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D4 BIRD-OF-PREY™
SPECIAL ISSUE

CLASS: D4

OPERATIONAL: 2259

LENGTH: 25.5 METERS

WINGSPAN: 39 METERS

KLINGON D4 BIRD-OF-PREY

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D4 BIRD-OF-PREY

SPECIFICATION



CLASS:

D4

OPERATIONAL:

2259

CREW:

6

TYPE:

ATMOSPHERIC FIGHTER

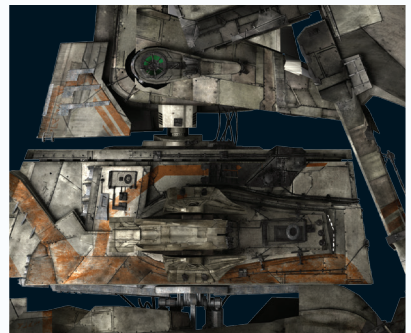
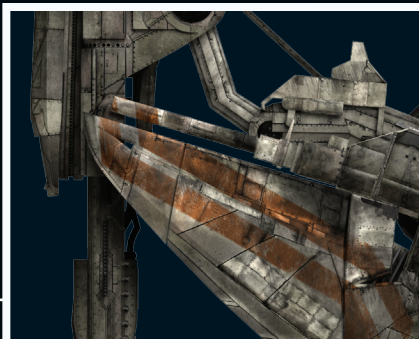
MISSION:

PLANETARY DEFENSE

WEAPONRY:

DISRUPTOR CANNONS

MICRO TORPEDOES





KLINGON D4 BIRD-OF-PREY

In the 2250s heavily armed fighters patrolled the surface of the Klingon homeworld.



◀ D4 fighters patrolled the atmosphere of the Klingon homeworld, defending from intruders and putting down any rebellion.

At a little over 25 meters long, the D4 fighter is one of the smallest birds-of-prey ever used by the Klingon Empire. Ships of this class were assigned to patrol duties on Klingon planets such as the homeworld Qo'noS, and were ideally suited for operation in a planetary atmosphere. They were operated by a pilot and co-pilot and carried four warriors in the 'belly,' who could rappel out of four circular ports, hidden under twin hatches in the underside of the ship to quell any disturbance on the surface. This class of ship was so small that it had no crew quarters and the crew only had no more room than was needed to transport them.

The D4 was a highly maneuverable ship that

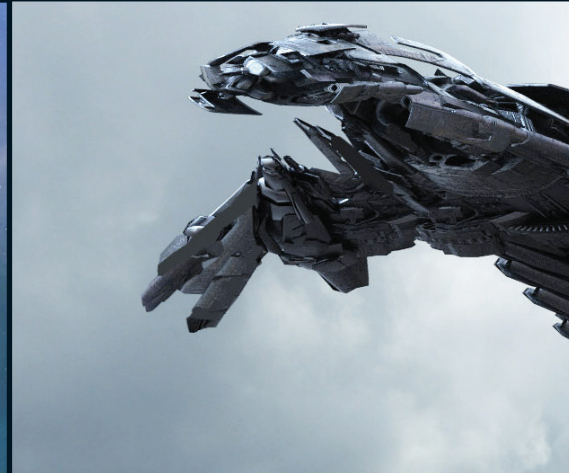
could dodge between buildings. Like the larger birds-of-prey the wings had variable geometry - in flight they moved through a range of positions, sweeping up when the ship touched down on the surface. However, on these planetary fighters the wings were designed to operate independently, and could rotate through a wide range of angles. Thrusters mounted on the wingtips allowed the ship to be flown with pinpoint accuracy.

Weaponry included disruptors and microtorpedoes, with a variety of weapons arrays mounted on the wings, most obviously near the ship's shoulders.

The D4s were too small to be fitted with transporters and the crew either dropped from the hatches or exited through a gangway at the front, which could be opened once the ship was on the surface.



◀ In the altered timeline caused by Nero's actions, D4 fighters carried a small complement of Klingon warriors.



DESIGNING THE D4 BIRD-OF-PREY

STAR TREK's new Klingon fighter had a long journey before becoming the most hawk-like of all the birds-of-prey...

The JJ Abrams *STAR TREK* movies have always been about reinvention, about taking the franchise's most familiar elements and updating it without losing its essence. So it was almost inevitable that the Klingons would play a

major role in *STAR TREK INTO DARKNESS*, and when it came to their ships, as with everything, the question was always how much to keep and how much to change. The final ship would be designed by James Clyne, but along the way the art



department explored some very different ideas. "It went through a lot of different iterations with a couple of other artists," Clyne says. "What I love about (Production designer) Scott (Chambliss) is that he's always trying to think outside of the box. I think he was trying to do something that's not exactly what we're all used to with the Klingon stuff. He wanted something a little unconventional, asymmetrical."

The first designs Chambliss asked for were created by Harald Belker and are unlike anything we had ever seen before – strange, three-towered ships with no obvious means of propulsion. In fact,

they were so strange that when Belker left, the team decided to roll back and try something more familiar.

The next set of designs were done by Steve Messing, who began by returning to the familiar shape of Nilo Rodis's classic bird-of-prey design. "As the process went on," Clyne remembers, "they kind of cut it apart. They were exploring different ways of looking at it. Does it have to be so symmetrical? Can you remove a wing and add something else? Remove all of the Klingon elements."

This led to a series of designs that became

▲ Steven Messing's designs for the Klingon ships started out relatively conventional and include versions that are clearly related to the traditional bird-of-prey, but they also included radical departures that altered or cut out the most familiar elements.



increasingly abstract. In some, one of the wings is rolled up to form a massive weapon, but in others the familiar bird shapes have all been cut down so much that they are barely recognisable.

Until this point, there had been plenty of time to play around with the design, but creating the sequence that featured the ships would take months and it started to become important to have a finished design. As VFX supervisor Ben Grossmann says, "We had so many big heavy shots that it was in, so if you don't have a complete Klingon fighter then you're having a bad day."

By this point, the art department was smaller and the design was passed on to Clyne. "It fell into my lap because I was one of the last men standing. I was simply still there!"

