of the planet.

**INDUSTRIOUS ILM (continued)**

- Twenty-third century San Francisco, built up using layers of 3D structures and haze effects to create the illusion of depth.
- Starfleet shuttles leaving Earth for ships in orbit – composited with live-action footage of hundreds of extras in a Southern Californian blimp hangar.
- The main viewer on the bridge of the Enterprise, which for the first time doubled as a panoramic window – complete with CG reflections.
Once again, digital fracture technology was used to break up the model globe in a scientifically realistic fashion, before creativity was unleashed to add interest and finer details. One reference point for the final effect was about as far from hard science as it was possible to get: ILM’s own imploding house effect from the 1982 movie, *Poltergeist*!

**PAST MEETS FUTURE**

The appearance of Vulcan in the film, with its harsh desert landscape and temples of logic destined only for destruction is one of several examples of STAR TREK lore being respected and radically updated all at once. Two other, less obvious instances are the transporter beam and warp speed effects.

For the new transporter effect, Abrams was keen to show the immediate area around the target being affected by the transporter beam, as well as the target itself. ILM visualized this in terms of particles around a beaming individual starting to “activate”, generating light until the person within the beam was obscured by the glow. Though the finished effect looked quite different from previous incarnations, Guyett and the team did their homework to make sure that the science behind their 3D particle simulations was in keeping with the principles laid down in previous STAR TREK films and series.

For the warp speed effect, Guyett was again keen to respect the past, while broadening the scope of the visuals to create something more cinematic that what had gone before. Whereas in earlier films, the Enterprise at warp leaves its own trail of blurred light, in STAR TREK it enters a barreling tube of light, intended to convey the vast power being harnessed by warp technology.

As with the transporter effect, this look was achieved using frenetic particle simulations that were enhanced and treated by Sabre artists. For the very last shot of the film, however – as the Enterprise goes to warp with Kirk now officially in command – the ILM team created a more traditional streaked-light effect in homage to THE ORIGINAL SERIES. It’s a blink-and-you’ll-miss-it moment, but it is intended as a subtle bridge between the movie and the same crew’s first adventures on TV more than 40 years before.

Back in 1966, of course, Industrial Light & Magic wasn’t even a twinkle in young George Lucas’ eye. But then, you can get away with writing yourself into STAR TREK’s earliest history when you’ve taken the trouble to build your own black hole…
The **Kobayashi Maru** training scenario was devised for *STAR TREK II: THE WRATH OF KHAN*, long before it appeared in 2009’s *STAR TREK*.

The Kobayashi Maru scenario appears in the very earliest drafts of *STAR TREK II: THE WRATH OF KHAN*. It was introduced by the first writer to take a pass at the script, Jack B. Sowards, who named it after his neighbors in Hancock Park. When Nicholas Meyer took an uncredited pass at the script, creating the version that was actually filmed, he remembers deciding to leave the simulator sequence out, but, as he explains, this soon changed. “I remember the simulator sequence wasn’t in it. We were talking about the fans, and about how they were very concerned that Spock was going to die in the movie. I was sitting behind Harve Bennett in a screening where we looking at footage we planned to borrow from the first movie. I said to him, ‘Why don’t we open the movie with simulator sequence, put Spock in it and kill him off right up front.’ I sort of thought I was being funny, but Harve turned around and said, ‘Oh, that’s great.’”

Once the Kobayashi Maru sequence had been restored, it became integral to what the movie
was going to be about – the unwinnable scenario.

Once the sequence had been restored to the script, Meyer had the idea that Kirk would have never had to face up to the no-win scenario, always finding a way out of it, even if that seemed like cheating. Meyer’s idea was that Kirk had reprogrammed the computers so that he could win. STAR TREK II’s producer Harve Bennett was nervous about this and felt that perhaps Kirk shouldn’t “cheat”. He remembered changing his mind when Meyer dismissed this as “TV thinking.”

The sequence itself was one of the few elements of THE WRATH OF KHAN that involved any reshoots. Robert Sallin, effectively the movie’s line producer, remembered being disappointed when he saw Kirk’s entrance at the end of the sequence.

“When we discover that it’s a training exercise; the doors open, and Kirk appears. I said, ‘Here’s what I want to do. When those doors open, the room is filled with smoke, and I want him to emerge in silhouette. I want the strongest backlight you can give him, directly behind him, so that when he walks through there are fingers of light that surround him in the smoke. I want it to look like the Second Coming.’ When I looked at the dailies, the light was off to the side and the shot had no drama whatsoever. I made them go back and reshoot it, and that’s the shot that’s in the picture.”

When it was decided that STAR TREK (2009) would show Kirk at the Academy it was inevitable that we would see him take the test. This time around though, the sequence was shortened. Additional scenes were originally planned that showed Kirk tricking his Orion girlfriend into implanting the virus that changed the test.