

Paramount Press Junket Part 4: Special Effects

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And for the pièce de résistance of rounding things up from the Paramount Press Junket, animation supervisor Scott Benza of Industrial Lights and Magic with images from astf that'll probably break brains over computing everything! From Jetfire getting a mouth, to the famous Forest Fight, and to the story of Devastator smoking one of ILM's computers! Who says you can't have enough math on figuring out screen resolutions?!

Also, Shane Mahan of Legacy Effects - successor of Stan Winston Studio - gives a quick peek behind the Accelerator Suits from G.I. Joe: The Rise of Cobra! And a little something for the Marvel fans!

Following Hasbro's panel, ILM animation supervisor Scott Benza and visual effects supervisor Russell Earl took center stage, with Benza going first on both Transformers and Transformers: Revenge of the Fallen (Earl would later be covering Star Trek's visual effects, although he did work on Transformers). Benza starts off that ROTF was his fourth film working with director Michael Bay, having also worked on Pearl Harbor (2001) and The Island (2005), Bay was a very collaborative director and was open to many ideas, and his feedback helps improve some of the shots.

Benza starts off with how Bay understood some of the criticisms from the first movie in regards to the Autobots and the Decepticons, and how the Transformers got a make-over for ROTF, such as Megatron having fully functional tank treads (which was difficult for the animators). Spinning models of the Fallen and Sideswipe followed, as well pointing out on how lighting played about. He noted that Bay believed "the more messed up the robots, the more realistic they look", hence the various scratches and dings. A lot of the concept designs were the basis for the robots, such as Ben Proctor, and feedback was exchanged between animation and art standpoints. Jetfire gaining a mouth compared to his early model is one such example, allowing them to animate him with more emotion which wouldn't be as effective if it just his beard, followed by a short clip of Jetfire talking to Sam (Shia LaBeouf) that showed the mouth pieces in motion. One robot can be composed up to 52,000 pieces, Devastator alone the largest they ever dealt with, and several levels of resolution had to be created in order for the animation team to work with the Autobots and Decepticons fast and efficiently. Benza showed off four levels of Bumblebee, ranging from the most simplistic model to the most detailed one.

All robots were rigged in a way that they could animate almost any individual part that made up of the robot, ranging from springs to brake pads and all sorts of mechanical pieces one would find in various vehicles, using Mudflap as an example. That way it helped with the robots' transformation sequences and the way how they moved. Benza added that each robot was defined by both external and internal pieces, sometimes certain parts filling out the interiors and certain animation models used in the first film were reused and revamped in the second. Since they had the same amount of time to animate everything like in Transformers but with a larger workload due to having over 40 robots, the animators had to make use of whatever they created and had. They tried to introduce more personalities into the transformation depending on the character and to work best from the camera's point of view - Ironhide has a more forward attitude and is a veteran, hence his rather slow transformation, compared to Sideswipe's energetic and flashy change, as well elegant and heroic for Optimus. Devastator's combination sequence was intentionally made clumsy and dirty, as well difficult, showing off a pre-visual sequence. None of the transformations are done ahead of time and simply plugged into the shot, Benza noted.

Having several parts being filmed in IMAX, ROTF was a first in the history of film making on having computer graphics in such a scale and presented challenges for the animators just for the sheer size of it. For a sense of comparison: IMAX at 0.0012 mm/pixel would be 70.41mm x 52.63mm, 5867 x 4385, and 25.7 million pixels; VistaVision at 0.0012 mm/pixel would be 37.72mm x 24.92mm, 3144 x 2078, and 6.5 million pixels; and Anamorphic at 0.0012 mm/pixel would be 22.0mm x 18.59mm, 1828 x 1556, and 2.85 million pixels - in short, it's six-eight times the resolution of what they work with, as well eight times the computing power. With Devastator being over 100 feet tall, the character rigger took weeks on how the mouth would open and they had to make sense of how things might move from concept artwork, with secondary animation helping to give a sense of how Devastator would move and plus a sense of scale. The technical directors worked out a complex particle simulation that would result in him sucking up a lot of material as seen in the quarry sequence, ranging from the path of depth with hundreds of layers to create an image of both characters and items that are being interacted, to the path of sand on top of the background plate shot on location, and the gas trunk that explodes once sucked in and then expelled.

The Forest Fight was something that was difficult for the animation team from a traditional perspective (Bay has his own team that created 90 percent of pre-visuials), due to the fight choreography, the robots' positions after taking an

action, and things had to be a lot more elaborate. Benza said that what they knew was three characters involved and Bay wanting the climax be when Optimus hooking the helicopter Decepticon's face apart (Grindor), but not how long or how elaborate. A one-minute pre-visual of the forest fight was first created and Bay's "This is it?" reaction very much had Benza thinking "time to go nuts", resulting in a much longer three-minute pre-visual where it was "much more violent, much more elaborate, and more thought out", closer to the final product (the three-minute version had a female human model being dragged by a male human model).

