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George Lucas leads his band back to the middle of his saga — and a guy with respiratory issues in a black helmet.



ILM's Roger Guyett with his "Wookiee D-Day": visual treats abound for repeat viewers.

Star Wars' grand finale

SAN RAFAEL, CA — Last summer Roger Guyett was sitting in an English garden, literally, convalescing from his stint as ILM's visual effects supervisor on *Harry Potter and the Prisoner of Azkaban*, when he got the call. It was George Lucas. Would Roger join John Knoll as the second VFX supervisor on *Star Wars Episode III: Revenge of the Sith*? This last of the prequels, which is all digital, was going to weigh in with an enormous shot count of around 2,200 effects. Soon Guyett was on a plane, only briefly to Northern California, and then on to China.

TRAVELING SECOND UNITS

You easily can envision an Indiana Jones-style globetrotting effort if you follow the exotic journeys made by Guyett, *Star Wars* prequels producer Rick McCallum and their crews as they crisscrossed the world shooting background plates in remote locations and gathering footage for use in *SW3*. The exertion seems unusual since for this new and final *Episode III*, here more than in any other live action Lucas entertainment, *nothing is real*. In fact, animation director Rob Coleman wound up directing a record 90 minutes of animation for *Episode III*. So why not just concoct the background environments in CG too?

"George really likes these different types of environments," Oscar-nominated (for *Potter*) VFX supervisor Guyett says. Lucas wanted to expand upon imagery shot in Thailand by McCallum's crew and remembered certain dramatic vistas he'd encountered in China during the filming of his *Young Indiana Jones* series.

So it is, when we visit the surface of the Wookiee planet, Kashyyyk (that's ka-SHEE-ik), we are looking at scenery that Guyett's crew originally shot in remote, primordial Chinese mountains meshed with real Thai shorelines plus a lot of additional digital enhancement. Both real locations were shot with Sony HDCAM cameras. Kashyyyk is a never-before-seen world where Wookiees are born free and live high up in towering treetops. It appears primeval and moody in the film with a contrast-y, hard edge to the lighting.

But why send a visual effects supervisor halfway around the world to shoot remote backgrounds?

When a director shoots a background plate, Guyett says, "it's going to affect everything we do. You're making a whole bunch of decisions at that moment. When that director's making that choice, you're standing next to him and all of those things get channeled into your process. Being a visual effects supervisor you end up always very involved in the photography of the first unit and the second unit — you probably end up directing some of the photography yourself, because that's where the shot is born."

SAVING PRIVATE CHEWBACCA

Guyett returned from China with a wide

gent we see defending their beach consists of only six actors in hair suits replicated numerous times (each time brandishing different weapons) across the front lines.

Behind them stands a battalion of CG Wookiees, many exhibiting war-like gestures and behavior acquired on ILM's motion capture stage.

Speaking of longtime Lucas cohort Spielberg, Lucas recently announced that the blockbuster director, working poolside in East Hampton during a lull in his own work last summer, developed a number of storyboards for *Episode III*. Lucas is challenging film lovers to guess which scenes were envisioned by blockbuster-meister Spielberg.



Too many elements to count: Rob Coleman and John Knoll oversaw the opening space battle.

selection of shots in order to give Lucas the greatest leeway in putting together what came to be called the "Wookiee D-Day" battle scene. It's here that a large band of Wookiee warriors faces a massive mechanized assault from the sea — it's a sequence that pays homage to the look of Steven Spielberg's *Saving Private Ryan*. And here we get to see a younger Chewbacca — Peter Mayhew again dons the hair suit — in action on his home turf.

Animation director Coleman succeeded in making the saga's Yoda character, who also lives on Kashyyyk, a better actor as a result of his transformation into a CG model in the prequels. But creating the band of long-haired Wookiee warriors was a different story, involving a mix of live action, compositing and animation. The armed contin-

WORKFLOW AS A GREAT PYRAMID

When Guyett swung into action last summer, it was his first *Star Wars* experience, and work on *Episode III* had been well underway for over two years with ILM veteran John Knoll — and only John Knoll — supervising visual effects. In past prequels, Knoll was one of three "supes." This change is due in part to the Lucasfilm/ILM team's sure grasp of *Star Wars* workflow over the years and also, producer McCallum says, to the production's dedication to "fiscal responsibility."

"Two things had happened," to allow this, says Guyett, "more delegation and the technology had moved on a notch. There were certain things we thought we could do better and faster than we had done on the previous two movies. One thing is doing the



work, and another is organizing the work — I mean, it's a minefield.

