ILM VFX Supervisor Roger Guyett on *Star Wars: The Force Awakens*

On Getting Real-World Reference, Making Motion-Captured Characters, and Balancing Practical and Digital Effects

By Barbara Robertson / Jan 8, 2016

Roger Guyett should have been stressed and exhausted, but he showed no signs of it when we met at Industrial Light & Magic in San Francisco shortly before *Star Wars: The Force Awakens* was released. As we walked down the hall toward the dining room, one person after another called out to him and, with a kind "excuse me just a minute," he was unfailingly lovely to each.

He's a tall man with a big smile and a British accent. He grew up with the industry, creating his first computer animation for commercials at a London studio by writing Fortran programs. In 1993 he joined PDI and in 1995 Industrial Light & Magic, where he has received three Oscar nominations, five BAFTA nominations, a BAFTA award (*Saving Private Ryan*) four VES nominations and a VES award (*Harry Potter and the Prisoner of Azkaban*). He plays saxophone in a blues band. And he led more than 1,000 artists in studios around the world who created 2,100 visual effects shots for *Star Wars: The Force Awakens*, the fastest film in history to earn $1 billion at the box office. This is his fourth film with director J.J. Abrams; he received Oscar and BAFTA nominations for their collaboration on the two *Star Trek* films.

Visual Effects for *Star Wars: The Force Awakens*

- 2100 shots.
- Industrial Light & Magic in San Francisco, Vancouver, London, and Singapore, and ILM's partners Hybride, BASE, and Virtuous created 1400 shots.
- Kelvin Optical's 80 artists in Los Angeles, a production arm at J. J. Abrams' Bad Robot, did 800 shots, including fix-its, graphics, composites, and some 3D.

There was much talk leading up to the film's release about the filmmakers' supposed rejection of digital effects in favor of practical effects. The implication was that the practical effects in *The Force Awakens*brought back the "reality" of the early *Star Wars* episodes, a reality preferred by fans and critics of the prequels who complain about the digital effects. Guyett seems puzzled and fascinated by this, and somewhat astonished that some people are willing to believe there are few CG effects in the current film.

Studio Daily: I read an article recently that gave the impression that most of the effects were practical; that the only digital effects were the two CG characters and some spaceships; otherwise most of the CG work was wire removal.

Roger Guyett: We could be flattered by the benign dismissal of a massive piece of work. It's flattering that people want to believe what they see. If we managed to achieve that, then we've succeeded. But 2,100 of the 2,500 shots in the film had digital effects. Hundreds of people [digital effects artists] worked on the show.

In the first *Star Wars*, when people watched the X-wing flying down the trench, did audiences think that was really happening? Did they believe it was a real X-wing flying? A model of an X-wing flying? What was their understanding of how real that was? Was it more real because the model was part of our world? Is that what people mean by real, a tactile thing? These are philosophical questions that you have to consider when you're doing a visual effects movie.

