INTERNATIONAL PHOTOGRAPHER

FILM AND VIDEO TECHNIQUES MAGAZINE

FEBRUAR

Donald M. Morgan

Miss Evers' B

The Incred
Work of

Twenty-some years ago, a young movie maven came up with a twist on "the hero legend." His production company, Lucasfilm Ltd., created a story that plucked a young person from his safe world and threw him into an adventure with a mysterious princess and a charming rogue. He sent them into a faraway land and placed all sorts of wondrous obstacles in their paths. Using amazingly advanced yet relatively new technologies such as motion control photography, his Lucasfilm Ltd. (Industrial Light & Magic) created worlds that only words once explained.

Star Wars became an overnight success. And George Lucas and his crew showed Hollywood where their imaginations could lead them. The 1977 Academy Award brought a new buzz word to the industry—"visual effects."

It began with a mastery of the traditional arts of blue screen photography, matte painting, and model construction. The company pioneered the development of motion control cameras, optical compositing, and other advanced effects technology.

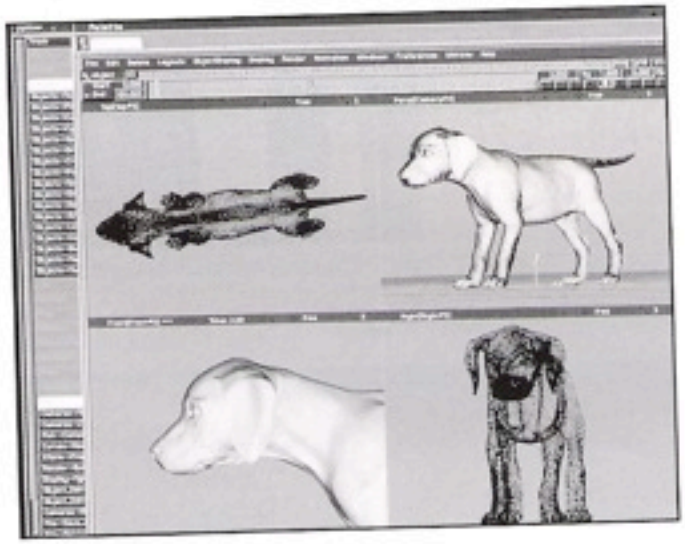
Over the years, ILM has garnered 14 Academy Awards for Best Visual Effects and nine Technical Achievement Awards. They have played a key role in six of the top ten box office hits of all time, and contributed leading edge effects to over 100 feature films, as well as hundreds of commercial productions and attractions.

Each time the ILM wizards approach a new project, they put a different spin on their techniques. Since the 1980s, they have led the way in the use of computer graphics, developing software techniques such as morphing, enveloping and film input scanning. They have created wholly computer generated characters in *The Abyss*, *Casper* and *Terminator 2*; life-like distortions of the human body in *Death Becomes Her* and *The Mask*; and startling 3-D computer animation in *Jurassic Park* and *Twister*.

Every one of the 700-plus employees will agree that 1996 was a banner year. As the twelve months ended, they were still feverishly working on new innovations for 1997 releases such as *The Absent Minded Professor, Speed 2, Spawn, The Lost World: Jurassic Park*, and *Men In Black*. They were also trying to complete the "last two" shots for the re-release of the *Star Wars Trilogy Special Edition* (to be featured in *International Photographer Magazine*, March 1997).

They also had time to put their singular style behind four of the biggest end-of-the-year films to come out of Hollywood. In *101 Dalmatians* they created some of the most lively and very real looking creatures ever brought to the screen. For *Mars Attacks!*, the crew created totally autonomous "martian" worlds, as well as popping these lively creatures into Tim Burton's bent reality. In *Daylight*, they made everyone believe Stallone and his female companion were really struggling for their lives in the deadly waters below the Hudson River. And, for the newest *Star Trek* adventure, they made *Alien* look tame compared to what the Borg can do to the stalwart Enterprise crew.

101 Dalmatians



Top photo: The Alias/Wavefront program used to create the movement for the puppies in *101 Dalmations* (screen courtesy of Alias/Wavefront)

Bottom photo: ILM's Visual Effects Supervisor, Doug Smythe, pours over slides for an ILM project.

"When you are doing an animal picture, especially when those animals are the stars, the first thing you have to figure out is what you can get the real animals to do, and what you can't," says ILM's Visual Effects Supervisor Doug Smythe. Unlike *Jurassic Park*, where details about the creatures could be decided as they went along, in *Dalmatians*, these creatures had to be absolutely "true to life."

A ten year veteran of ILM's magical crew, Smythe has received four awards from the Academy of Motion Picture Arts and Sciences. These include two Technical Achievement Awards, one for the invention of the "morph" process that transforms images of any one object or character into another and one for digital image compositiong systems. He received a Scientific and Engineering award for the co-invention of a Digital Motion Picture Retouching System. And, his Oscar for Best Achievement in Visual Effects was for his work on *Death Becomes Her*.

"We had puppies down here a lot," he says. "It was great! The little buggers were roaming around everywhere." To study their movement "style," Smythe and his crew sat with the puppies watching them as they played, attempting to react to commands. "This way, we could determine whether particular shots required some synthetic approach (puppets or CGI), or if real puppies could be used." They also studied such details as the density of fur and how it came off their body.

After a short while, it was clear that the puppies were great actors if they were sitting still or were going from point A to point B. "A little food and they made a beeline toward it full speed," Smythe says. "If we wanted sneaky or stealth action, we realized we would have to do it."