LOOKING FOR DIRECTION

Clyne's first designs were a variation of Messing's final cut down ship and he describes them as being like a sculpture rather than a ship and they were still a long way away from the final design. Clyne thinks that one of the reasons the design wasn't coming into focus was that it wasn't entirely clear what the ships were going to do. The only thing they were certain of was that it had to emit a pattern of lights. The production team were already filming the sequence where Kirk and Khan fight the Klingons on the surface of Qo'noS, and they had developed an interesting lighting rig that shone on the actors. "It was kind of an array of three or four lights. It could have separate little beams of light that could be used to search the ground and almost kind of create a vector of a location.

"Roger Guyet, the visual effects supervisor (and second unit director), needed an exact location on the ship that these lights were coming from. It was almost like we were doing things in reverse – designing the ship around the lights. There was a whole question about how this thing lit up. I came up with different patterns, there was like a searching, or a mapping of the ground."

In order to find a design that he liked, Abrams

◀ In Messing's final designs all the recognizable shapes had been cut away to leave a core with the only slightest suggestion of traditional wings. This was where the design was when Messing left and the task was handed on to James Clyne.

HARALD BELKER: THE FIRST DESIGNS



The very first designs for the Klingon ships were done by Harald Belker. "It started out," he says, "as a great challenge. There was great potential there to do something very different but true to the history of Klingon ships. The premise given by Scott was cool, that he wanted to explore a very deconstructed way of Klingon architecture and have that reflected in the ship as well. He told me that he wanted 3 towers in an arbitrary angle so I went off and rendered endless versions of it." But as he worked, Belker always felt that there was a problem with this approach. "It might be cool as a stationary object but flying around... To design a spaceship you need direction, symmetry, propulsion." The designs were eventually abandoned at a point when, Belker says, the Klingons were temporarily written out of the film. Belker left the art department around the same time and the baton was passed to Steven Messing.





PROJECT	ILLUSTRATION TITLE	155_Vfx_Ext_CD_YellowCab_120222_Lineup01_JC	
	ARTIST	James Clyne	
	PRELIMINARY DATE	02/22/2012	APPROVED DATE
	Production Designer: SCOTT CHAMBLISS	PRELIMINARY	
	Supervising Art Director: RAMSEY AVERY		

▲▼ Clyne's first pass at the Klingon ship was a variation on Messing's design and he describes it as being very abstract, almost like a sculpture.

needed a clearer vision of exactly what the ship would do on screen. "For JJ," Clyne says, "it's about what is the scene, what's happening in that moment. Then you kind of design for that moment, not the other way around. But as you can see Steve was using different backgrounds for the ship - it's in space or in a different world - that's because I think we didn't really have that scene laid down in concrete just yet. We were still

designing the world it lived in."

Things fell into place when Clyne finally came up with a look for the ruined surface of the Klingon planet. "The fun part about that was I built a very simple CG model. It was this kind of ornate lattice work of architecture. Scott thought it was cool and he said 'Go down to set where JJ's shooting'. I was able to have a couple of minutes with JJ with my laptop. I let him fly through this dumb model. It

PROJECT	ILLUSTRATION TITLE	155_Vfx_Ext_CD_YellowCab_120224_Lightsource01_JC	
	ARTIST	James Clyne	
	PRELIMINARY DATE	02/24/2012	APPROVED DATE
	Production Designer: SCOTT CHAMBLISS	PRELIMINARY	
	Supervising Art Director: RAMSEY AVERY		



PIERRE DROLET: A FAMILIAR IDEA



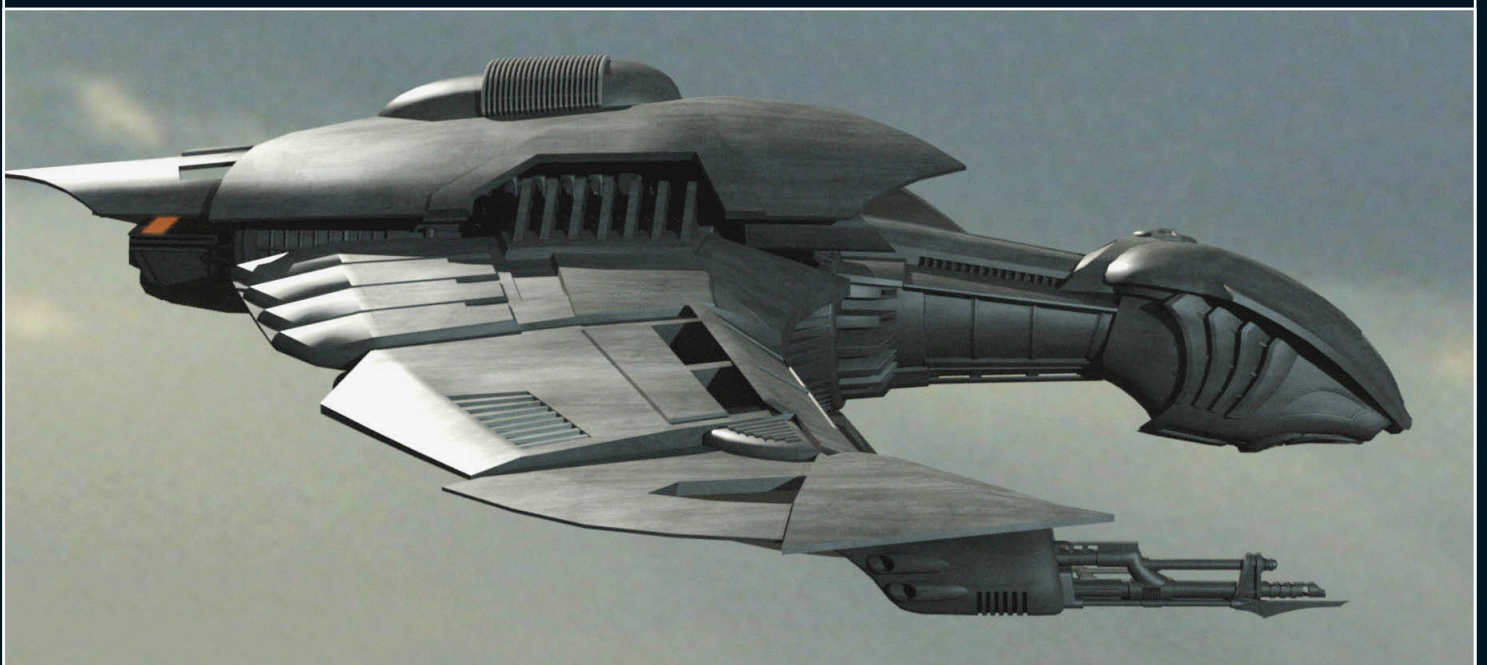
Although the *STAR TREK INTO DARKNESS* art department was designing the Klingon ship, the visual effects house that built it, Pixomondo, also took a pass at the design. The look hadn't been finalised and they realised that one of the people working for them, Pierre Drolet, was a veteran of the *STAR TREK: VOYAGER* and *ENTERPRISE* CG departments. They asked Drolet to see what he could come up with. Drolet's approach had much more in