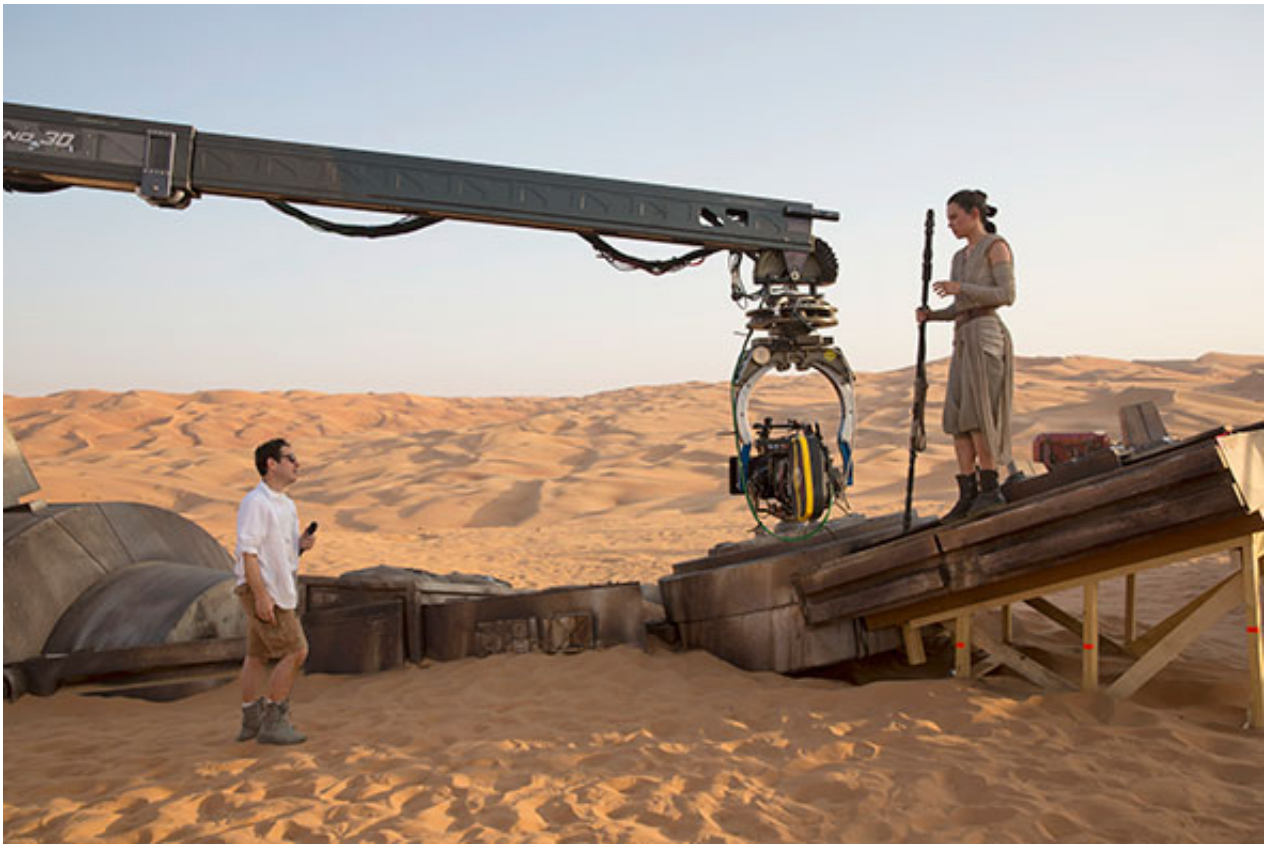
What was your goal for the effects in this film?

I wasn't interested in making a retro movie. That was not what I thought we should be doing and it would have had a limited shelf life. When you think of those movies, people were excited to see them, to go along for a great ride with amazing characters. Part of that world achieved a certain charm and authenticity because the filmmakers built sets and went to real locations. That part is fantastic. We wanted to hold onto the charm the original stories had but use the technology available now in a way that would make a more contemporary film.

How do you get the audience invested in the characters and willing to go along for the ride? Part of their brain says this is not a familiar world and what they're seeing is slightly odd. How do you get past that? You want to convince the audience everything is happening for real by hopefully creating a world that's a natural extension of the real physical world. My theory is that this is a bizarre extension of primitive storytelling. Think of how invested children become in simple puppetry. This is a crazy extension of that. The whole thing is a trick of some kind.

Clearly you were successful in making the digital effects believable. How did you achieve that?

Part of it was trying to photograph as much in camera as possible to help the actors understand the world they're immersed in and as a better foundation for our work. We went to places and tried to photograph as much as we could. We tried to make each moment as real as possible and blend the line between real and imaginary as much as we could.



