

ICG

INTERNATIONAL CINEMATOGRAPHERS GUILD

MAGAZINE

VFX

issue
featuring:

Game of Thrones

Insurgent + Chappie

March 2015
vol. 86 no. 03
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Photo by Scott Alan Humbert

PRESIDENT'S LETTER

March 2015 • vol. 86 no. 03

“Flocking Together”

My experience with visual effects movies was in the pre-digital era. I was very fortunate to work on classics like *Blade Runner* and *Close Encounters Of The Third Kind*, shooting second-unit for visual effects genius Douglas Trumbull. My first real experience with digital VFX as Director of Photography was *Stuart Little 2*, where the characters were animated and placed into the live action. That process was amazing, but was still (in 2002) in a very early stage of refinement. I recall meetings we had with the production designer, VFX supervisor, producer, and director, where we all went to the Natural History Museum in Los Angeles to look at dead falcons. No one had done feather work prior to that film, and the VFX vendor needed to learn how to create digital feathers.

One of the most important takeaways from *Stuart Little 2* was my realization that I needed to color-grade each background plate before it was composited with VFX. It was essential for the compositor to know what the color was going to be in the final assembly – if we had to change the background color in the digital intermediate (only the third film to use a DI at that time) after marrying the VFX, it would also change the foreground, and the color of our white hero mouse. I was able to work closely with Sony Imageworks to color-time each plate, on film, before it went to the compositor, ensuring a workflow that would protect the project’s look and be consistent all the way through to release.

In today’s world, where both live action and CG animation are in the digital space, we can do that same process as we are shooting, guaranteeing a consistency of the intent of the image all the way through postproduction. But up until very recently, that was not an easy task, living in what I would describe as the “dark ages of digital filmmaking.”

In fact, when it comes to digital moviemaking, my mantra has been consistent for the last twenty years: we need to create an end-to-end, device-independent color-management system. That’s been the goal of every technologist and digital artist since the dawn of the digital age. Of course we have been getting closer and closer, and now, with the soon-to-be launch of ACES 1.0 (Academy Color Encoding System) at this year’s NAB Show in Las Vegas, we have taken a giant leap toward achieving that “holy grail,” that end-to-end, device-independent color-management workflow that I, and so many others, have been seeking.

ACES means we can have color management from the set that will be attached to each digital file and travel throughout the postproduction pipeline. So when we, as cinematographers, see yet another project with five to ten post houses and VFX vendors, we can feel secure (with ACES) that there won’t be confusion among the vendors, or that each house will be applying its own “secret sauce,” potentially altering the creative intent that originated on set with the cinematographer and director.

The process will be standardized to such a degree that the image we all see and labor so much toward perfecting on the set will indeed be the same vision that appears at the end of the pipeline, up on the screen.

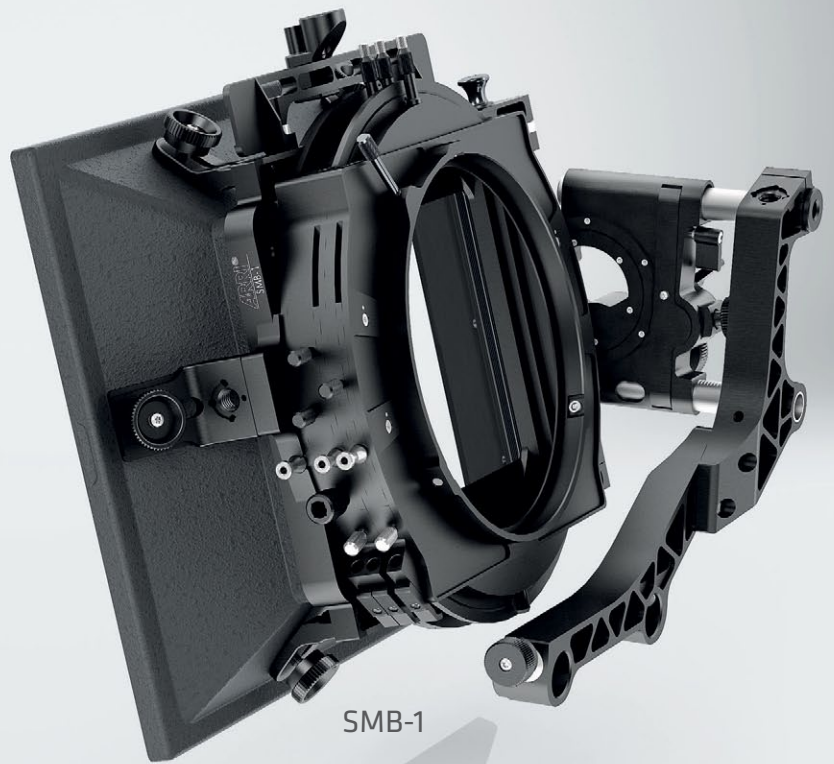
That’s a very exciting proposition, to finally have all our digital feathers perfectly flocked together, exactly as they would appear in the real world.

Steven Poster, ASC

National President
International Cinematographers Guild
IATSE Local 600



SMB-2



SMB-1

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{ features }



Game of Thrones / **p.34**
by Kevin H. Martin



Insurgent / **p.46**



Chappie / **p.58**

contributors



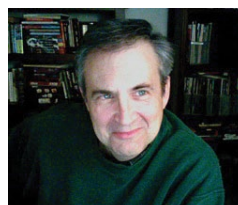
David William McDonald
Water Time (Web Exclusive)

"I consider myself fortunate to have worked with and befriended the late great Local 600 Cinematographer Sonny Miller. He captured some of the most amazing water sequences of our time. He inspired me as a shooter, a technician, a waterman, and, most importantly, a human being. 'It's Miller time!'"



Debra Kaufman
Tomorrow Land

"Virtual reality has fascinated me since I covered it in the late 1980s/early 1990s, when the technology wasn't quite ready. Now there is no barrier to VR's taking off, but its success depends on whether creatives can tell the kind of stories that people want to experience in immersive 3D 360 degrees."



Kevin Martin
Take Me To Your Leader, How To Train Your Dragon, Love Machine, Return To Tomorrow

"I get an absurdly intense rush when re-visiting a number of older photochemical/analog VFX-heavy films. It's easy to marvel at what was accomplished using optical printers, both with and without motion control, but what I find most impressive is how the movies are edited to maximize the impact of a limited number of well-designed trick shots."



On The Cover: *Game of Thrones*
Courtesy of HBO

DEPARTMENTS

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SPECIALS

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VFX FLASHBACK / p. 72

CORRECTIONS:

We regret not including the photo credit for our February cover image, *Fifty Shades of Grey*, which was shot by Chuck Zlotnick

Rachel Walker's "noted independent publicist father" in Executive Editor David Geffner's *Wide Angle* editorial is named Jeffrey (not Jeremy).

In our February crew listing for *McFarland*, Dyanna Taylor should have been listed as 2nd Unit Director of Photography.



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March 2015
vol. 86 no. 03

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ICG (ISSN 1527-6007)

Published Monthly by The International Cinematographers Guild

7755 Sunset Boulevard, Hollywood, CA, 90046, U.S.A.

Periodical postage paid at Los Angeles, California.

POSTMASTER: Send address changes to

ICG

7755 Sunset Boulevard

Hollywood, California 90046

Copyright 1998, by Local 600, International Alliance of Theatrical Stage Employees, Moving Picture Technicians, Artists and Allied Crafts of the United States and Canada. Entered as Periodical matter, September 30, 1930, at the Post Office at Los Angeles, California, under the act of March 3, 1879. Subscriptions: \$93.00 of each International Cinematographers Guild member's annual dues is allocated for an annual subscription to International Cinematographers Guild Magazine. Non-members may purchase an annual subscription for \$48.00 (U.S.), \$82.00 (Foreign and Canada) surface mail and \$117.00 air mail per year. Single Copy: \$4.95

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WIDE ANGLE

MARCH 2015
THE VFX ISSUE



Whenever I hear people complain about movies and television being overrun by visual effects (myself included), I point to a show like HBO's medieval fantasy series, *Game of Thrones*, which has become a worldwide phenomenon for many reasons, the most obvious being its thrilling combination of remote location work and carefully modulated CGI that represents the best of contemporary visual effects, no matter the size of the screen on which it's ultimately viewed. That's why it was such a treat, for this month's VFX-themed issue, to read Kevin Martin's cover story about *GOT*'s visual brain trust – including Guild cinematographers Anette Haellmigk and Robert McLachlan, ASC, CSC; lead visual effects supervisor Joe Bauer; and lead visual effects producer Steve Kullback – who wring every possible creative droplet from the show's demanding structure. We're talking fire-breathing dragons, soaring Irish castles, battling reanimated skeletons, and giants, stomping alongside human-sized wildlings and woolly mammoths, on their way to a massive ice wall.

Natural wonders between man and machine also factor into this month's exploration of VFX in the commercial world. Cinematographer Mattias Montero talked to staff writer Pauline Rogers about a series of spots he did for Adidas, focused on what "super stardom" means in today's celebrity-obsessed culture. Pharrell Williams, David Beckham, Rita Ora and Damian Lillard are among the celebrities who went before Montero's camera, with the goal of portraying their "internal energy" through images of nature – underwater stingrays, migrating starlings and volcano storms. VFX house a52 worked closely with Montero to execute the complex imagery, using, as VFX Supervisor Patrick Murphy describes, a "wide range of compositing tools to blend 2D and CG elements" for shots like 3D and 2D water particles and bubbles, which is no easy trick.