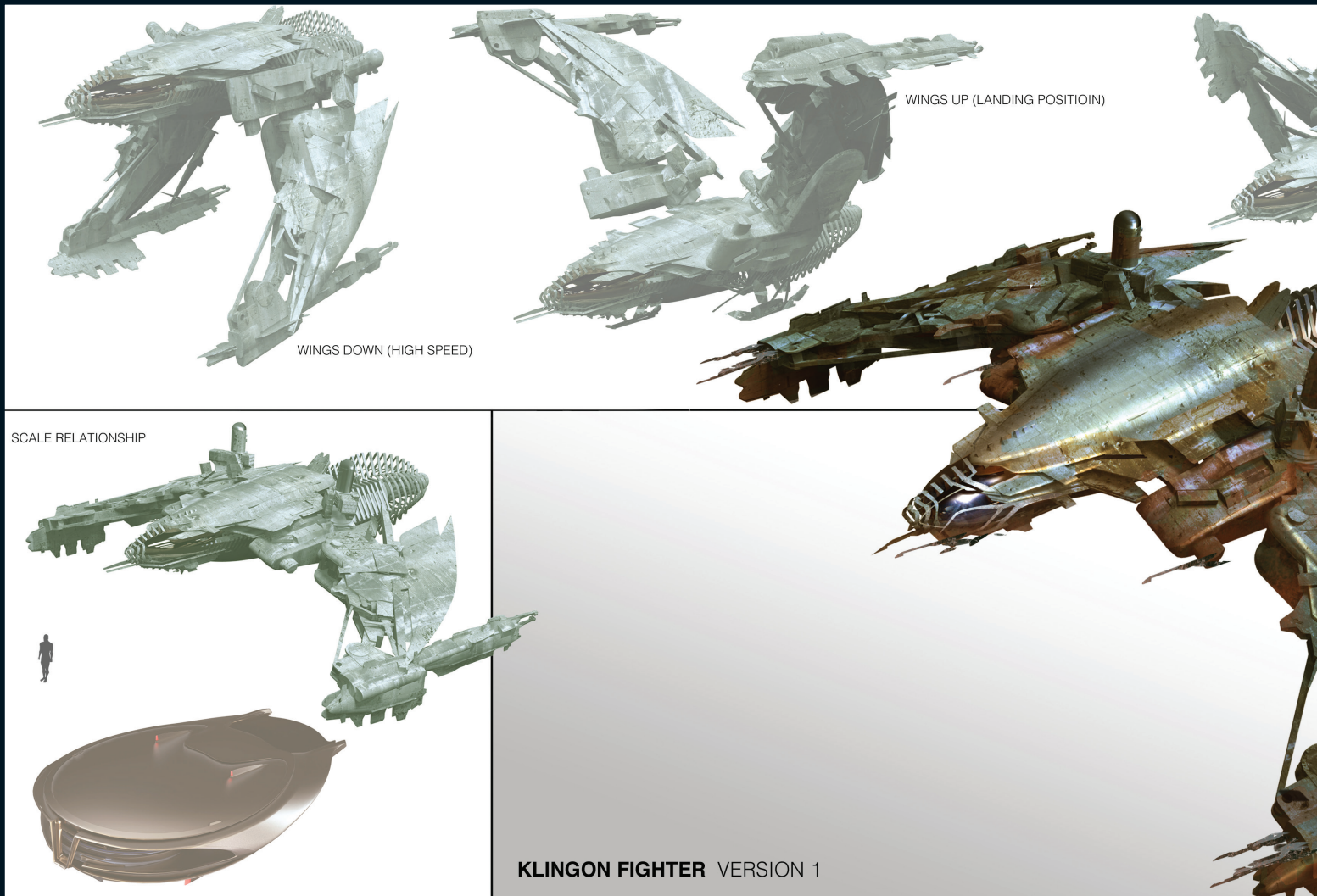
common with Rodis's original design. He had only just started to block it out when Clyne's final design was approved so it was abandoned before he even completed it. "It was just a shape," Drolet remembers, "the front was not done. I knew where I was going with it, but I never got the chance."

"Pierre had done some great designs that were much more grounded in the original canon," Grossmann remembers.

"That was a good exercise to see what someone who has had more experience in the Klingon world would do. We asked him to take another fork on that branch so to speak."

Drolet left Pixomondo shortly afterward but he had enjoyed starting the design and a year or so later he decided to finish it off in his own time. The final version can be seen on his website, www.pierre-drolet-sci-fi-museum.com.





SCALE RELATIONSHIP

KLINGON FIGHTER VERSION 1

▼ Clyne knew that the Klingon ship would emit lights that would have to match up with a lighting rig that had been installed on the soundstage. The idea was that the lights would become kind of scanner and he worked up several different looks.

wasn't even really textured much, it was just a hodgepodge, but it created a fun environment for the sequence. JJ responded to that idea and thought it would be really fun to fly through. I'm sure the script called for this exciting dogfight, but we had no context for it until I kind of came up with this very simply lattice work structure."