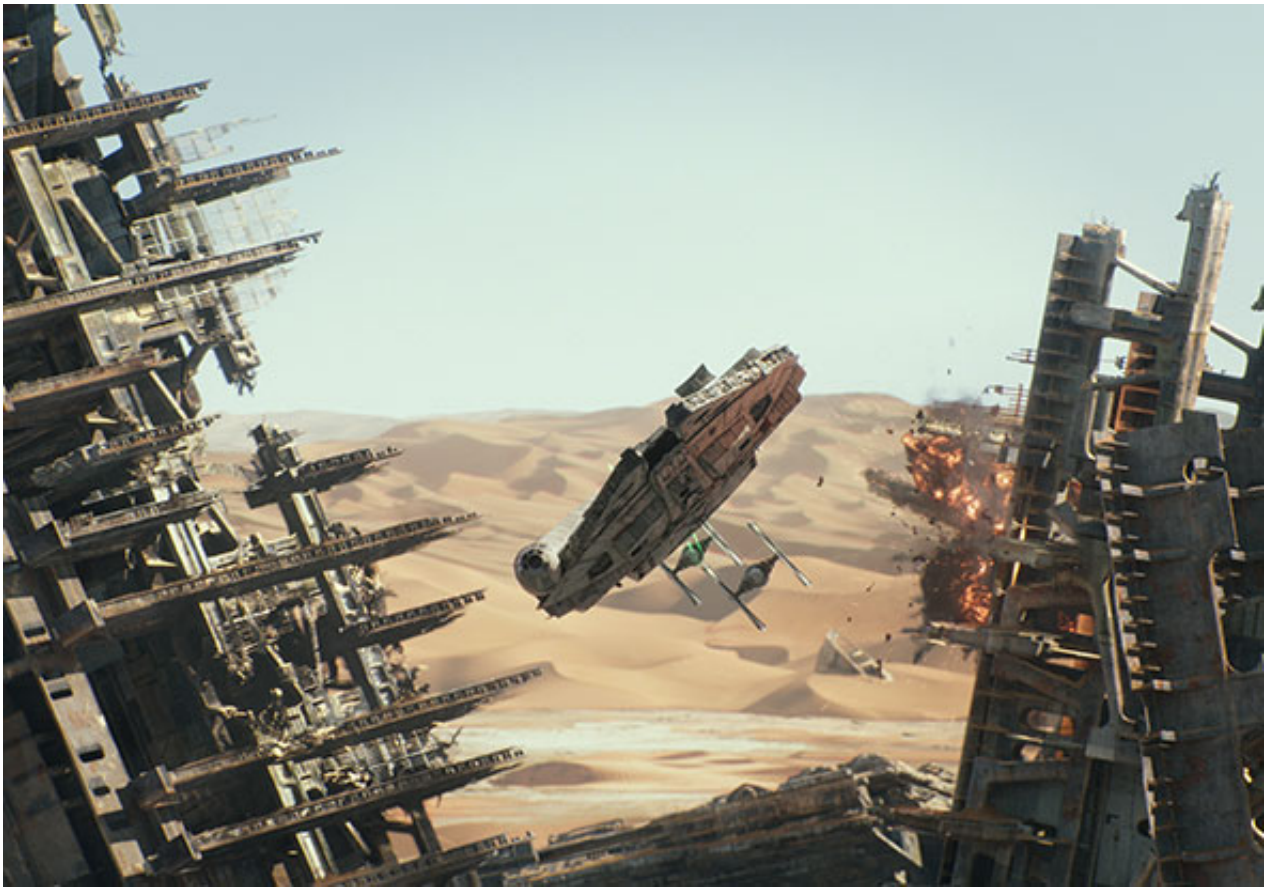
Director J.J. Abrams and actress Daisy Ridley (Rey) in the desert.

This sounds like what I often hear visual effects supervisors say — that, whenever they can, they use reality as a foundation to make the effects believable and photoreal. What is different about this film?

That's an interesting question. You're right. Everyone sets out to do that. Ultimately it's the audience who'll tell you if you've succeeded! But we do have some great new technology — and of course you can talk this game about the shaders and technology etc. — but it's also how you construct the shots and how engaged the audience is at any point. If you're tasked to do something that by its nature undermines the concept, it's hard to pull off. There's a certain point, if you overexpose your hand … a film like this is so ambitious, so fantastical that no one could imagine it could have happened. The nature of filmmaking in a real space is that you see the place. You react to it. You design shots around that place. If you remove the idea that you're really there, it becomes a different thing. We tried to show a real level of restraint to keep it in the charming category without losing a level of excitement, without ever being ludicrous.