The most recent collaboration between Guild DP Trent Opaloch and South African filmmaker Neill Blomkamp (*District 9*, *Elysium*) is another thrilling example of molding complex digital effects to serve a narrative. *Chappie* is a film about a young prodigy, kidnapped and raised by criminals, who also happens to be a robot. To create a passionate, sympathetic lead character with 980 VFX shots and 22 different versions was challenging. But that's exactly what Blomkamp, Opaloch and VFX Supervisor Chris Harvey managed to do, raising the bar for "the living machine" genre for years to come.

Speaking of years to come – this month's *Exposure* conversation features veteran journalist Debra Kaufman, who has covered virtual reality (VR) production since its inception in the late 1980s, interviewing David Morin, co-chair, joint technology subcommittee on virtual production and senior director for Autodesk. Morin's résumé includes two Academy Awards (during his tenure at Manex Entertainment for *What Dreams May Come*, *The Matrix*) and helping to develop groundbreaking CGI technology for *Jurassic Park*. Morin's work with Autodesk, whose MotionBuilder software has set the standard for VR production technology on films like *The Hobbit* and *Dawn of The Planet of the Apes*, is as leading-edge as VFX gets – but the thrilling part is that Morin says we've barely scratched the surface.

"The virtual world superimposed on the real world, and the two completely in sync with each other" is the promise of virtual production, he reveals in the interview. "You can see your VFX in camera, and the filmmaker can work the way he or she ordinarily works, without relying on a green screen and a long review-and-approval process. It can bring a whole new level of creativity to cinematography and filmmaking."

David Geffner, Executive Editor
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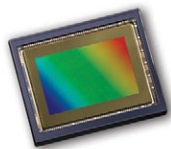
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MARCH 2015 / by Pauline Rogers

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- Volker Engel, VFX Supervisor



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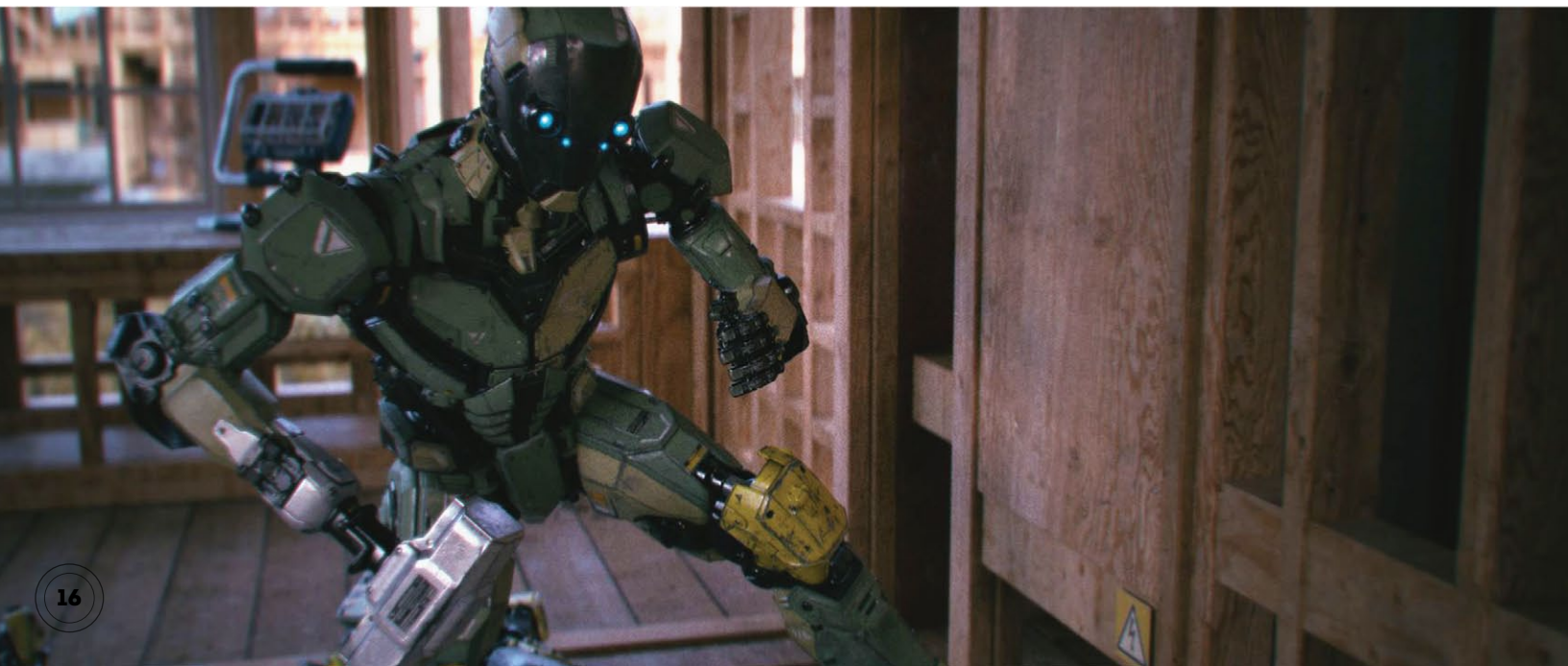
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– Kevin Margo, Director, *Construct*



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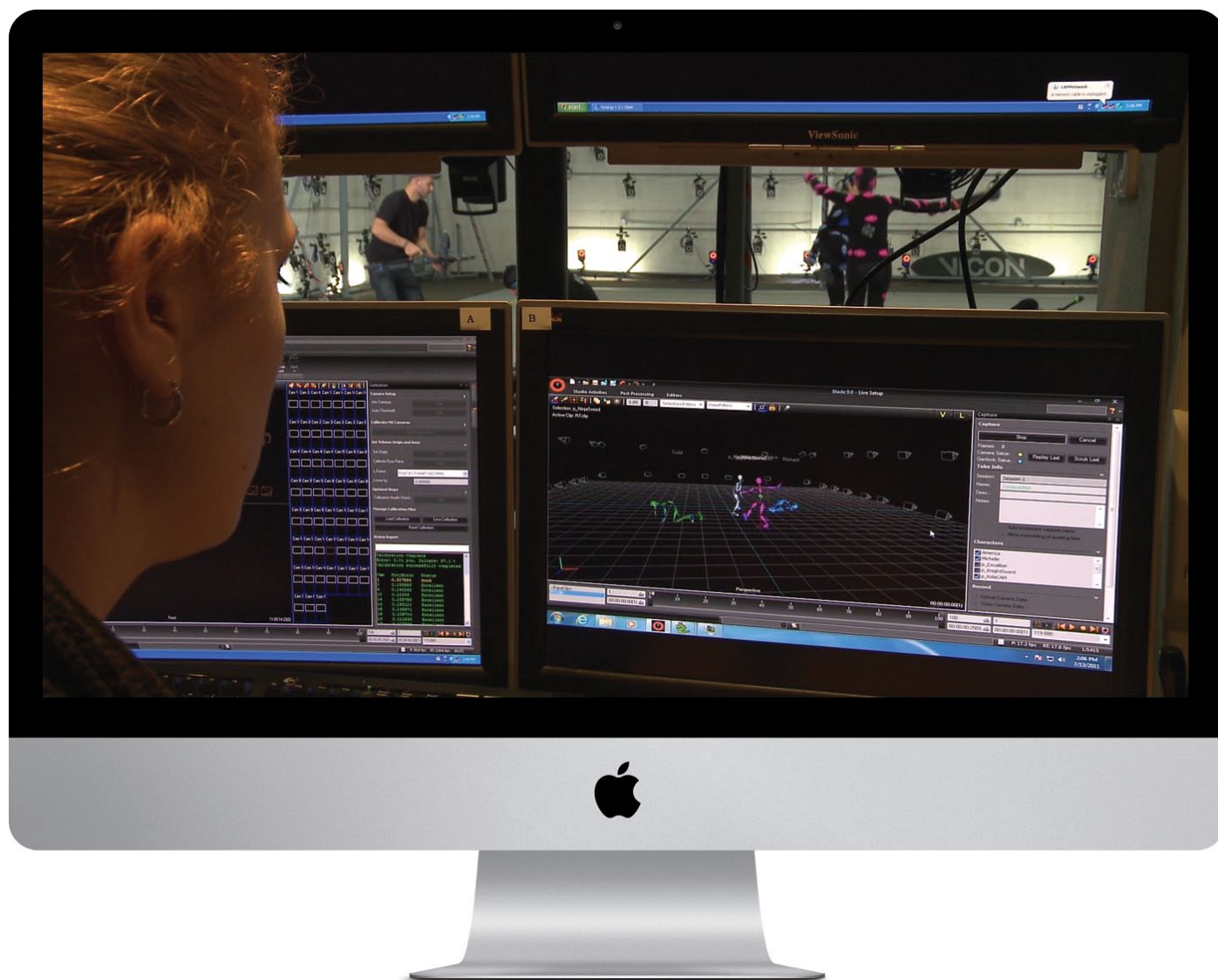
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— Gary Marshall, Motion Capture Supervisor at Framstore