Once the technicians completed their "hands on" study of the puppies, they turned to the technical approach. "We would figure out how they moved and how they fit with the camera," Smythe explains. "Then we had to find a way to create them through CGI.

"We began by photographing a puppy on top of a Plexiglas platform," he continues. "We used a really cool rig that carried Nikon

style 3:5:8 cameras. Using synchronized shutters, we photographed them from ten different angles at the same time."

These photographs were used by Geoff Campbell, Kyle Odermatt, and Wayne Kennedy as a "hero" model in the computer. "We used Alias Power Animator," Smythe explains. "Once we had a model in the computer, we began to animate walk, trot, and run cycles by placing this model on a turntable and looking at it from every angle until all angles looked right. We also digitally painted 13 different spot patterns to be used to vary the characteristic shadings," he says.

This hero model served for nearly every CGI shot in the picture. "We did have to create a different model for one sequence," he adds. "At one point in the movie, several dogs slide through a drain pipe. Three are sitting, but one goes through lying on its back. We needed a different model for the back flop. In this configuration, the animal takes on an extremely distinct shape."

For Smythe and the ILM crew, one of the most intricate and amazing sequences was set in a library. "There was no way to get enough real dogs to race through the elaborate room," Smythe explains. "We initially planned to use only real puppies and some Henson animatronic dogs, but the scene was too lifeless. In order to do the splits, the dogs had to stay in one section of the room at a time. As Jon Alexander and Matt Wallin erased the real dogs and animatronic 'Stuffies' from the live photography, Mike Eames and Philip Alexy replaced them with CGI dogs doing more appropriate actions."

To do this, the team began by using a technique established on *Jumanji's* stampede. Using simplified figures called "pawns," they placed the figures on paths "drawn" on the virtual ground. As the computer created movement, the pawns would stick to these paths. Then, by carefully choreographing the actions with start and stop times and speeds, they created a multitude of puppies and paths. "As we built up the tool set, the shot became more complicated," Smythe admits. "Every time we thought we had clear paths, one of the pawns would crash into another, or actually run through another—and we would have to redo the timing!" Then came the final touches, like nuances in head motion.

Lighting these types of shots was also difficult. Although they always started with the pattern cinematographer Adrian Biddle created, often times the question "Does it look right?" had to be answered. "We sometimes had to move our light around to get the necessary effect," Smythe admits. "That's because, in computer graphics, we do not have the same illumination control with flags and bounce cards as is available on the real set. However, we can position our lights anywhere we want—behind props, as an example. If we don't want the floor to block the light, no problem. We just turn off the floor!"

"The CGI lighting in the library scene was done by technical director Ed Kromer. Often times, Ed would take several different lights to simulate what was done on the set," he continues. "Where there was one strong light in the live action, we might put two or more in a CGI area. By spreading the lights around, we were able to get them to soften each other, thus falling together to make one source.

"It's a calculation," he adds. "A 2K might come from half a dozen Peppers. We can get the brightness of a 20K into a little mole hole. We can even put filters in front without worry."

Although several shots were done with the four perf camera, most were filmed with eight perf, either locked off or with a simple tilt. "Four perf has less repositioning latitude," he says. "That means we can't add bobble or tilt to the camera move in post. Eight perf allowed us to add a camera tilt or push in or something that would help give more interest or focus to a shot.

"The lifelike CGI puppies were used for many shots," he continues. "Sometimes it was lots of pups doing specific actions that couldn't be achieved on set. At other times, they were in shots simply too dangerous for a real dog such at the shot of Wizzer slipping and sliding across a patch of ice, or when one of the dogs stands on the edge of a treacherous rooftop."

Even if it was deemed safe to "coax" Wizzer across the ice, there would be no guarantee he could have hit his mark without a massive case of ice burn.

"It was ILM's job to create images like these," Smythe concludes, "but with such reality that the audience believes a real dog was in this kind of dangerous situation."

Daylight

Pat Turner, visual effects director of photography for ILM, sets up the lighting scheme for a miniature set, one of several used for the film *Daylight*.

"The idea was to make this film much tougher and more powerful than *Backdraft*," says ILM's Visual Effects Supervisor, Scott Farrar. A 15-year veteran of ILM's magic, Farrar started as a camera operator on *Star Trek II: The Wrath of Khan*. In 1985, he received an Academy Award for Best Visual Effects for his work on *Cocoon*.

"This film became an update of the old style Hollywood disaster picture, like *The Poseidon Adventure*," he explains. "We had to find a way to shoot scenes that were supposed to be 14 or 15 feet under the water. We needed safety, suspense, and a setup that was violent and dangerous."

While ILM has done various fire effects before, and won much acclaim for them, co-Visual Effects Supervisor Joe Letteri and producer Denise Ream were determined to give these effects an extra edge. "Some of them were supposed to be quite 'explosive,' and some were supposed to be subtle yet interesting," he says dryly.

"We did some shots in real sets, blowing things up with light effects around the actors. Other shots were done in miniatures, in a fire tunnel created on our stage," he adds. The cars might have been miniatures, but the fire tunnel was rather large, encompassing a floor to ceiling 30 degree slant on one of ILM's largest stages.

"The tunnel was about five feet by eight feet and 40 feet long," he says. "We had about 40 fire jets located at exact areas within the tunnel. We had an amazing plumbing system that could literally