Can you give an example?

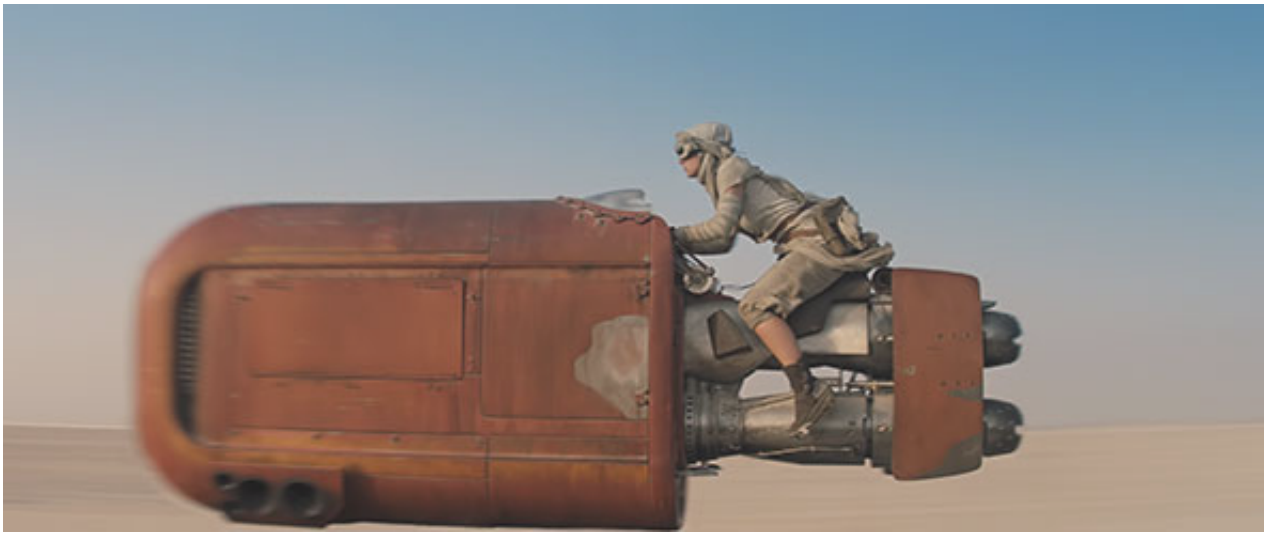
OK. Here's an example that's relevant to what we did. In old-fashioned filmmaking, you didn't go to Tunisia and then change it. You'd go there and that was in the movie. Sometimes, on other films, we might go to a location and then the director would want another version — taller buildings, a different sidewalk. They want their desert a different color. They don't embrace what they have. This is the VFX era. Every blockbuster has big visual effects. People shoot and figure it out later. Maybe that's why so many people shoot on green screen. We didn't want to do that. We had a director who clearly wanted to go to the desert, and he was happy with the desert he went to.



But you didn’t composite a digital Millennium Falcon flying over footage of the desert, did you?

When you have a ship that travels 600 to 700 miles per hour, it’s difficult to shoot plates, especially with the shot choreography we wanted, unless maybe you hire a jet fighter. So, in the Falcon chase, pretty much everything is digital. We could have just based it on the location and made up the rest, but we would have been in a place of guesswork. So we shot a lot of reference footage from a helicopter. It wasn’t directly usable, but it was incredible reference. You’d notice things about the way the desert behaved — dust coming off surfaces as we travelled. More importantly, the quality of the light on the sand, the geography of the environment. We ended up with 18 hours of aerial footage alone from one camera, and terabytes of photographs. We could see the nuances of colors of the sand dunes from photography based on the time of day and conditions.

The other thing we did was to survey the crap out of everything and everywhere we went. We researched and recorded environments as accurately as we could. We had a whole team on this. We had size and scale. We had stereographic views. This isn’t outside the bounds of what people do for visual effects movies, but we really wanted to be accurate.