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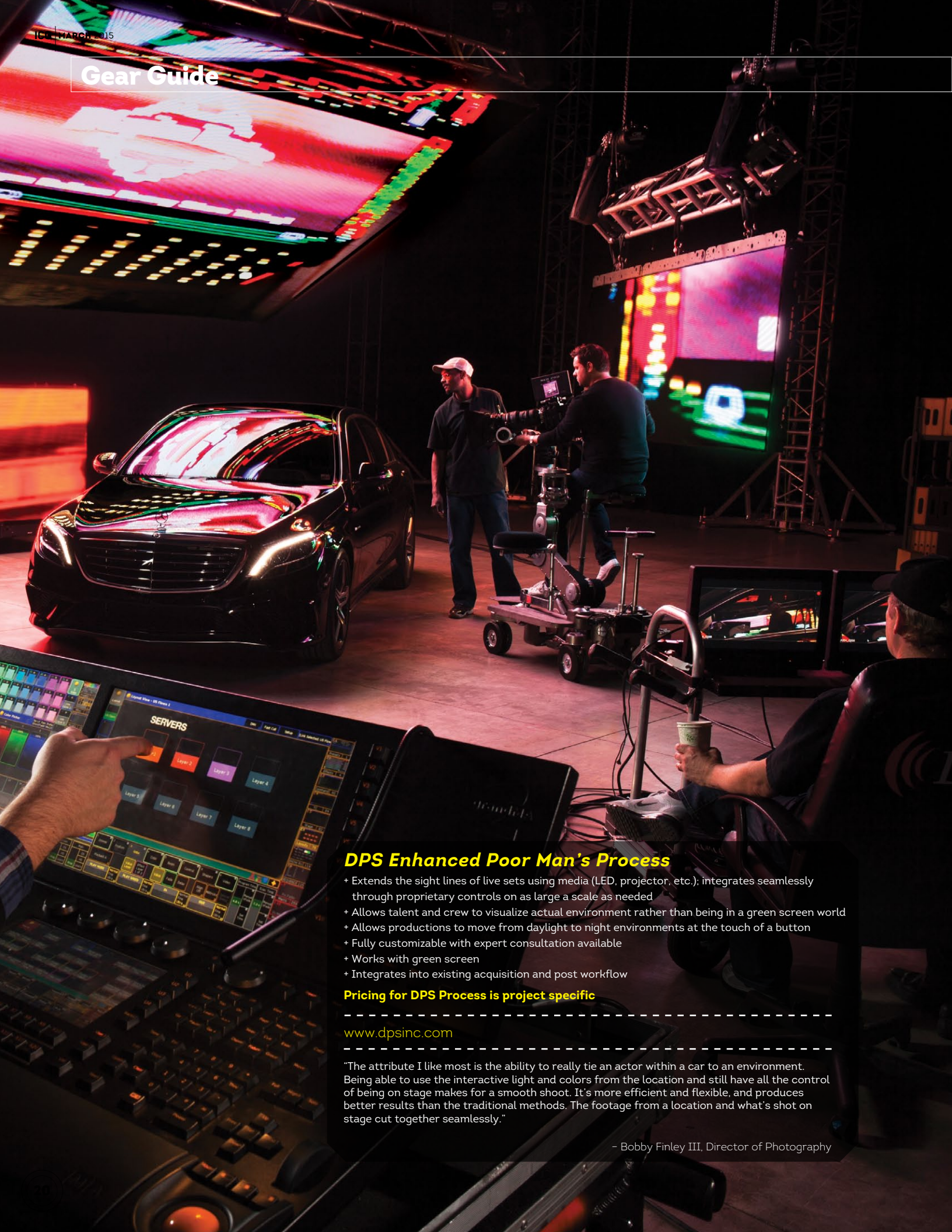
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— Bobby Finley III, Director of Photography



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First Look



Photo Courtesy of Greg Jardin

CRAIG KIEF

BY PAULINE ROGERS

When Craig Kief was a junior in high school, he worked as a prop-department PA on a Warner Bros. movie shooting in his hometown. “I fell in love with working on the set,” he recalls. “I was really attracted to the lighting, but my true fascination was with visual effects and, in particular, the work of ILM. I wanted to shoot spaceships with motion-control cameras as well as creatures and explosions to make impossible things real.”

But when Kief applied for the ILM internship program, he wasn’t accepted. “That sort of knocked me into a more conventional route,” he admits. “In hindsight, I can see this was for the best, though, because today there are only a handful of DPs fortunate enough to exclusively shoot visual-effects work.”

After finishing film school at Florida State, Kief moved to Los Angeles, where he started working as a gaffer on a wide range of projects – eventually focusing on short format. “Shooting commercials allows me to explore a variety of styles and techniques,” he continues, “and I’ve wound up being able to specialize in visual effects-driven projects.

Through these experiences, I’ve somehow managed to check every box on my list that I wanted to shoot back when I was 17 years old. That includes miniature spaceships with motion control, which I thought I’d never get to do in the age of CGI.”

With VFX maturing well beyond explosions and space travel, Kief often works with directors who use effects that are completely indistinguishable from the live action.

“Chris Alender (*Eye of the Storm* music video) and Greg Jardin (*Floating* short film) are great examples,” he describes. “In both projects, the protagonists are heavily manipulated or completely CGI. Yet the life these directors and the VFX artists breathe into the characters and worlds they inhabit are so compelling, the effects disappear.”

Kief says *Floating* director Jardin emailed him a test of the balloon CGI (the main character is a balloon) that was only a few seconds long. “It was a handheld tracking shot in a parking lot, and I don’t think I even read the script,” Kief recounts. “I saw how brilliant the character was that he had created, and told him I was fully committed.”

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First Look

There have also been commercials where the live-action elements and CGI are so balanced that “it’s impossible to separate them,” Kief continues. “The Wills at the Los Angeles-based production company Gentleman Scholar have mastered this marriage to make any product look sexy, and their spots can be called nothing less than art. This is accomplished by extensive previs that gets refined many times and perfected before shooting a single frame. They are also early adopters of the newest technologies. We did the first commercial to be shot on a MōVi – back when it was still a prototype.”

Of course, even the most elaborate previs or storyboarding can’t prevent something from going awry. “It happens,” he laughs. There was a Muppets commercial for Sky TV with director Kirk Thatcher that had a little hiccup. “We were setting up a shot on stage where Gonzo jumps from a diving board onto a seesaw. We did the static plate shot of the diving board first, and then needed an element with Gonzo flying through the shot – which I was going to shoot on green

screen with the camera dolly past him.

“On the scout, I had told my fantastic New York key grip Dave Araki that we’d never need more than a couple of sticks of track and a one-foot riser to do the shot. Fortunately, he completely ignored me. Kirk wound up wanting a much wider lens than I had anticipated, and when I worked out the math for the element shot I wound up needing a 38-foot dolly move with a full boom down from about 10 feet up.”

Kief says the best way to predict the future in VFX is to look at the recent trends. “The past few years it’s been all about the dissemination of postproduction technology, which has led to faster shooting and doing more with less on set,” he concludes. “There’s going to be more of that ahead. But this year’s short list of VFX Oscar nominees at the Academy Bake-Off still incorporates as much in-camera work as possible, which requires talented cinematographers and crews behind the lens.”



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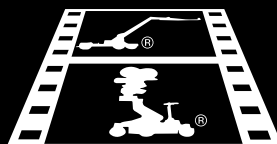


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Photo by Nicola Goode

DAVID MORIN

The career of David Morin, co-chair, joint technology subcommittee on virtual production and Autodesk senior director, industry relations and business development, can best be described as that of “digital pioneer.” Morin, who earned a computer science degree from Laval University in Quebec City and attended Sheridan College’s International School of Computer Animation program (which has turned out numerous CGI and animation whizzes), has played a significant role in developing both 3D software and the technology that has become performance capture.

In 1990 he joined Softimage, which introduced technology that allowed CGI to evolve from simple metallic geometries to the terrifying – and believable – dinosaurs of *Jurassic Park*. When Microsoft acquired Softimage, Morin was director of special projects; shortly thereafter, the company was sold to Avid and he became vice president of the Special Projects and Content group, working closely with clients.

In 2000 Morin left to head up the MVFX division of Manex Entertainment, which garnered two Academy Awards for Best VFX for *What Dreams May Come* and *The Matrix*. Later, he became a consultant to several companies, including Autodesk, where he is now an integral part of the Film and TV group. Based in Los Angeles, Morin helps film and television professionals to intersect with other industries that might use the same software storytelling tools, from architecture to gaming to engineering. He also acts as a “scout” to look for interesting ideas and companies that might become part of the Autodesk portfolio. ICG writer **Debra Kaufman**, who’s been covering digital VFX since 1989, spoke with Morin about virtual reality and the future of digital entertainment.

You’ve been involved with so many groundbreaking VFX movies: What do you consider your greatest accomplishment? The first time we saw a virtual character connected to an actor and coming to life was a real highlight. I was also involved in the early development of motion-capture technology, called Channel, at Softimage. For that reason, the work that Robert Zemeckis did on *Polar Express* (2004) was very important in the evolution of moviemaking that led to *Avatar* (2009), *Rise of the Planet of the Apes* (2011) and *Dawn of the Planet of the Apes* (2014).

What does the Joint Technology Subcommittee on Virtual Production do? The history of this committee goes back to 2007, when the ASC Technology Committee chair Curtis Clark, ASC, asked me and Ron Frankel, founder of Proof, a previs studio, to create a subcommittee on previsualization. We joined forces with the VES [Visual Effects Society] and the Art Directors Guild and formed this Joint Subcommittee on Previs that ran from 2007 to 2009. Our charter was to have 12 meetings, each one centered on a case study of a film that used previs. At the end, we delivered a report with recommendations, and the previs companies got together and created the Previsualization Society. Just as we were wrapping up, *Avatar* came out and

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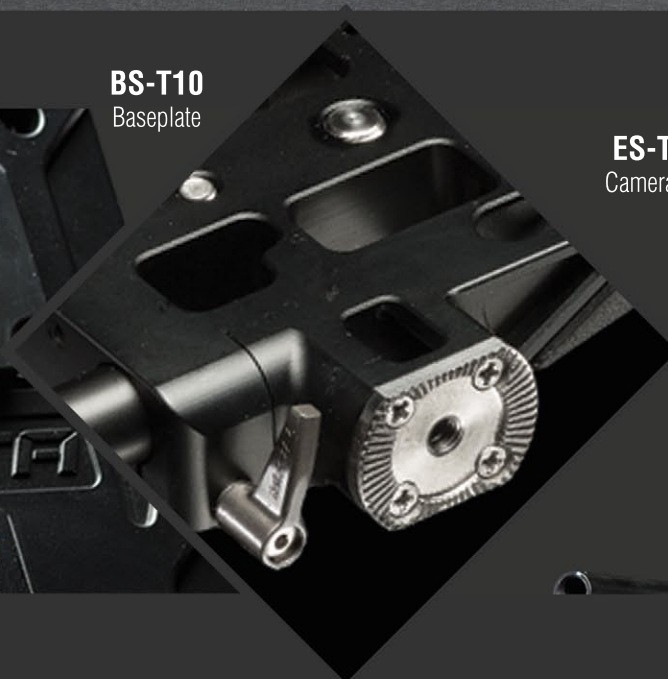
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there was a lot of interest in understanding how that movie was made. Many people came to me and said we should put together something on virtual production. I picked up that flag, and [VFX Supervisor] John Scheele joined me as my co-chair of the Virtual Production Committee. Similar to the Previs Subcommittee, we're going to meet 12 times and then deliver a final report.