"John bore the majority of the load of *SW3*," Guyett says. "In terms of the post, John was responsible for most of the first-unit photography." Knoll provided the "one clear voice" in the early going, and that resulted in his oversight of a gargantuan total of over 1,500 effects shots, making his job some kind of superhuman record. Knoll worked on the shoot and a lot of the planning, "but where you need the help is in the post production cycle," Guyett says, "and that's where I came in. In the summer of 2004, we divided the work into two units and our unit got approximately 650 shots.

"Obviously, Rob [Coleman] and John have got this thing down to a fine art," Guyett says, "I was sort of the new kid on the block. It's an enormous undertaking, making a visual effects movie like this. George creates the template, this animatic, and that's what everyone refers to. George and the art directors create concepts and we make decisions based on those concepts as to how we would build this thing — is it a miniature? A CG thing? George embraces technology and he's not afraid of using the most recent techniques.

"Rob's worrying about the performance of the animation and I'm taking that as a component and building it into the whole shot so that character is lit correctly, the background lines up, the camera moves are working together," continues Guyett. "But it's very much a team effort. I'd like to claim credit for the good bits, but the truth is there are hundreds of people — a huge pyramid of people at work on the thing that contribute one way or another."

Guyett says such workflow requires a hierarchy. "You have a tight-knit group and hopefully you're all talking the same language. In my case, I've got a compositing supervisor, Pat Tubach; two CG supervisors, John Helms and Craig Hammack; we have roto people and paint people, and Brian Cantwell who's head of layout — all these different people. I'm basically my own version of Mussolini — I sit there and say, 'This is what I think should be happening — we should have an explosion over there and this guy blows up.' Then I show that to George and George goes, 'What were you thinking?'" Guyett jests. "But it's my responsi-



bility to lead that team in the right direction. George is very open minded. Someone might have an idea about some small aspect of a shot. What makes [a shot] cool is not just what's happening in the foreground, but how you're supporting that."

For instance, in the Wookiee battle, Guyett says, what could be found happening in the background that would interest the die-hard fan upon a 50th viewing? Another visual treat is the answer and this is the real lesson of visual effects today. We've seen it everywhere with nonlinear editing — editors can work much faster, but they also concentrate on making their cuts richer and more sophisticated. So it is now with visual effects. ILM put three years into pumping visual effects into this movie, and it's a richer visual experience than you can imagine coming from any three years of effects filmmaking.

HOT STUFF

Guyett's shots are sprinkled through 17 or 18 different sequences in *SW3*. At least half of his responsibility involved the climactic action on Mustafar, the volcanic planet where Obi-Wan (Ewan McGregor) and Anakin (Hayden Christensen) finally cross sabers amidst spewing lava. Guyett did not have to shoot his own background plates for this extravaganza, however. McCallum's unit had already acquired HD footage (very carefully) of the eruption of Mt. Etna in Sicily in 2002. In addition to the live action lava, "Mustafar is a combination of matte paintings, miniature work, CG lava, digital doubles — it has all sorts of things going on," according to VFX editor Greg Hyman.

The protracted duel takes place, with a few breaks, in and around an energy-collecting complex modeled by ILM in CG. "But a lot of the environment was created using

some miniatures and we put those together digitally," Guyett says. In the movie, this complex provides visitors and workers with an invisible shield that protects them from the inhospitable conditions. There's even a Niagara-like "lava falls" on the planet.

Alan Travis was in charge of all the lightsabers for both *Episode II* and *Episode III*. It all starts with a plastic stick screwed into the detailed Jedi saber handle. "The stick serves as a contact point so the actors can practice and know that they're making contact," Travis says. It also serves as a guide as to where the lightsaber is in 3D space for manipulation in post. What were once optical effects on film are now digital.

"We're not in the animation department," Travis says, "it's 2D animation and we go through and keyframe a shape for the blade on every frame. It was a massive amount of work." There are over 500 lightsaber shots in *SW3* with multiple, different-colored lightsabers per shot, all handled by ILM's roto department. "We have the best paint and roto department in the world and a team that I trained, five or six employees dedicated to lightsabers, and we dove into it." Thirty rotoscope artists worked on *SW3*. Travis would sign off on his team's saber shots, send them to Guyett or Knoll, and finally Lucas would review them. An important duty was to maintain the consistency of look between lightsabers used in both Guyett's and Knoll's shots.

Sometimes they'd need to paint out an errant prop blade. "The stick is just a piece of plastic," Travis says, "and oftentimes the actors are being so forceful they're kind of bending it. Or we might decide to animate it doing something different from what it was doing on set." But typically, Travis's team would just key over the prop saber. They

They're real, he's not: all-CG Yoda chats with local Wookiees on Kashyyyk. Background elements were shot in China using Sony HDCAM cameras.