When you see the little speeder moving across the landscape, it's a completely digital shot. But because we'd been there, when we recreated that moment, we did it from a physically-based approach. I don't know if J.J. [Abrams] knows how we constructed the images, but he was at the location and he knew how it looked.

The other thing is that we photographed these events in a way that I think did not cross the line of the impossible with complicated camera moves. We made sure if you had a Millennium Falcon, this is how you'd shoot it. We tried to photograph some kind of version of all these events to give us a point of reference even if we threw it away. One advantage I had in putting shots together in the final movie is that I shot second unit. If a shot involved visual effects, I knew what we'd need to achieve.

Did you shoot miniatures for any of the space battles?

We did motion-control tests, but we couldn't have shot miniatures on our time scale, and it turned out to be a moot point. *Digital* is a dirty word, but the stuff you can do with digital models is incredible. You just need time, patience, and talent to take it to another level so the audience doesn't notice how you're going about your business.

And our modelers had so much affection for these ships. Dave Fogler [asset build supervisor], who came to ILM from the model shop, was interested in rebuilding the Falcon in the way it should be built, with integrity and a referential quality. He had an inherent knowledge of the processes the model shop guys used. It was a very loving process in many respects.

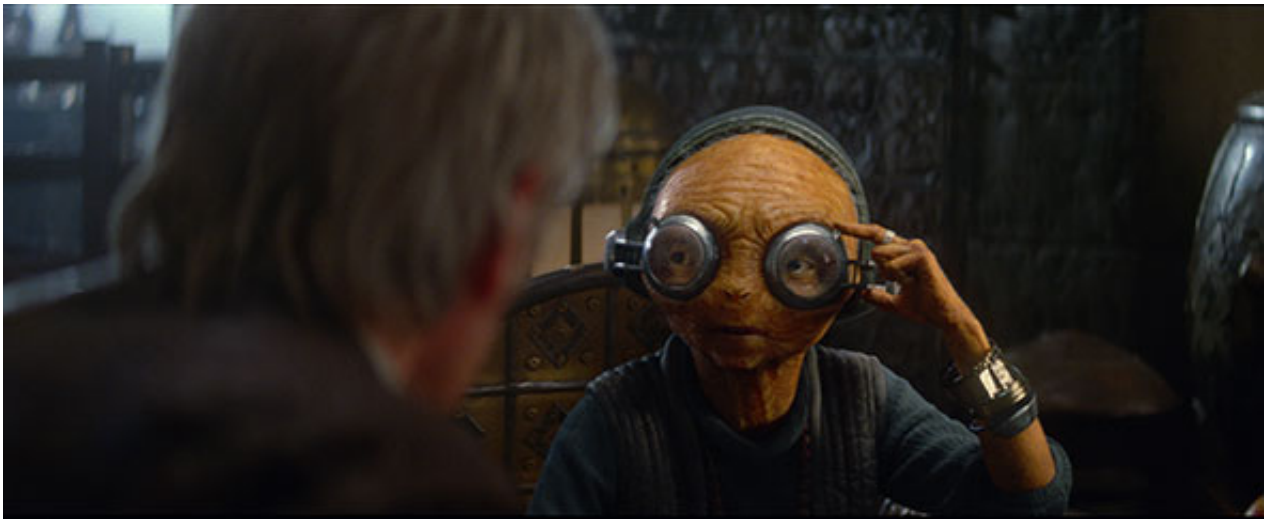
Droid BB8 was mostly practical.

And BB8? Practical or digital?

Probably about a third of the time BB8 is digital. This is a perfect example of riffing off something that exists. It's another version of my desert analogy. If you don't build BB8, where does the personality come from? The personality came from being there with the actors and J.J. directing BB8 just like another actor. When we created the CG character, we had absolute reference. Each animator had a template. People could comment about the droid's performance just like they would with an actor because his personality was defined. The asset team did such a great job with BB8.

Did you primarily use elements or simulations for the explosions?

There was much talk about the kinds of explosions we might do. I showed the practical explosions that Chris Corbould [special effects supervisor] did to Dan Pearson [effects TD supervisor] and asked him if we could do something like that. The technical team ended up rewriting the simulation engine we were using. It was one of those things that came out of trying to make something real. We did a helluva lot of [digital] explosions in this film. Also, dust, snow and a ton of atmospherics. The new simulation tool was a great asset to the show.