How is the work of the Virtual Production Subcommittee going so far? We've been going for more than two years. Our first two case studies were devoted to *Avatar*, which deserved a double meeting. We're also doing ancillary events; for example, I'm curating the virtual production track at FMX, a conference on animation, effects, games and transmedia in Germany. When *Avatar* came out, it felt like there would be an onslaught of virtual productions, but there haven't been as many as expected. Certainly, there have been some, and Autodesk MotionBuilder is the standard in virtual production technology. Peter Jackson's *The Hobbit* and *Dawn of the Planet of the Apes* embody the potential of virtual production.

Autodesk recently acquired Shotgun, a very popular production management platform. How did that acquisition reflect the needs and desires of your customers? From 2008 to 2014, I was chair of the Autodesk Film Advisory Board, a twice-yearly internal meeting with Autodesk clients. We know that people using digital technology are generating incredible images and stories – they're the Michelangelos of our time. But we also know it still isn't cheap, and we want to make these processes simpler and less expensive. That's why we think the next wave of innovation will be at the pipeline level, which is why Shotgun is with Autodesk.

What's going on in production at the pipeline level? Every studio, every movie has a pipeline, which is essentially the string of people and applications that need to be put together. That pipeline, using Maya or MotionBuilder – the key tools for storytelling in a variety of media markets – and how the data, images and assets go from person to person, aren't as well understood. Every movie, every facility has its own custom ways of doing things, and there are a lot of inefficiencies and reinvention of the wheel. We believe if we can bring some standards to part of the process, we can make it easier, and we'll also make the process more iterative. A linear workflow – pre-pro, production and post – worked well in the days of chemicals

and film. But, technology now allows us to be more intuitive. If we can have a pipeline that can allow data to flow back and forth, then an animator, for example, can make better decisions because that individual will know the context of the shot he or she is working on.

Tell us a little more about developing standards for the pipeline. Right now we need to standardize a lot of practices – like what the Academy is doing on ACES. We're a big supporter of that. Autodesk has engineers working with the Academy on ACES, and we're also supporting ACES in our creative finishing products, where it's most relevant. And we are developing a set of common tools that will be common to most Autodesk products that deal with color. Through the Autodesk Film Advisory board, there has been a lot of discussion about the world of open-source software. Our clients will often develop technology they'll then license with open source in the hope others will develop it further. We are a supporter of our clients, and when it makes sense, we use them. OpenEXR is one example of this. The VES's technology committee is working on the VFX Platform, a group of open-source technologies, and we support that.

Will virtual production really take off? I'm not going to risk predictions here, but I'm absolutely convinced that moviemaking in the future will totally integrate the technologies of virtual production. Virtual production will become production. It's still a complicated process used by a few, but the benefits are enormous: You can see your VFX in camera, and the filmmakers can work the way they ordinarily work, without relying on a green screen and a long review and approval process. It also helps their actors tremendously. We need to take these technologies and make them easier to use and not so scary, so there's still work to do.

What are the movies in production now that are using virtual production? We're working actively with Lightstorm and Weta in developing the next generation of tools for virtual production to be used in *Avatar 2*. I can't name any other titles, but we are supporting every moviemaker who is willing to go into a virtual production process.

What kind of an impact will virtual reality (VR) have in the media/entertainment space? Virtual reality popped up on the scene eight months ago. It's joined at the hip to virtual production, and Autodesk technologies are

already used for that. Most of the environments you see in VR are created using Maya or 3ds Max; some use MotionBuilder if they've done performance capture. More will come later...keep an eye on GDC [Game Developers Conference, which takes place in March]. Autodesk also has a big presence in games, and future news will relate to VR and potentially to virtual production. What's really interesting is what's going on with storytelling. Live-action filmmaking with 360-degree cameras offers tremendous potential for sports. You can sit in the stadium with Jack Nicholson sitting on your right. Or as Fox did with its short VR film, *Wild – The Experience*, you can spend three minutes on the Pacific Crest Trail with Cheryl Strayed, played by Reese Witherspoon.

How will that impact linear storytelling? Many film directors, the most progressive ones, are looking at this and are very interested to see what they can do. I think the delivery mechanism is the question for the VR experience. How many people will stand in line to put on sweaty goggles? I don't think that's the model. But from a content-development point of view, we're ready.

Is there a role for the cinematographer in VR? Absolutely. People think you place a 360-camera in the scene and push the record button. But if there's a story, you have to direct the viewer's attention. With VR, it'll be a lot more about lighting but also about setting up the scene, and visualizing where the director wants the users to go in the story. There are all kinds of tricks that cinematographers already use to do that. At the end of the day, it's just another camera. You might need a rig, and you can't hide behind the camera, but besides that, the process of shooting and the questions are the same.

How do you envision the future of entertainment? It is rooted in the past. We are social animals, and telling stories is the way we transmit information; the best classes and teachers, for example, are the ones who transform the material into stories. The technology we create at Autodesk is to enable them to tell better stories. I think we're succeeding, but there's a way to go. The virtual world superimposed on the real world, and the two completely in synch with one another, is the promise of virtual production, and it's the cinematography of the future. It'll be easy, something anyone can do on any camera, and it'll bring a whole new level of creativity to cinematography and filmmaking. 🎬

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PETER CHIANG

SUPERVISOR PETER CHIANG ON THE STATE OF VISUAL EFFECTS

Cinema today is an immersive experience where the images are so convincing that the viewer never doubts the reality and is never taken out of the narrative. There is no environment that can't be imagined or created digitally. The state of the VFX industry allows directors the luxury of unlimited imagination and filmmakers a safety net to realize their vision. They can explore multiple methods knowing that if all else fails, VFX can make it happen. Even productions can streamline shooting budgets without compromising the ability to tell the story.

Movies like *Transformers* could never have happened if it weren't for the radical change in the state of the VFX world. In the early digital days it was only the larger companies that could afford to have big R&D teams to write proprietary software and coding. Complex CGI problems like water, hair and fur, cloth

and creatures are no longer an issue for even the smallest of companies. Design can now rightly be the most important aspect of VFX shots. In the past, ideas were often compromised by practical concerns, such as, "How can we afford it?" and "How can we do it?"

As the software becomes more "off the shelf," and each year processors get faster, VFX shots can become even cheaper. The line between film and television has become more blurred; great effects can now be seen in much of long-form TV, the result of lowered costs and better access to toolsets.

Time, however, still remains the biggest problem. Filmmakers need to allow a realistic amount of time in which to create the ever more sophisticated VFX images. Lack of time limits the ability of the VFX team to perfect the shots. In a way, VFX companies



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“The only [VFX] discipline left to overcome is perfecting the digital human.”

are their own worst enemies. Scrambling to successfully complete hundreds of shots on a tight deadline allows filmmakers the leverage to shorten the post period next time around. The VFX industry is so competitive that there will always be a company willing to take on the next challenge.

Even with all the many advances made in VFX, there is still one discipline to overcome: the “Holy Grail” of perfecting the digital human. *Benjamin Button* was a major breakthrough and gave the world a glimpse of future potential. It remains an area that still makes production companies nervous, but in the coming years this will change. One day we will be able to see Marilyn Monroe starring alongside Rita Hayworth and a young Clint Eastwood.

We are all constantly challenging ourselves to make these kinds of images possible. Every year at the Academy of Motion Picture Arts & Science’s global “bake-off,” the standard of work keeps getting better and better. The craft is being practiced by a much larger workforce that gives rise to special individuals who can support the work of the directors, designing great VFX by combining art with technology. Competition is good and makes for a higher standard throughout the industry. Nomadic crews working all over the world share their experience and know-how as they move through multiple companies, which raise the standard so that the whole industry learns and improves.

It is now standard for the VFX team to be part of a project from the beginning. In fact, preproduction is my most enjoyable time on a film. Designing the methodology to achieve the director’s vision is exciting, because at this stage the art leads the technology.

VFX is no longer a “black art.” Everyone understands the process, up to a point. Good VFX supervisors are able to explain the methodology to all departments so that efficiencies can be made and the right material shot.

But, knowing the technology and being aware of the latest developments is only one part of being a good supervisor. It is also key to know the art of designing a VFX shot that can fully realize the director’s vision. That means communicating with all departments so that everyone can understand not only the process, but also what it takes to support the narrative in a pragmatic way. It is crucial that the VFX artist be flexible. There are always a number of ways to achieve a shot, and sometimes supervisors need to design other options, or what I call “VFX lateral thinking.”

I have been working in the VFX industry for 30 years, begin-

ning with the analog era from an art-college education. I learned my craft from two VFX veterans, Derek Meddings and Roy Field. That time was invaluable, introducing me to every aspect of the filmmaking process and, particularly, solving problems with limited resources. It has shaped the way I work today.