Traditionally, Bay wouldn't let ILM work on anything that didn't had an actual background as he is "particular about his camera angles" and the lighting of his shots. Trusting ILM was somewhat a big deal in Transformers, while in ROTF he was willing to let two scenes be done all digital – the underwater scene of Megatron's revival, and the Nemesis sequence. All the camera moves had to be created from scratch, although Bay wasn't quite happy because he wanted his hands on the shots himself, which had them having to repurpose their motion-capture stage to turn it into a virtual stage for the director to "shoot in" with a virtual camera. Thus, it allowed Bay to "get in there and touch the shot virtually", resulting the camera angles as seen underwater and when Megatron converses with Starscream and The Fallen.

Destroying the pyramid pushed the level and limits of technology they had, and "the largest rigid-dynamic simulation" done at ILM prior to ROTF was the swirling of dust and destruction of Akator from Indiana Jones and the Kingdom of the Crystal Skull in 2008. According to Benza, that scene involved 15,000 rigid-bodies of individual objects being simulated that entailed natural phenomenon such as gravity and high winds. "Going from 15,000 to several hundred-thousand is a kind of a big deal," and one of the ILM artists came up with a technology that utilized graphics cards instead of traditional software to achieve faster and realistic results of calculating rigid-bodies falling apart. Benza recounted the story of how Bay was finally be given permission to shoot at the Pyramids of Giza (in over 30 years) and the bureaucratic difficulties before finally gaining permission via a loophole from Zahi Hawass, the current Secretary General of the Egyptian Supreme Council of Antiquities. They first started by taking in the non-destroyed pyramid before adding layers – depth, debris simulation – and lighting that had to be recreated behind Devastator during the destruction so as to light up with appropriate sections. The fact that ROTF took over 145 terabytes of space as compared to Transformers' 20 terabytes was obviously attributed to the large number of robots, and that it would take a regular home PC to render the entire film 16,000 years to finish was actually calculated.

Questions and answers came up. On the number of man-hours, Benza answered that he couldn't quite quantify that, but there was over 200 artists at one point, going on for 2 years, and it was ILM's largest project at the time, as well taking 83 percent of the computing power at one time (second to NASA in computer processors). On the story of one of the computers melting due to the complexity of rendering the assembled Constructicons, Benza admits that they're not 100 percent sure that the incident is directly related to Devastator, but artist Kaori Ogino was mostly in charge of the combiner. A work-in-progress of the robots was shown to Bay and he "wanted much more small-scale details to show the ultimate size of [Devastator] on screen", nearly doubling the resolution at one point. Upon loading the material into the computer, Kaori's computer went down and then started smoking, motherboard and graphics board being fried (Benza jokes about how they like to blame it on Devastator). Megatron was almost remodeled entirely from scratch, and the effects were much more complicated, such as the lighting technology that had to be upgraded since the first film to make it more realistic. Model rigging takes up a large portion of time on creating the characters, but reappearing characters does help a little. The Forest Fight was based on Benza having worked with Bay previously and it was very much designed to showcase the animation, on animate first and then create the camera moves. He also mentions that Bay isn't big on storyboards and "abandoned them and does everything through 3D pre-visuals".

Following the ILM presentation, a ride up to San Fernando so as to check out the special effects workshop that worked with Paramount on creating the Accelerator Suits for G.I. Joe: The Rise of Cobra, Legacy Effects, successor to Stan Winston Studios. Shane Mahan, co-owner of the shop, showed several of the suits used in Marvel's Iron Man in 2008, from the Mark I to the enormous Iron Monger, as well several battle-damage pieces of the Mark III. Next up was two of the six Accelerator Suits used in Rise of Cobra, weighing almost 45 pounds, requiring 4 months to build and milled, and composing of over 30 pieces as well additional replacement if anything got broken. Legacy Effects originally laser-scanned Marlon Wayans (Ripcord) and from his measurements they built the first suit; Channing Tatum's (Duke) suit had to be retrofitted later, even though it's not the most ideal way but there's no beating around it. The suits were designed in mind so that it'll take at least 15 minutes to be fitted on with 2 to 3 people assisting, although the crew spared no expense on the padded cases when it came to shipping them overseas.

Mahan pointed out how they learned quite a bit after Iron Man, from making it light but strong enough for some of the physical stress Tatum and Wayans put it through during shoots, as well giving each piece enough give and flex so it could bend with the actors' bodies without anything breaking off (although a leg piece did fall off during the tour). The suits were primarily used for "bookend" sequences – scenes at the beginning that defines the setting and plot before wrapping everything up – with their digital counterparts when it came to performing the more complicated maneuvers, such as certain running scenes.

The helmets with safety glass facemasks (that would later have the heads-up display, or HUD, added on digitally) worked

well in southern California Mediterranean-like weather but when they arrived in Prague where it was colder during filming, it fogged up with the actors inside (much to Mahan's dismay). The bright side was that the facemasks were removable and the computer animators took care of adding it back on. In addition, the gatling gun on the right arm does actually spin like it shows in Rise of Cobra, the bullets and missiles from the left arm also added on via CGI.