“We have to know at all times where the lightsaber is in 3D space.”
— Alan Travis

would create a spline — all lightsabers have eight points — and draw saber shapes in the computer for every frame.

“The shapes vary wildly,” Travis says, “we’re drawing the motion blur into the shape.” So a sweeping saber takes on a flattened-out spatulate shape that is actually drawn into the frame. Once it hits its mark, or comes to rest, the saber assumes its cylindrical shape. “We have contact flashes too,” Travis says. “We have to know at all times where that lightsaber is in 3D space. And sometimes they weren’t shot with a stick on set so we’d have to invent the shape without even a rough guide of the stick and just animate it one frame at a time.”

Travis says as work progressed, he and his team would give in to the urge to vocalize the famous sound effect (created long ago by Ben Burtt) of a whooshing lightsaber — hearing that was a real sign of progress.

HIGH DEFINITION

Lucas and company shot with Sony HDC-F950 digital cameras recording to Sony’s new HD format, SRW, which was designed specifically for shoots that would need to support numerous layers of digital compositing. Long-time Lucasfilm DP David Tattersall worked exclusively with Sony HD cameras for the principal photography.

Guyett’s first real experience with HD was on his trip to China with the unit shooting background plates and that included using Sony’s new lightweight portable record deck, the SRW-1. “It’s incredibly efficient working in HD,” he says, “What you shot is there; you can play it back. It’s a lot less equipment and we were able to shoot a lot more footage. The other real advantage is we’re swapping digital media so freely [at ILM], it really does streamline it. You can grab anything that’s pho-



Decisive duel on Mustafar: Roger Guyett's team oversaw an environment made of many elements, including Mt. Etna's real eruption.

tographed, send things to the motion-control systems, everyone’s sharing information in a different way than you can with film.”

Lucas and crew made good use of HD during the principal shoot in Australia and on the final pick-up shots in England. The team built a “video village” of plasma screens and HD monitors for viewing and examining shots immediately after they were lensed. This is how Lucas often would spot some footage that would become valuable little takes destined to fill existing holes or match existing shots in the production. And some “holes” were so small, they’d consist of just a glance or a missing gesture.

KEEPING TRACK

Episode III’s opening sequence, overseen by John Knoll, is conceived as a jaw-dropper: Its wild space battle is a testament to what Coleman’s 3D animation team can do. The sequence’s aggressive use of Z-axis alone can induce vertigo. High above the planet Coruscant, the struggling Republic is facing a faction of the evil Empire in a chaotic battle with too many CG elements to count.

Luckily for ILM’s VFX editors, Greg Hyman and Tony Pitone, all those innumerable animated elements are a good example of what they don’t have to keep track of. The whole rest of the film — especially live action — is their prevue. Rick McCallum points out that there are easily 50 to 60 layers composited into many *Episode III* live action shots and it’s their job to shepherd every layer, every shadow, every explosion, every repositioned body part, every resized figure, every miniature, every bluescreen element — anything that goes into Lucas’s shots — for use by the compositing team. Hyman and Pitone do all this on NT-based Avid Meridians — the same models in use at Skywalker Ranch. They

split duties for all the shots — over 1,000 each. Pitone got all of Guyett’s shots plus hundreds of John Knoll’s while Hyman looked after the bulk of Knoll’s work.

They work from an original cut of a given sequence sent over secure Internet link from the Ranch by Lucas’s editors Ben Burtt and Roger Barton. “Every single shot for all three [prequel] movies went through our pipeline,” says Hyman.

Hyman and Pitone use an Avid Unity shared network system with tons of storage to move elements and finished shots around ILM.

“George is a very fluid filmmaker; his cuts are always in progress and oftentimes, when he’s shooting on stage, he’s looking for pieces he can stitch together,” says Hyman. Compositors will even reposition an arm, called “repo,” and the final effect is indeed seamless.

Shots are first cut up at the Ranch, then finished down at ILM. “What we do is go through and decipher everything that was done and figure just how many [original frames from the master] need to be put online, which frames need to be speeded up, where the morph starts, and we provide all of that sync information to our compositors — shot by shot for 2,150 shots.” After ILM’s compositors provide a take, Hyman and Pitone double check it against the cut from the Ranch. When a composited shot is considered finished, Lucas views it in ILM’s HD screening room. If he likes it, the VFX editors send the Ranch editors a digital file of the sequence, which they cut into their project so that Lucas can look at it again in context. Then, sometimes, George may think of another change... **POST**

George Lucas with DP David Tattersall (center) and producer Rick McCallum: a new Sony HD camera delivers footage directly into post.



For more on Star Wars, producer Rick McCallum, and the digital film revolution, see the June issue of Post.