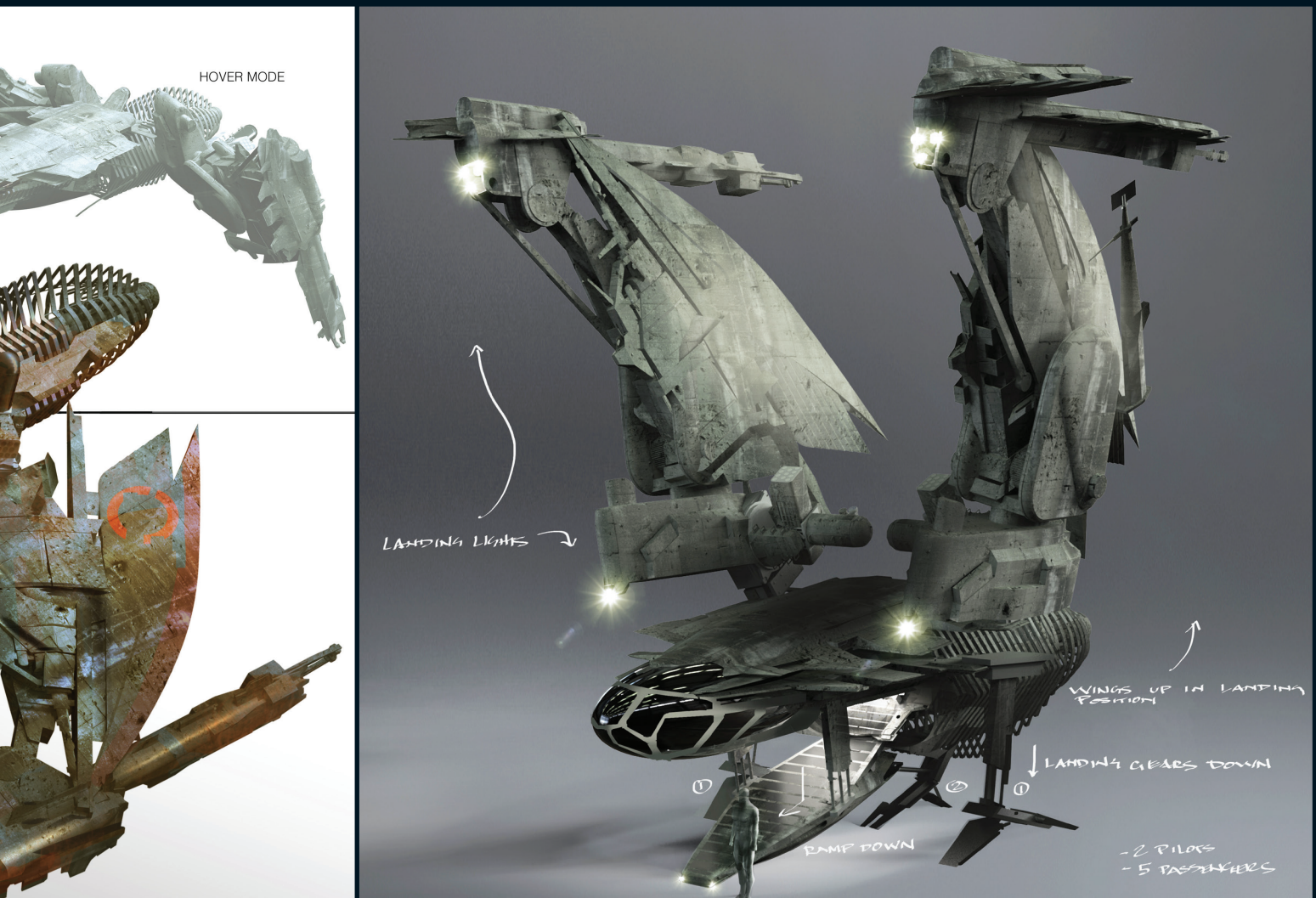
And for Abrams this clarified what he need.

Since the Klingon fighter would be moving at high speed, dodging through buildings and canyons, the silhouette had to be instantly recognizable as a traditional Klingon ship.

KITBASHING IN CG

Clyne returned to the drawing board or, more accurately, his computer and started to design a





▲ Clyne's final approved concept sketch, which was given to Pixomondo, was made by mashing several different elements together in 3D software. The design included suggestions for how the ship could land and the wings would move.

new take on the bird-of-prey, but he didn't work with conventional drawing tools. Instead, he "kitbashed" the design in much the same way traditional modelmakers had done on *2001* or *Star Wars*, only instead of using physical parts he used CG ones. "It was an exploration. In that kind of mental state you're not thinking about every shape or form, you're kind of just looking for something. I might have played with three or four of these models. I'd just kind of lay them out in my 3D package and I'd mix and match pieces. For example that kind of thorax – the bee shaped thing on the back – that is a Santiago Calatrava piece of architecture. I just threw that in there and it became something else. There are some pieces off of an aircraft carrier that was part of the body that I just squashed.

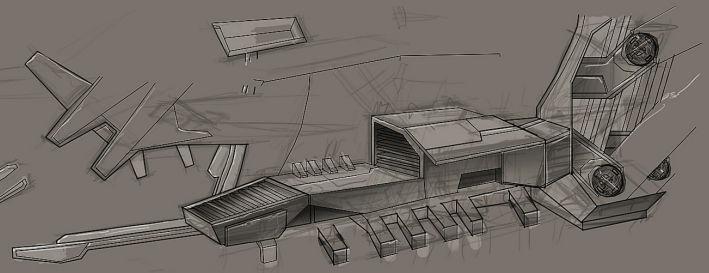
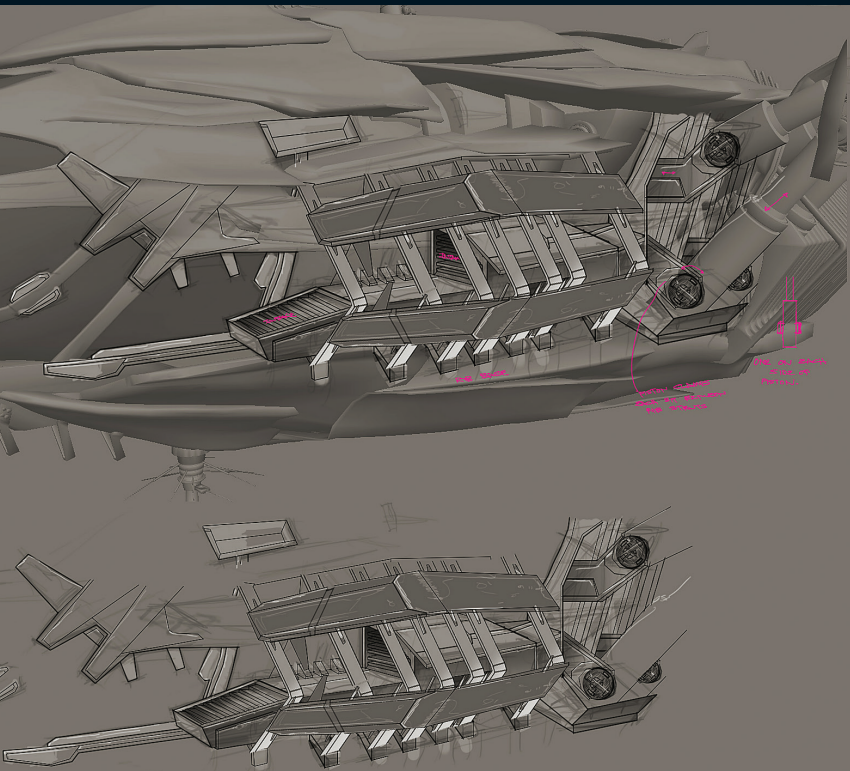
"I would have never thought of doing it that way had I sat and thought about it and sketched it. I would have probably come up with something

that made a little more sense! But because I was doing it this way, it gave the design a little more interest and uniqueness."