Setting up Double Negative in 1998 provided a firm foundation on which to build. Collaborating with some of the most talented people in the world has only made me a better supervisor. Bringing the next generation through and giving them an environment in which to experiment is something I wanted to pay forward. We encourage the artists and producers to push themselves into new areas to further their careers.

Today’s economics have forced VFX to chase the “rebate” around the world. It is important for Double Negative to be global, to place the company in a position to compete on all work all over the world.

It is also important to understand that the art of visual effects is not confined to spectacular sequences. In *The Debt* (2010), directed by John Madden, we did a series of shots with Helen Mirren and Tom Wilkinson traveling at night, in the back of a car, that still remains seamless by today’s standard. Traditionally shot on a stage against green screen, technically the sequence appears very straightforward. Unfortunately, we had to shoot the moving, panoramic night plates that would serve as the background after the green screen shoot. I drove the team crazy fine-tuning the details: grading, interactive light, lens flares, complementary camera moves, shadows and reframing. For me this work executed by the VFX team stands out as a fine example of VFX art done well.

Recently I had the pleasure of supervising the work on *Exodus: Gods and Kings* for Ridley Scott. The wave for the Red Sea sequence was very much design led. Ridley draws brilliantly and has a fantastic eye for detail and composition. It was as much about sculpting and composing the water as technically creating a realistic 180-foot wave. Flowline, produced by Scanline VFX, allowed water simulations to be rendered quickly, and special tools for making small changes were designed to allow Ridley to fine-tune every parameter.

Visual effects are only going to get better and become ever more integrated into the filmmaking process. Previsualization will be key to successfully conveying ideas – a preview of the future that will forever compete with spontaneity. 🎬

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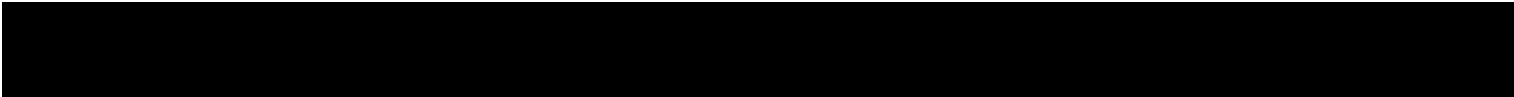
How To Train Your Dragon

HBO's *Game of Thrones* demands (and delivers) VFX spectacle beyond other small-screen fare

by KEVIN H. MARTIN / photos by KEITH BERNSTEIN/HBO



A SONG OF ICE AND FIRE IS THE TITLE OF NOVELIST GEORGE R. R. MARTIN'S SERIES OF RUNAWAY SUCCESSES IN FANTASY FICTION, ONE THAT FOR MANY SEEMS DESTINED TO ECLIPSE TOLKIEN'S AND OTHER PAST MASTERS' WORKS OF THAT GENRE. FROM THE SEMINAL BOOK *A GAME OF THRONES* ONWARD, MARTIN'S UNIVERSE HAS PROVED IMMENSELY POPULAR, AND EVEN THOUGH HBO'S SERIES BEGAN AIRING IN 2011, DEVELOPMENT BEGAN MORE THAN FOUR YEARS EARLIER, UNDER THE STEWARDSHIP OF DAVID BENIOFF AND D.B. WEISS.





Director Michael Slovis lining up a shot for Episode 1, Season 5, *Game of Thrones*

The series balances strong production values with a combination of eye-opening and invisible VFX, but all elements are carefully subordinated to the epic storyline. For director Michael Slovis, ASC, who helmed the first two episodes of the new season, the production – based in Northern Ireland – differed markedly from a domestic TV shoot.

“During my episode prep, producer Chris Newman and I drove an hour out of town,” Slovis recalls. “Then we transferred to a four-by-four to go fifteen minutes up the side of a mountain. This whole while, I’m saying, ‘We can’t afford to get a crew up here,’ knowing you’d never pick a location like this in the States. But I’m told, ‘Of course we can,’ and Chris just keeps smiling. I wonder how much of my prep is being eaten up by this madness, but then we got to the top – and there’s this incredible vista, and it is immediately clear that this is worth all that time and effort.”

When Slovis learned he had six weeks of prep for his two episodes, his first thought concerned what he

would do with “all those weeks,” but he soon discovered otherwise. “I worked seven days a week getting ready and could still have used another week,” he laughs. “Some of that was due to this being my first show, so I had to learn the culture of this production and how it works, but you are just so involved with all departments due to the lead time to come up with what will be needed in advance of the day. You can’t just run to Macy’s to get a new costume.”

During his work as cinematographer (most notably on the Emmy-winning *Breaking Bad*) and as director, Slovis has always preferred shot lists to storyboards. “Boards don’t always translate to the real world in terms of framing,” he maintains. “But this series relies heavily on storyboards and photoboards.” The latter arise out of location trips during prep, when the director photographs stand-ins in a variety of potential shooting environments. “This step is essential in letting us determine if the locale can be dressed out – which is the preferred option – or if we’ll have to cover aspects of the frame with VFX.”



There's a live action film language we don't want to depart from [with VFX]; it's rare that we do a full CG shot.

{ VFX SUPERVISOR JOE BAUER }



With six episodes under his belt, cinematographer **Robert McLachlan, ASC, CSC**, reports that *GOT*'s major VFX sequences are addressed early in each season's prep.

"The climactic stuff for the last two episodes of Season Five, which we shot during October, was the subject of meetings in L.A. with director David Nutter back in April," McLachlan recalls. "Boarding and extensive previsualization began, including techvis, so that each department would have no surprises down the line, and planning for VFX design could begin."

Lead visual effects supervisor Joe Bauer and lead visual effects producer Steve Kullback are heavily involved up front. "We start by putting our heads together with the others to make guesses about who will be doing what based on the script," explains Bauer. "From there it's a matter of figuring out hand-offs between departments. There's a film language with live action from which you don't want to depart when entering the realm of VFX, so it is rare that we do a full CG shot; realism benefits when at least some elements from all departments are included. Even on our standalones, we'll rely on reference from set and from stunt performers to keep working from some real-world aspect."

Another real-world concern is dealing with the physical realities of locations and their impact on production. "When doing previs for our dragons and giants," says Bauer, "we put the digital camera on the digital crane or dolly so that our virtual world matches the conditions Production faces with their

equipment. By staying in the world of real photography, we can generate info and give that tech back to production so they know how much track will be needed and just how far the crane is going to have to extend, which makes the shooting much more efficient."

McLachlan stresses the "director as filmmaker" angle as key to making the show work. "A lot of DGA members shoot everything from every angle, which most producers like, since they can do whatever they want in post," the cinematographer observes. "But that kind of piecemeal shooting isn't cinematic. Here, you have to be more selective up front, and so the show employs directors who have a vision going in."

***Game of Thrones* has shot on ALEXA from the beginning**, and has been captured via Codex starting in Season Two. Only plate shoots and shots requiring exceptional amounts of post work are acquired in RAW, though one unit now carries a 4:3 camera to facilitate the effects effort. McLachlan credits both Newman and executive producer Bernadette Caulfield with coordinating the huge logistical monster that is production.

"They're juggling ten episodes that shoot with two units," he marvels. "As a result, I may shoot three or four days with one unit, then do a day of prelighting and rehearsal while working with a different crew. You hopscotch around, sometimes squeezing in a day or two in Croatia before flying back to Belfast."

Since episodes often rely on oft-used sets and locales, continuity of look is a factor. “When DPs start on a new season, they get an iPad with what is called a *flipbook*,” McLachlan reports. “It includes frame grabs from the most successful examples of how each set has been photographed, with chapters showing how various DPs handled locations each season, and how it all looked after final color timing – there’s some variance, since there’s more than one cook in the kitchen.”

With eight episodes to her credit, cinematographer Anette Haellmigg reigns as the queen of *Thrones* shooters, earning one Emmy and two ASC nominations in the process. Haellmigg often finds it necessary to eliminate light from above or the side of frame while on location.

“I’m always using eight-by-eights or twelve-by-twelves on closer shots,” she reveals, “and when we shoot Harrenhal [Castle] in Northern Ireland, I’ll use flyswatters. With really sunny conditions, I may use a 40-by-40 overhead to control the light intensity. Production says, ‘Shoot in all weather,’ so matching is an issue. I recall one scene in a quarry over several days requiring dark overcast weather. Since we were shooting in November, the sun came into the set for a few hours; we had to block it. We built a huge wall of negative fill with 20-by-40s suspended horizontally from three or four Condors.”

McLachlan has faced similar conditions. “I had a 20-by-20 solid on a Manitou that let me get some modeling on faces,” he reports. “That only took five minutes, but it turned out we needed to be doing thirty setups per day. Five times thirty cuts a big hunk out of your shooting day, so I just had to stick that away in the corner and do without.” On one grueling stretch this season, McLachlan had four ALEXAs turning almost continuously in order to record 127 setups in 9.5 hours. “Our playbook was the size of a small phonebook,” he chuckles, “but it let us know all we needed to do and at what time of day it needed to be shot.”