Maz, one of two significant all-CG characters in the film

Did you use any special techniques for the two CG characters in the film, Maz [Lupita Nyong'o] and Snoke [Andy Serkis]?

We did motion capture tests at Andy Serkis's [Imaginarium in London], and then did motion capture on set. Ben Morris, who set up the ILM studio in London, was on set for the shoot, and Mike Mulholland supervised the London work. I've always believed that if you cast the right person, the rest takes care of itself. You have to believe in the actor; motion capture won't save a bad performance. Maybe it might, but chances are it won't. Casting is what it's all about.

Andy's character didn't move around very much, but we needed a great face performance. We shot Andy and then re-mocapped his scenes once we got the edit. We went back and refined the shots in his studio. He can play anything — small, large, in-between. Lupita is way more restrained. She does a softer, nuanced kind of performance. For her, we used image-based capture and some keyframe work. Andy's studio helped us out with that, but it was really about the face, and we used systems from Disney research. The face of the character she plays is very different, so we had to make sure that translation was successful. But again, like with BB8, she defined the character, the nuanced performance.

Did you previs much of the film?

We started prevising in the fall of 2013 with Brad Alexander at Halon. But they didn't have a script. They had story ideas. So we weren't in a position to nail down the previs. However, as soon as we were in post, Halon came in and we did postvis with Paul Kavanagh [animation supervisor]. Paul's brilliant at putting stuff together, so we'd all collaborate.

The original *Star Wars* inspired a lot of young people who are now working in the industry as digital effects artists. Was that true for you, too?

I went to see *Star Wars* when I was 17. Our local theater in Farnborough had closed down, so we got on the train and went to London. But I wasn't that kid who had a VHS tape and wore it out. That would've been difficult anyway — we didn't have VHS! I was interested in animation, but to me the idea of working on a movie was so far from any reality I knew that you might as well have said I was going to the moon. I wanted to be an architect and even that felt difficult. So I studied engineering and design in college. When a friend told me I could get paid if I did a computer course, I got an M.Sc. in computer science. But at that point I was more interested in being a musician.

How did you end up at ILM?

I think the most complicated choice you can make is what you want to do. So many interesting things happened to me in my early years. I played in bands. I lived in France, in Hong Kong. I did jobs to pay the bills and play music. I wouldn't trade those years for anything.

One day when I was working as a draftsman, I saw an advert for an artist who understood computers. They asked me how I would animate a flag. I went away and figured it out and got in the door. The company was called CAL Videographics. We did commercials for Ridley Scott. I met Tim Burke, who I later worked with on *Harry Potter*. I'd hear these people talk and I'd learn. Doing CG animation back then was like watching paint dry. Everything was so slow! It made you think really hard about every choice you made.

Then in 1993, I went to SIGGRAPH in Anaheim and bumped into a friend in a hotel lobby. He was working at PDI.

Two months later, I was working at PDI. The business had exploded. I joined ILM after that as a senior technical director to work on *Casper*.

What have you learned by working on this film?

I think I've learned that maybe showing restraint is something we should do more of in the future. Restraint sounds negative, and that's not the connotation I mean. Just trying to make sure the shots are focused. More isn't necessarily better.

It's interesting how much the work has advanced, even in the last couple of years, and certainly from Episodes III to VII. It's a completely different lay of the land, and the people are capable of so much more. You don't want to do things you've done before. You want to do something more challenging and exciting in different ways. Sometimes, by defining what the box is, you can have a more interesting problem to solve.

It's been an incredible project. We set the bar for ourselves incredibly high and everyone just went for it. We had an unbelievable crew. We worked so hard. I learned so much by working with all these incredibly talented people. I think the older I get, the more I realize the people you choose to work with is an important part of the process. Projects like this take two or three years of your life.

I'm very proud. People's reactions to the film make me feel so good. You want to create moments people will remember. It's great that people are enjoying the film!

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