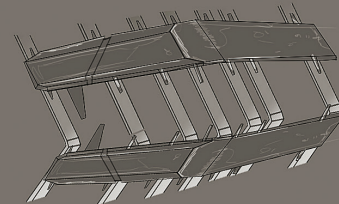
A REAL BIRD OF PREY

As he pushed pieces together, Clyne kept thinking about the idea of a real world bird of prey rather than slavishly following the established Klingon design. This led him to alter the proportions and the way the ship moved, "They wanted the ship to be very maneuverable and I thought, 'The wing articulation on the original Klingon bird-of-prey just goes up and down. How can we up that articulation?' You could use those wings as a braking mechanism, or maybe they're independent of each other. They almost become kind of more bird-like in their anatomy where they can shift their wings accordingly."

Of course, he was also careful to make sure that the new design still matched up with the lighting rig



Wing Mechanism Intakes w/ cockpit flourishings



Rib siding encasings so it feels like you can see the interior guts of the ships drive intakes.

Side Pieces Combined

AA
BOP Wing Detail
0001
4/10/12

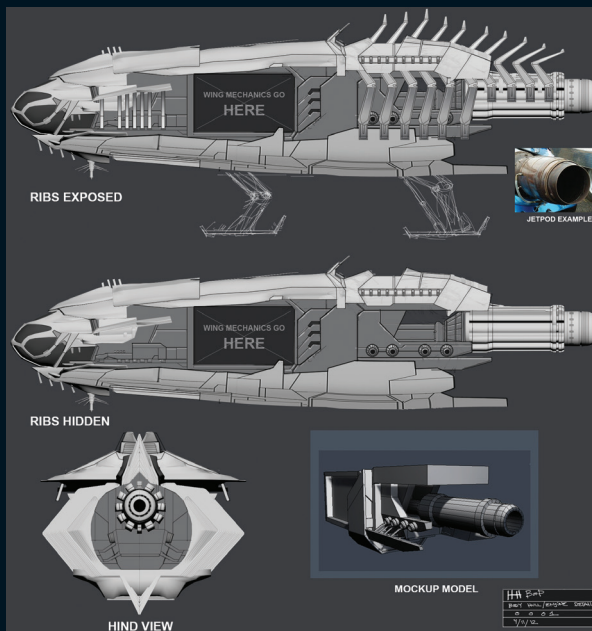
▲ Clyne's concept drawing established the basic look of the ship but left a lot of room for interpretation and the team at Pixomondo spent a lot of time working out what the ship would look like in detail.

that had been used on the stage.

Within a day and a half, Clyne had found a design that everyone was happy with. The next stage was to hand it over to Ben Grossmann and the team at Pixomondo. "The visual effects guys brought it to life," Clyne says, "they really made it real. I met with them a couple of times but when you have a good visual effects company like

them, you really kind of trust they'll do the right thing and put in the time to make it work. They were able to spend time to refine a lot of the shapes and make sense of it all which was great."

And, as Grossmann says, even though they had finally settled on a design, the Klingon fighter still had a long way to go. "We got James's concept but a concept is just a sketch. Enrico Damm, Patrick Schuler and Adam Watkins are the guys who put that thing together. We changed the way the thing flew. We changed the way the thing landed. We tweaked out lots of stuff but kept the basic broad strokes of the design the same."



► Pixomondo didn't just want to make a ship that looked cool. They wanted to make it convincing and they devoted a lot of thought to the interior layout, even though it would never be seen.

HAWKS VS SPARROW

Like Clyne, Grossmann and the Pixomondo team were driven by what the Klingon ships had to do. Most importantly, they knew that they would be involved in an exciting dogfight. "We designed them so we could create a chase sequence that was based on the idea of hawk and sparrow. You have a small sparrow that is rather defenseless, then you have these hawks that are larger. The sparrow is going to be weaving through this forest, dodging branches and trees to get out of the way of the hawk and avoid getting killed. You need

the hawks to be maneuverable enough to keep the chase close and to make things scary.”

Clyne’s concept had implied that the wings could move in several directions, and, as Grossmann explains, his team thought it was important that their movements were convincing and served a purpose. “We just kept adding more and more articulation to the way the body and the wings moved. At one point we went too far – the wings could rake forward they could almost do a full 360 and they could move individually.

REAL WORLD PHYSICS

“We ran simulations, to find out in what scenario you would want to have asymmetric movement. You can do it, but it makes the ship look like it’s in trouble so that’s how we decided to play it – when it gets hit then the wings move into asymmetric articulation, but if it’s not getting clobbered, we just kept it symmetrical. The wingtips can move forward if it’s going into high speed mode.”

The team also ran simulations looking at what kept the ship in the air and where the propulsion came from. “We worked a lot on the propulsion systems,” Grossmann remembers. “JJ would always ask, ‘How do these things fly?’ Well, how does