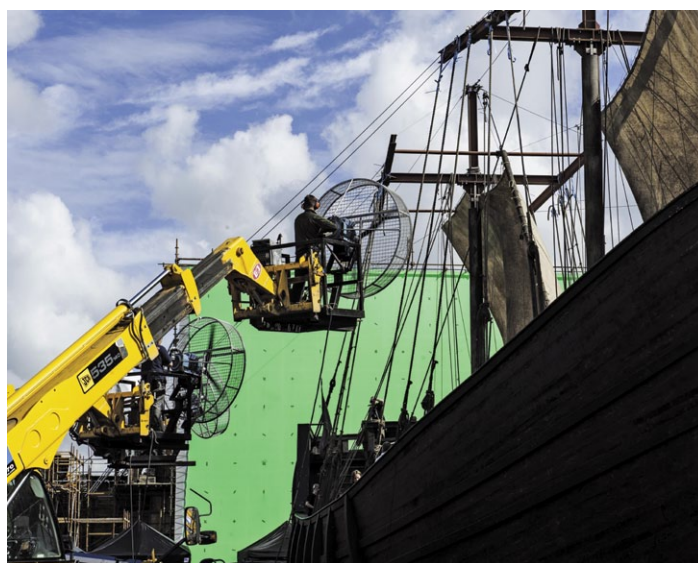
Earlier in her career, Haellmigg worked on Paul Verhoeven’s VFX blockbusters *Total Recall* and *Starship Troopers*. She finds that the evolution in digital effects has streamlined some of what was once tedious and time-consuming.

“We often need only small screens for composite work, and sometimes can do without them altogether,” the German-born Haellmigg offers. “We had a very big fight scene in season four with several ‘wights’ – our reanimated skeletons – and putting green screens up behind the performers for every shot would have been very impractical.

“So we ended up only using it for one shot, and VFX was able to make the rest of the sequence work just by employing the empty passes shot after the talent, along with their terrain measurements and markers.”

Scanline VFX was tasked with realizing the battle of the wights, translating the action of the stunt personnel, who wore prosthetics over green costumes that facilitated extraction.

Haellmigg characterizes Season Five as being “more of everything” – more VFX, more dragons, and even more challenging. “In the past, I just had some minor dragon scenes when they get locked up,” she recalls, “which involved shooting a green screen dummy head so the actress could appear to put restraints on.”







“More VFX, more dragons, and even more challenging”

{ CINEMATOGRAPHER ANETTE HAEELMIGK DESCRIBING SEASON 5 }





With the dragons getting larger and more active, it can only mean fire-breathing attacks are on the way. And, Bauer says, there always issues with CG fire. “If you can’t spend time to refine it to work with a specific environment, it will look wrong,” he insists. “This happens even on high-ticket features.

“Since fire is an object that throws shadows, with an appearance that is affected by the sun and other strong sources, we always try to photograph real fire on location,” Bauer continues. “If you just rely on generic fire elements shot against black, that can work for a cave shot but will fail when comped into a daylight plate.”

During Season Four, the physical effects crew piped the grounds being strafed with flames, with the idea that only the fire coming from the dragon’s mouth would have to be comped. Unfortunately, strong winds flattened the practical fire, requiring post enhancement that Bauer acknowledges as a less-than-ideal solution. To accommodate the expanded dragon workload, Rhythm & Hues joined this season’s VFX roster, augmenting Pixomondo’s work on the flying lizards.

A major sequence in Season Four – realized by MPC – involved giants alongside human-sized wildlings and woolly mammoths, all approaching a great ice wall.

“In previs done at The Third Floor, we made a point of keeping the camera at human eye height,” says Bauer, “to get across the true size and menace of the giants. We

cast much larger performers, too, because when a normal-sized person acts big, you can tell he is exaggerating his movements. Big people have that gait naturally, so all you have to do is slow the film down to get them the rest of the way to standing a convincing 12 feet tall.” Camera moves were scaled appropriately to allow proper integration of the other characters, and shots featuring attackers climbing the wall re-employed a foam wall section built for Season Three, augmented by a CGI set extension.

An L-shaped 30-foot-high by 400-foot-long green screen was deployed for the Northern Ireland location work in the giant sequence. “We put red flashing lights on top,” Bauer adds, “both for tracking and so low-flying planes wouldn’t hit it.” The series experienced a mishap during shooting in Spain, when a huge screen was ripped apart by winds. “This year production committed to inflatable green screens for our last stretch of work,” notes Bauer. “Normally we finish by mid-November, but we were going well into December this time, when the worst weather the British Isles can throw at you arrives.

“To avoid a possible repeat of Spain, they ordered them, and the inflatable greens were rock-solid, even in the heaviest winds,” he continues. “That’s a great innovation. So many things continue to improve. We can deal with filtration in front of the lens now, since the cameras are so good our key edges don’t get screwed up. And between the Arri equipment for metadata capture and all data wrangling



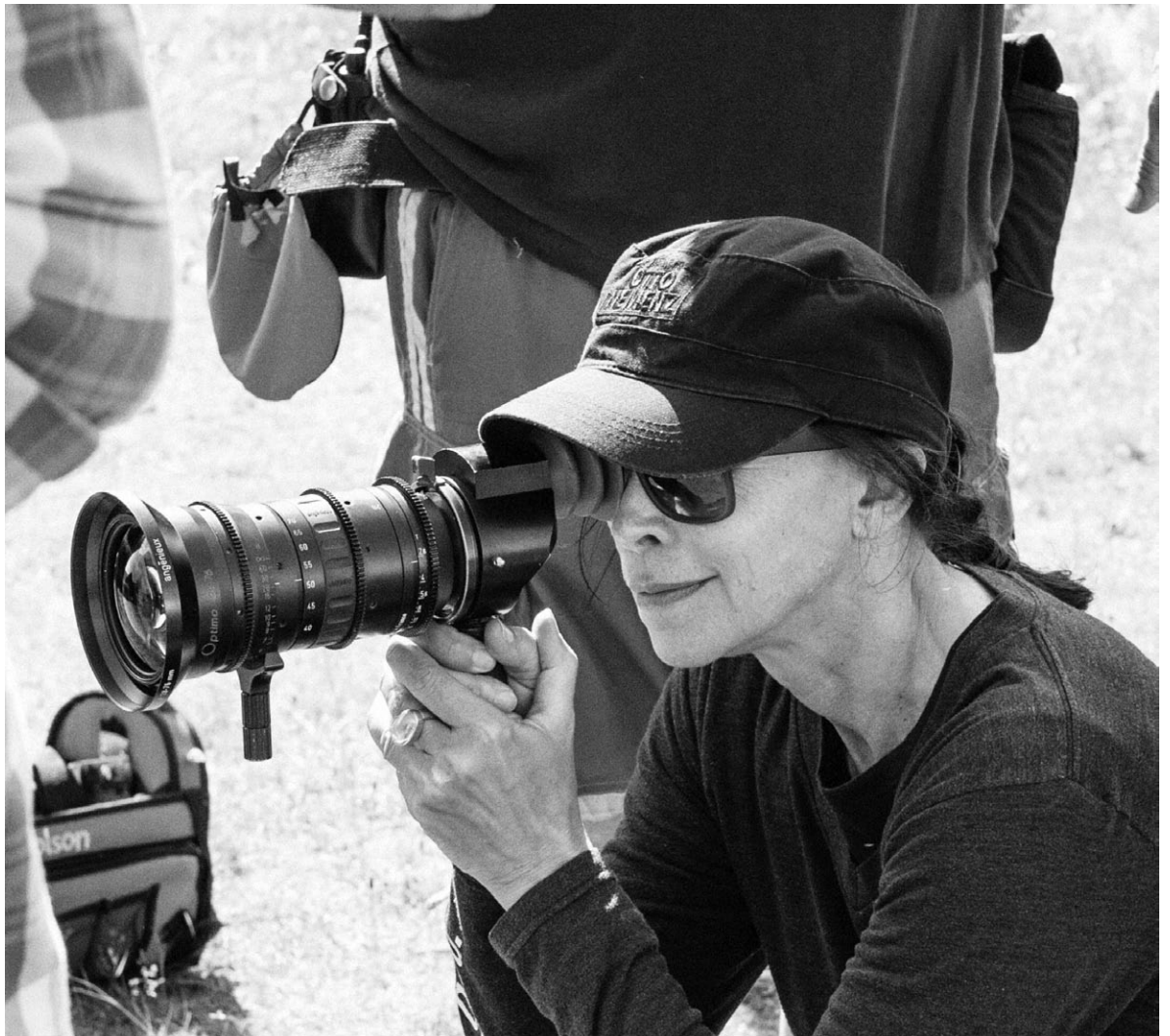
and HDRI passes, we're never short of information for the vendors."

Earlier this year a preview of Season Five was screened in IMAX theaters, along with the two-part conclusion to Season Four. While Bauer admits to some trepidation ("I signed off on shots viewed on a 60-inch monitor, not a 60-foot screen!"), McLachlan has cause for more optimism. "At IBC [the International Broadcasting Convention held each September in Amsterdam], Arri up-rezzed some of my footage to 4K and projected it on a 65-foot screen," he notes. "While prepared for the worst, I wound up being blown away by how well the material held up."

Ensuring her material looks its best is why Haellmigk makes a point of trying to get as close to a final look as possible on the day, which facilitates the DI. "Initially, post had requested I shoot one stop overexposed, especially on exteriors," she recalls. "There was some dialog about that ... until the finals colorist explained that more time

would have to be spent on an exploration in the DI if the image wasn't nailed up front. So my approach – baking-in lighting, contrast and color temperature, which I change in the camera – gives the colorist a clear idea of intent. Also, I've always been available to do the final grading, so I've been lucky in that regard."

Perhaps Michael Slovis has the track on why this series succeeds consistently in ducking the curse of many a genre entry, when the VFX tail wags the dog. "VFX meetings never get off track, because these guys aren't pitching, 'I've got a kick-ass effect to throw in,'" Slovis observes. "For Joe and Steve, it is about delivering the story beats; their huge team always keeps that front and center. The quality of the work goes far beyond what I even hope for, but it's a never-ending dance between production and effects to deliver a thousand shots in nine months, and it's not a task I'd advise mere mortals to tackle." 🍄



Cinematographer Anette Haellmigg



Take Me To Your Leader

Florian Ballhaus, ASC, invests *Divergent* sequel *Insurgent* with a new vision for an embattled future in the ruins of New Chicago

by KEVIN H. MARTIN / photos by ANDREW COOPER



BY THE END OF *DIVERGENT* [SEE *ICG* MARCH 2014], HEROINE TRIS (SHAILENE WOODLEY), A GIRL WITH UNIQUELY DIVERSE SKILLSETS, HAD MADE GOOD HER ESCAPE FROM FORCES GOVERNING FUTURE CHICAGO. THE SEQUEL *INSURGENT*, ALSO DERIVED FROM NOVELIST VERONICA ROTH'S SUCCESSFUL SERIES OF YOUNG ADULT ADVENTURES, FINDS TRIS AGAIN IN CONFLICT WITH THE POWERS THAT BE, INCLUDING THE RELENTLESS LEADER OF THE ERUDITE FACTION, JEANINE (KATE WINSLET.)



Cinematographer Florian Ballhaus, ASC (R) on the set of *Insurgent*

With *Divergent* director Neil Burger serving as executive producer this time out, filmmaking reins went to Robert Schwentke, who wasted no time in bringing about several past collaborators, including production designer Alec Hammond, VFX Supervisor James Madigan (who also directed second unit) and director of photography Florian Ballhaus, ASC. After screening the original film, the cinematographer discovered there was no studio mandate to adhere slavishly to Burger's vision of this new Chicago. "We were free to treat *Insurgent* almost like a standalone movie," he reports, "so I never felt my hands were tied creatively, which might be the case with other sequels."

Since this story explored different facets of Roth's universe, new locations were sought, leading production to be based in Georgia (with VFX plates and aerials again lensed in Chicago). Some bits of *Divergent* art-department creations were repurposed for *Insurgent*, but Alec Hammond reports that more than 90 percent of the environments were created new.

"We also looked at the workings of the city," he states. "This is a hermetically sealed society with no imports, so everything is sourced internally. The differing ideologies all had their own looks, with the agrarian Amity group being very unadorned, whereas the Erudite group is science minded, looking very clean and sophisticated."

Sets were conceived both in practical model form and as CG renders prior to construction. "Rhino and May renders gave us an idea of how the lights and reflections would register in the sets," says Hammond, "but they don't completely replace cardboard models. For me, there's still an advantage to picking up a model and studying it up close, because you immediately understand the volume of space involved."

"I never felt my hands were tied creatively, which might be the case with other sequels"

{ FLORIAN BALLHAUS, ASC }

With less than twelve weeks of prep before the commencement of principal photography, the design effort was two-pronged. Madigan worked with previs firm The Third Floor to develop VFX concepts, the bulk of which would be accomplished by vendors Double Negative, Luma Pictures and Animal Logic.

"We developed visuals to support the arc of Tris' emotional journey before the script details were worked out," Madigan relates. "The Third Floor [imagery] involved detailed dynamics of cities and people disintegrating on a scale never done before for previs."

A large part of that journey is represented via "sims" – the mind's-eye fantasy visions Tris experiences while wired up in a lab. "Robert wanted to explore this in greater

depth, so we researched photography and a huge variety of creative conceptual art, looking for inspiration to visualize these sim worlds," Ballhaus describes. "But we also wanted to establish points of similarity between the sims and reality, so there could be some question of where you were. To keep that mystery alive, we chose subtle ways to set them apart." While the project was anamorphic, all sim scenes were captured through spherical lenses, which provided the practical advantage of flexibility in reframing from its larger image for VFX. "We shot wide open with Leica primes for the sims, which gave us a very beautiful look," Ballhaus adds.

In all, the cinematographer used four different kinds of lenses to deliver different looks throughout the show.



“This is a hermetically sealed society with no imports, so everything is sourced internally.” { PRODUCTION DESIGNER ALEC HAMMOND }

“We’re one of the first big movies to use the Zeiss Master Anamorphics,” Ballhaus continues. “Gus at CSC/Arri Rental was instrumental in getting us enough for both units; we couldn’t have picked them without knowing there would be enough support. Shooting anamorphic is always difficult for focus pullers, but given how well the Zeiss lenses handled wide-open apertures, it became even more of a challenge, which 1st ACs Heather Norton [A-camera], Dennis Seawright and Jorge Sánchez [B-camera] handled incredibly well.

“I also very much liked the look of more-traditional anamorphics,” the cinematographer elaborates, “so I used Hawks as well. We mixed them according to what we were looking for in any particular shot. It’s a bit strange that in the past we were striving to get closer to optical perfection and maximum sharpness, and now we are fighting against that perfection and look for more character instead.”

Ballhaus admits to being a late adapter of digital, and recalls frustration over early years dealing with video dailies. “I’d prefer not to ask a colorist to just take his best guess, so bringing control of the look back to me on set is better for me,” he opines. “I like on-set grading. You’re not touching the Raw, so you maintain the full flexibility of the log image for post.” DIT David Satin notes that the project had great support from Codex for capture issues. “Technicolor supplied us with a 3D LUT,” Satin reports. “I colored underneath that to create a look that would translate faithfully for dailies.”

Since his exposure to Arri’s ALEXA six years ago, Ballhaus has relied on it exclusively. “I can take more chances,” he elaborates. “Because of the safety net of instant review, you learn to rely on your eye more than on meter readings.”

For Hammond, Ballhaus’ lighting suggestions helped define and delineate each faction. “As an integrated design



element, light really helped shape the performance space,” Hammond observes. “Florian’s input influenced and improved the look, plus he was adept at dealing with the many reflective surfaces, which is great because Robert loves using them. We needed a new way to interact with displayed data, so rather than dealing with a flat-screen monitor, there was layered holographic imagery that felt more immersive.”

LiteGear’s LED ribbons were used throughout to deliver a high-tech look that could be varied in intensity as needed. “We could adapt to high-speed shooting by increasing the light by up to three stops,” Ballhaus notes. “We wound up buying a lot of it because it needed to be installed within the sets, and while it wasn’t inexpensive, the effort was more than worthwhile.”

A set that features prominently is Jeanine’s lab, where Tris’ sim experience takes place. The sim experiences in *Divergent* occurred with subjects chair-bound, but director Schwentke wanted more dynamics, so this time out Tris is suspended in mid-air, and the events in her mindscape actually affect her physical form, spinning her hither and yon. More visual interest in the chamber is afforded via

kinetic lighting.

“There are glass tubes all around her in this room,” Ballhaus adds. “I had ten 20K video projectors that could project colors into these tubes, with unique patterns that represented different phases of the testing. Gaffer Chris Culliton came up with unbelievably creative solutions for this set.”

For A-camera operator Thomas Lappin, *Insurgent* represented a return to more-controlled methodologies in shooting. “Robert is very specific about his framing and maintaining control of that frame,” Lappin explains. “We didn’t throw B-camera in just any place to get extra coverage, it was always part of the overall shooting plan, and there wasn’t a lot of frenetic, all-over-the-place handheld, which has been more common in recent years. There were four-by-four electric carts with Libra heads, along with lots of dolly and crane for moving camera work, and jib arm employed for various running shots. While we didn’t use Steadicam as a go-to, which is the norm, we had Scott Sakamoto operating those shots, so there were never worries about the feel being wrong when intercutting.”



“[Director] Robert [Schwentke] is very specific about his framing and maintaining control of that frame” { A-CAMERA OPERATOR THOMAS LAPPIN }

Tris engages in some incredible aerial acrobatics during one sim and elsewhere in the film. “With a lot of the flying scenes, I decided we didn’t want to see CG characters, but instead Shailene herself or her stunt double,” Madigan reports. “I think it helps audiences engage emotionally when there’s an identifiable human presence in these extreme or fantastic moments. Shailene did a lot of it herself on various big moving rigs.”

Since Production couldn’t drop its lead actress 300 feet, CableCam was required to depict Tris plummeting earthward. “Robert and Florian put their heads together with our key grip Charlie Marroquin and decided to stage the whole sequence by tipping it over on its side, horizontally instead of vertically,” recalls Lappin. “We had the talent static on a pedestal, then raced this cable rig with a wireless Libra head over her. It was a perfect way to go from wide to up-close and then pull back away at speed, but with great control. We shot the action around 60 frames per second, and while it took two days

to set up, we had it done in six takes and wound up with this tremendously fun shot.”

Ballhaus lit the “fall” with a flat, late-afternoon feel. “It’s important to maximize interactive lighting,” he explains, “but without completely tying the hands of VFX in case things change in post. It was very helpful that she wasn’t in hard sunlight.”

In *Divergent*, speeding city trains were nearly ubiquitous, providing adrenaline-rush challenges for denizens who would mount them as the commuter vehicles traveled at speed. “This time out, we designed a secondary train system that moves product between Amity and Chicago,” Hammond describes. “This different shape worked better for our needs anyway, since we had substantial action taking place aboard.” Two trains – each fully realized as interior/exterior sets – were built atop truck chassis and could be pulled down roads, either side-by-side or back-to-back, with track rails added via CG.

On stage, the units were gimbaled, with video







projectors installed behind them.

“Second-unit DP Lukasz Jogalla shot exterior plates of the woods that we projected on set,” Ballhaus reveals. “Those images gave us an interactive light aspect visible throughout the interior and on the faces of the actors, and it turned out to be a lot more effective than having electricians just pan and track lights outside the set.

Other sequences involving an assault on Amity, a rooftop attack and the train required a second unit, directed by Madigan and lensed by Jogalla. “My gaffer Jay Kemp and I were in constant contact with Florian and Chris Culliton,” Jogalla relates, “running all my lighting schemes by them to match.” Second unit also shot some airborne Tris sims featuring her atop a burning house. “The scene was shot partly on stage and partly in front of a massive blue screen outside. [Since] Florian opted for soft light, we had to shade our outdoor set [using] two 40-by-40 solids suspended from construction cranes, under the brilliant supervision of main unit rigging grip Craig Vaccaro.”