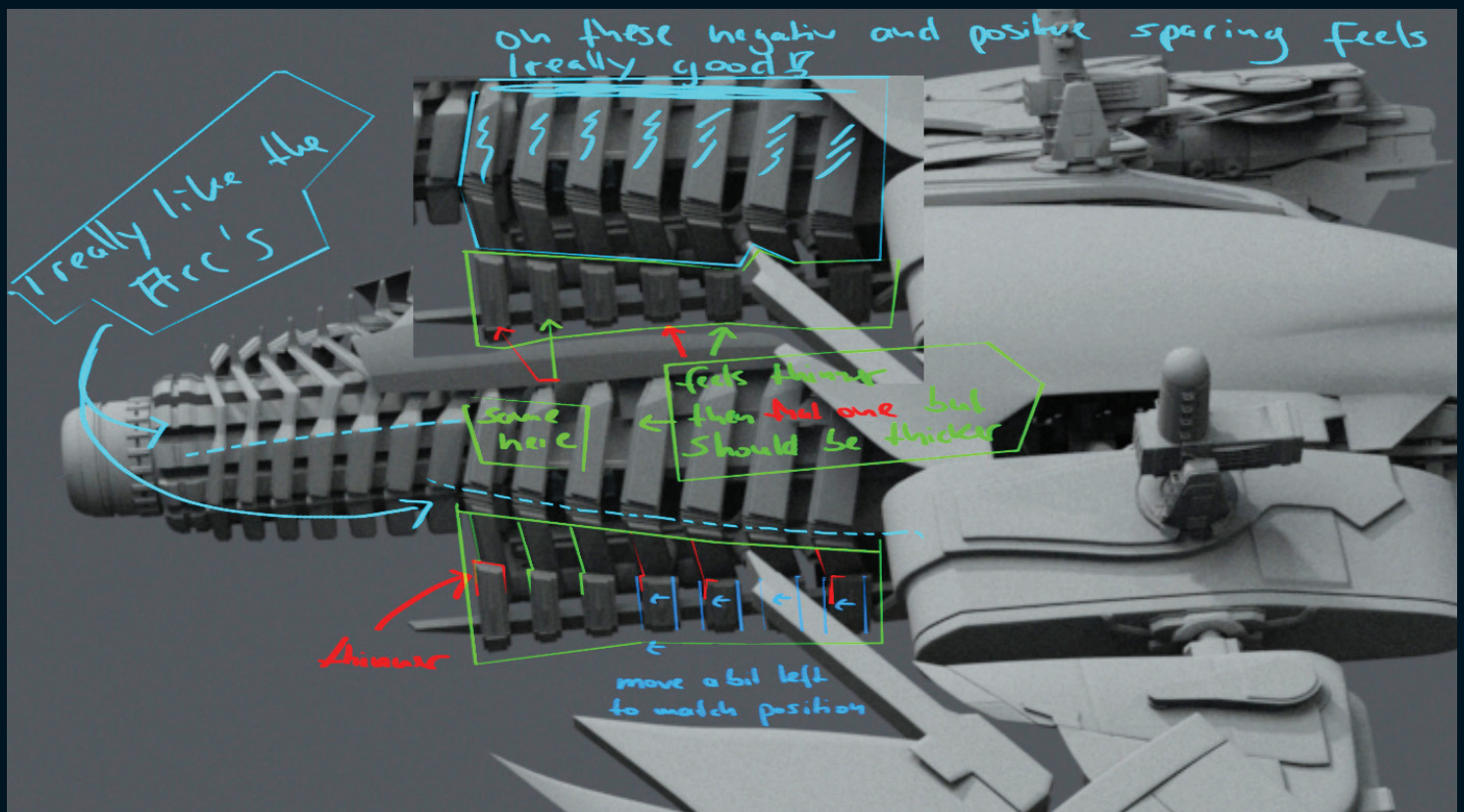
anything in *STAR TREK* fly? It’s always tricky when you say, ‘Do we have these ionic thrusters or do we have air propulsion?’

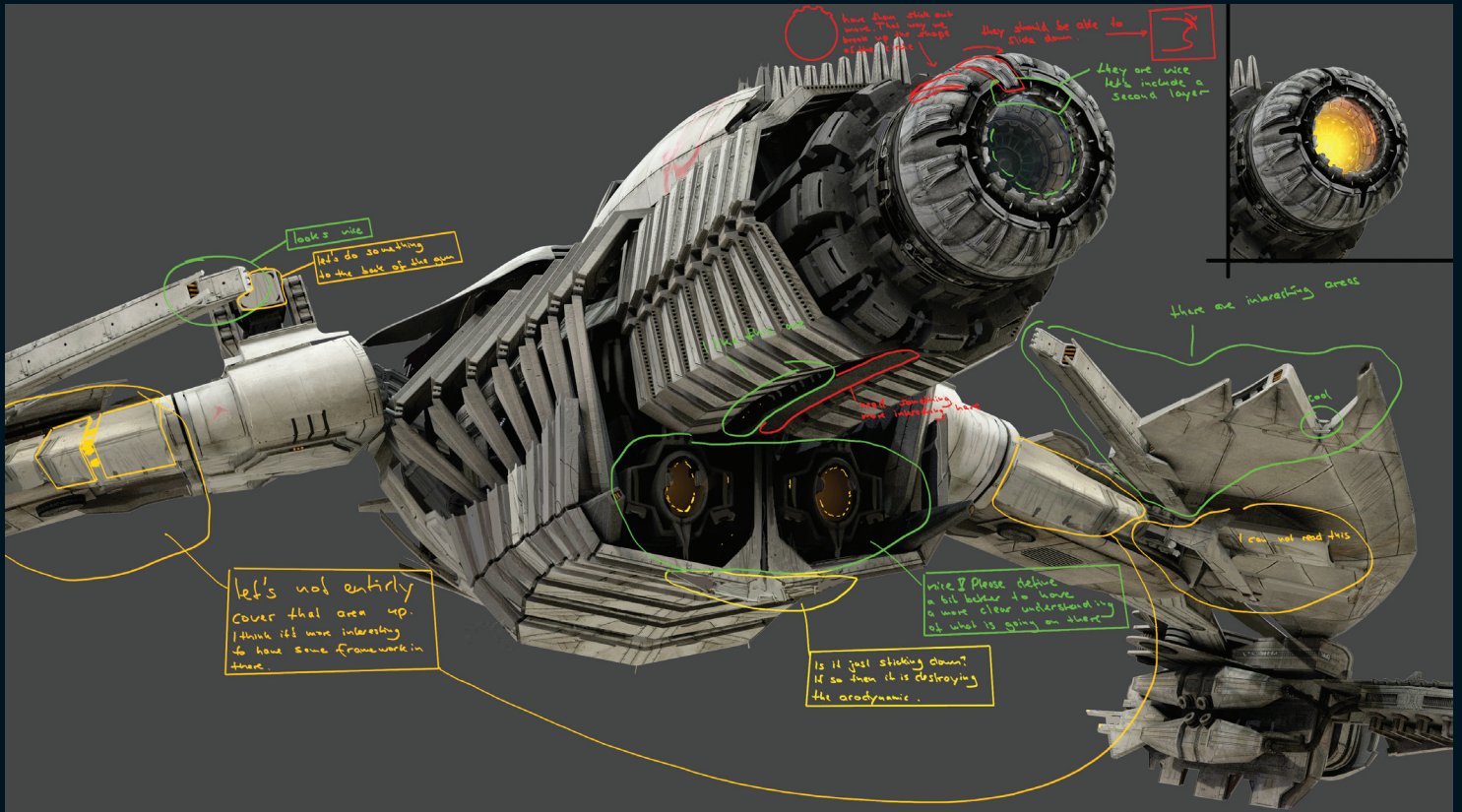
“We originally did major simulations of what the ships would look like if the wings were individually articulated and there was air thrust coming out of the bottom of them. The problem with that is that if you’re doing thrust from the bottom of the wings, even in addition to the main tail engine, you want the wings to tip forward as you’re flying. Then it moves more like a helicopter and less like a plane. In the end, we decided that the air thrusters weren’t such a great visual element and it started to create too many confusing metaphors: how do the ships float all the time? We only turned on those retro thrusters in one shot when the ship is going to crash into the camera.”

EVERY DETAIL

Grossmann says Abrams was deeply involved and took great interest in every element of the design. “He got pretty granular with things. At one point we had too many accent lights – you have navigation lights, identification lights – so we turned that down. When we were looking at the landing mechanism, we decided that compositionally we

▼ Pixomondo’s work went from big changes to tiny ones, including the exact amount of spacing that would be seen between the ribs of the ‘thorax’.



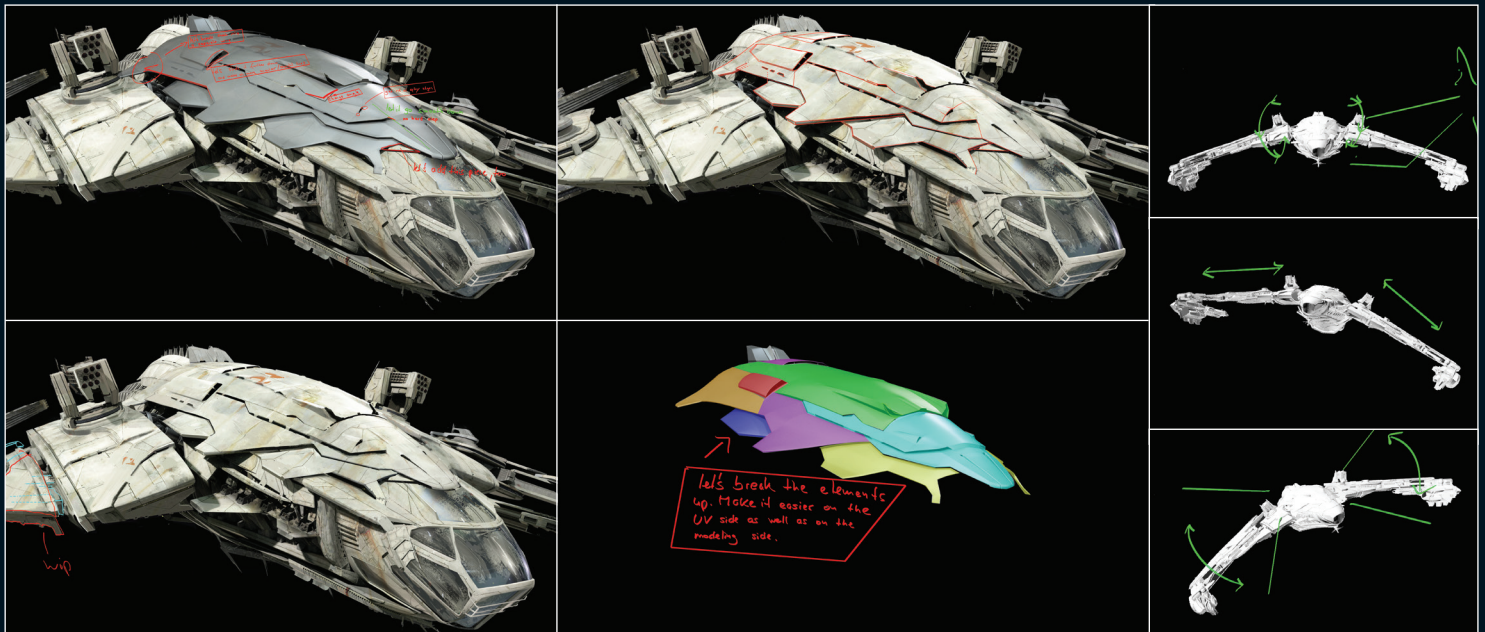


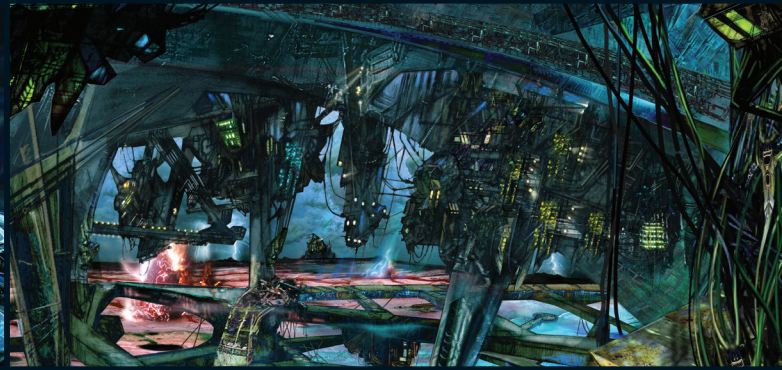
▲▼ As Pixomondo worked on the ship they filled in an enormous amount of detail that was missing from Clyne's original drawing, including the look of the engines, surface textures and how the wings would actually move in flight.

didn't like the idea of them landing on their wingtips, which would make them very tall. So we folded the wings up into a V shape when they landed."

One of the biggest changes came about because of a decision Abrams made about the action involving the actors. Clyne's original design was for a two-man fighter but in order to add excitement to the fight on the ground, Abrams

wanted teams of Klingon warriors to rappel out of the back of their ships. As Grossmann explains, that meant altering the proportions of the design to accommodate them and adding hatches to the underside so they could get out. "We had to fit those guys in there, so we made some adjustments to the body shape. It started to look like a blue whale, where it feels like it has a big belly and a small head. We did a lot of iterations on tweaking

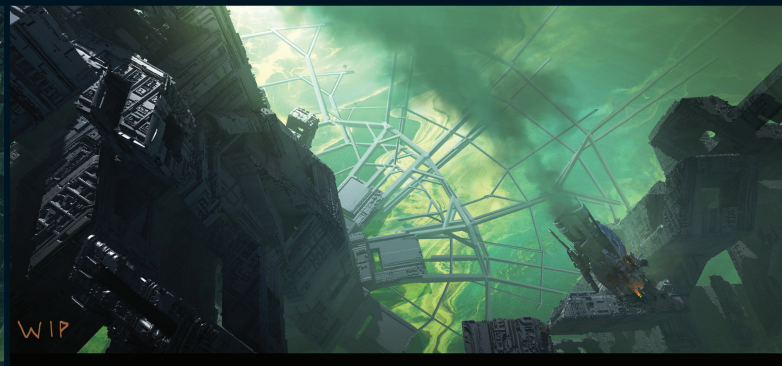




▲ **ANDREA DOPASO** Early on in the design process Andrea Dopaso produced a series of designs for the surface of the Klingon planet that were extremely alien and organic.



▲ **VICTOR MARTINEZ** The next round of designs were produced by Victor Martinez. They kept the idea that the planet's surface was unstable but pushed in a much more industrial direction.



▲ **STEVEN MESSING** As well as taking his pass at the design of the ships, Messing came up with several concepts for the planet. If you look closely, you can see that some feature his early version of the Klingon fighter.



▲ **JAMES CLYNE** According to Clyne, the design of the Klingon ships only really fell into place once Abrams was confident about the kind of environment they'd be operating in.



▲ This series of renders shows the surface textures that Pixomondo applied to the model from every angle.

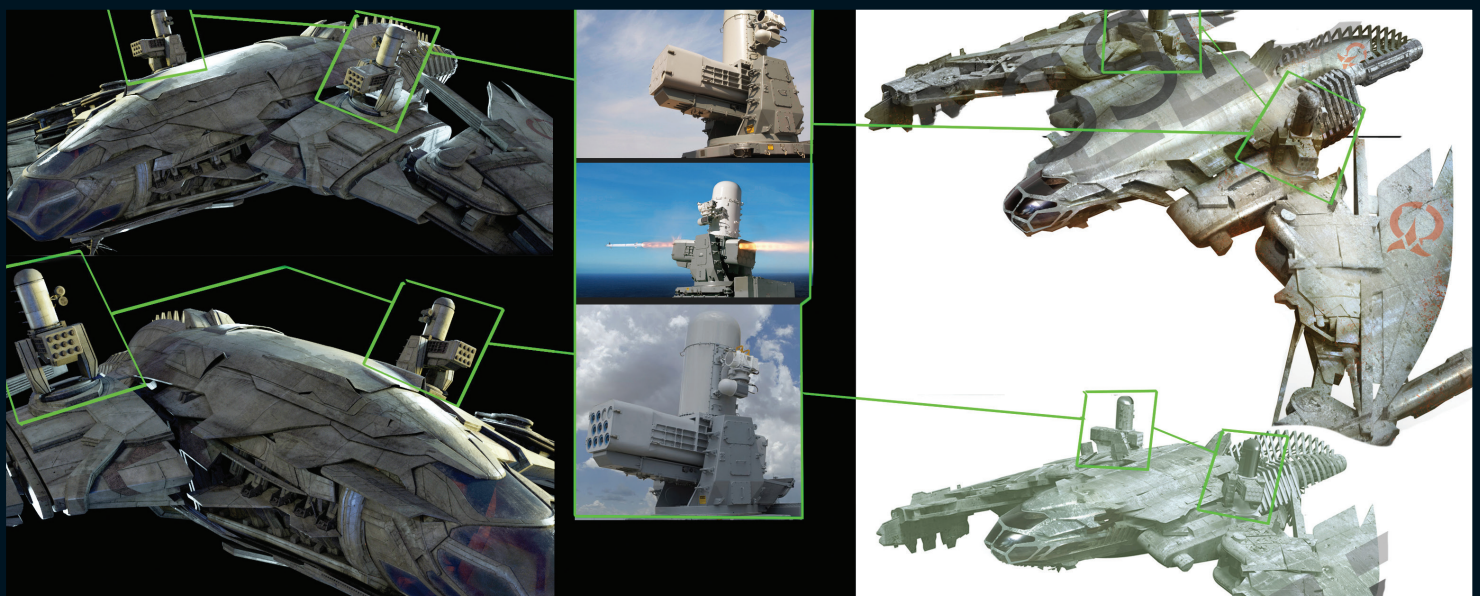
▼ Because of the way Clyne had built his model it included some real world details including a weapons system that was lifted from the US Navy, which had to be replaced at the last moment.

the body so it had more of a hawk’s aerodynamics with a stronger head.”

The team also worried about how the passengers would actually accomplish what Abrams wanted, but in this case Grossmann told them they’d have to accept that Klingons would tolerate things that humans would find impossible. “We had these shots of a fast moving fighter and we’d start to look at an x-ray view of the people sitting inside on benches to make sure that worked. These are the ports that are going to open. This is the rail system that their rappel lines are hooked on. I was like, ‘Guys this is a shot about the outside

of the ship flying around a corner and shooting. I appreciate that the guys inside are probably vomiting right now but we have to do this!’”

As building the ship progressed, the Pixomondo discovered something else that made them change the design. They hadn’t realised that Clyne had developed his concept by using real world models, and that, as a result, the Klingon ship sported some very 21st century weaponry. “We caught that late in the game,” Grossmann laughs, “in James’s concept the weapons on the wingtips were originally modeled after the Phalanx system on US navy ships. It’s kind of like an R2D2 droid





looking thing and it's designed to shoot down missiles with high rates of fire. That was the exact design of the device. As soon as we realised it we changed all the guns on the ship."

The newly revised weapons were much more sophisticated than you might realise from watching the movie, since they involved an entirely new design of torpedo with a churning ball of lava at its heart that was carefully worked out in physics simulations. Grossmann says that kind of attention

to detail was typical of the team's work on the Klingon fighter. "You really had to tear it out of their hands because any opportunity that the modeling team had to play with the Klingon fighters they would be back in there. I think originally it was supposed to take 30 days and in the end they spent nine months working on it!" The results though left everybody delighted and gave the Klingons and cool and deadly new weapon in their arsenal.

▼ The VFX team looked at renders of the model during the chase sequence to see where they should make final adjustments to the colors and textures.



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