Second Unit key grip Kurt Kornemann’s team was instrumental in helping realize Madigan’s previs notions, which were captured by 2nd-unit camera operator Kent Harvey. “It was very challenging to match to the previs,” Harvey recalls, “as the computer vision isn’t something that is always straightforward to capture practically in the real world. We were using a 50-foot Technocrane, performing very dynamic moves to cover the fast action that included tracking, tilts and backpans.”

Much of the film’s aerial work was handled through the use of a radio-controlled Octocopter, supplied and operated by Georgia-based Yonder Blue Films. “Restrictions on regular aerial work make it expensive both in terms of money and time,” Ballhaus observes. “But these guys from Atlanta were very enthusiastic and



had a terrific system that was a fantastic new opportunity to explore, on both main and second units.”

Due to weight considerations, pilot Ben Rowland and operator Will Wheeler flew a RED Scarlet 4K with Zeiss ZE lenses aboard the Octocopter, which was employed for several sequences, including a rooftop battle featuring soldiers rappelling from rooftops and descending on ziplines.

“It took a lot of skill to pilot the aircraft between buildings and all the lines that were rigged for the commandos and CableCam,” relates Jogalla, who recalls another unexpected difficulty during rehearsal. “A peregrine falcon took an interest in our aircraft and started to closely circle, like he was about to attack! Ben landed the drone as fast as he could.”

Madigan found the shot dynamics achieved via Octocopter impressive. “A shot starts off looking like Steadicam, and then it seems like a crane move, and then you’re thinking: ‘I don’t know what they’re using there!’ And if you fly other remotely operated small helicopters – ‘chainsaw’ copters is a good name for these whirling metal objects – a slight breeze could mess you up. And if they hit somebody, that person could be killed. But this agile little thing has nylon blades, so we had both versatility and safety. And using a Red Scarlet means you have imagery that is high-res enough to be able to punch in on when you need to.”

Mixing Scarlet [and Phantom for some high-speed work] with Alexa capture complicated workflow issues for Madigan, whose philosophy regarding color space

relates to whether the bulk of a scene is captured or CG.

"For non-effects stuff, I use live action as the key," he explains. "Then, on big VFX scenes, it is better to go for a neutral grade. For those times when we had an actor on green screen with the rest of the frame synthetic, I'd try to get a number of shots fairly filled out, then have Florian go through and put his look on it, grading it in the zone he indicates. That way, at the end of the game, he doesn't have to pull everything apart to get where he needs to be."

At press time, the cinematographer was just starting the digital intermediate process, which was mounted at Technicolor L.A. with colorist Steven J. Scott, a veteran of Ballhaus/Schwentke efforts *Red* and *The Time Traveler's Wife*.

"I'm re-familiarizing myself with what was done on set and seeing the VFX shots that have come in," Ballhaus smiles. "We're really close to what was originally conceived, which is very gratifying, given the limited time we had to make this all come together." 🎬

CREW LIST > *Insurgent*

Dir. of Photography: Florian Ballhaus, ASC

Operators: Tom Lappin, Scott Sakamoto

Assistants: Heather Norton, Dennis Seawright, Victoria Warren

Digital Imaging Tech: Dave Satin

Digital Utility: Sagar Desai

Loader: Victoria Jackson

Steadicam Operator: Scott Sakamoto

Still Photographer: Andrew Cooper

Publicist: Tony Atterbury

2ND UNIT

Dir. of Photography: Lukasz Jogalla

Assistants: Boots Shelton, III, Courtney Drewes

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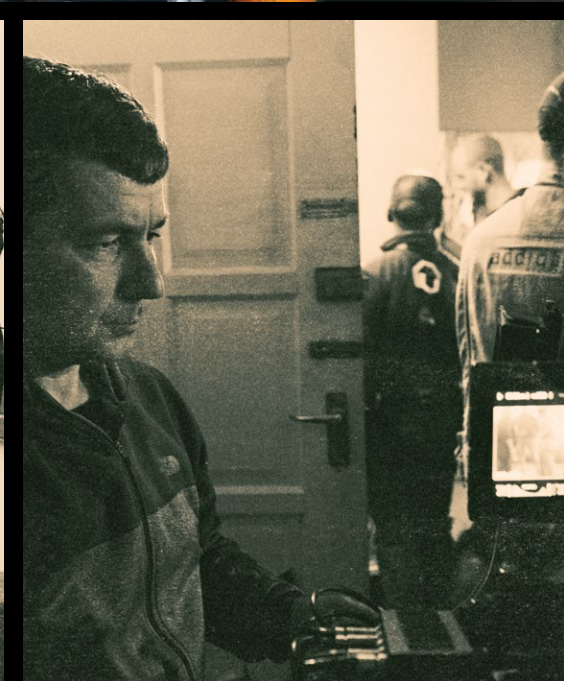
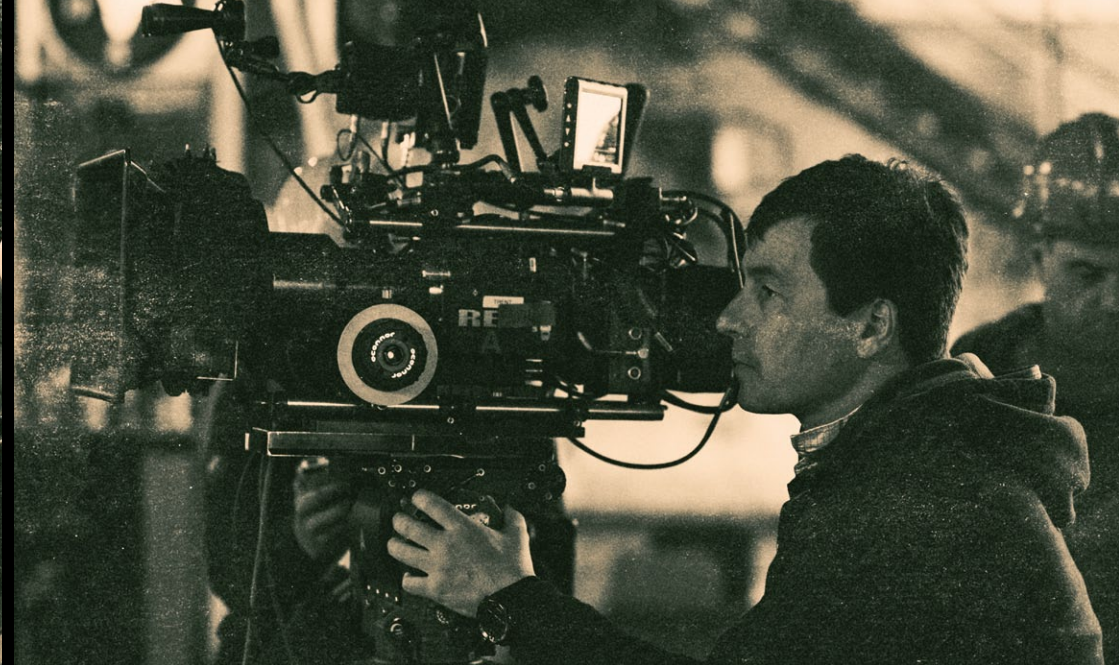
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Love Machine

Trent Opaloch, Neill Blomkamp and VFX Supervisor Chris Harvey
talk about the making of *Chappie*

by KEVIN H. MARTIN / photos courtesy of STEPHANIE BLOMKAMP/COLUMBIA PICTURES



LONGTIME NASA SCIENTIST ROBERT JASTROW RAISED EYEBROWS WITH HIS 1978 *PENTHOUSE MAGAZINE* ARTICLE PROPHESYING THE DEVELOPMENT OF MACHINE CONSCIOUSNESS AND HOW “SILICON INTELLIGENCE” WOULD BE THE NEXT STEP IN HUMAN EVOLUTION. BUT HOLLYWOOD PAID ATTENTION, EVEN USING JASTROW’S CLAIM TO QUELL AN INTERNAL DEBATE AMONG PARAMOUNT EXECS OVER THE ENDING OF *STAR TREK: THE MOTION PICTURE*. IN THE FOLLOWING DECADES, OTHER FILMS BEGAN TO FLIRT WITH THE “LIVING MACHINE” IDEA, INCLUDING THE *SHORT CIRCUIT* MOVIES, *BATTERIES NOT INCLUDED* AND *D.A.R.Y.L.*, AS WELL AS TV’S *TRANSFORMERS*.

SOUTH AFRICAN FILMMAKER NEILL BLOMKAMP, WHOSE DYNAMIC RÉSUMÉ INCLUDES *DISTRICT 9* AND *ELYSIUM*, FIRST EXPLORED A SENTIENT GEAR-HEAD THEME IN HIS 2003 SHORT FILM *TETRA VAAL*, WHICH SHOWS A WORLD IN WHICH ROBOTS HAVE REPLACED HUMANS AS LAW-ENFORCEMENT OFFICERS. THE WRITER/DIRECTOR’S NEW FEATURE, *CHAPPIE*, FOLLOWS THE EXPLOITS OF SUCH A ROBOT, BUT ONE WHO IS “RAISED” BY CRIMINALS! THE PROJECT MARKS THE THIRD THEATRICAL COLLABORATION BETWEEN BLOMKAMP AND GUILD CINEMATOGRAPHER TRENT OPALOGH, WHOSE LAST EPIC ON-SCREEN ADVENTURE WAS *CAPTAIN AMERICA 2: THE WINTER SOLDIER*. ICG WRITER KEVIN MARTIN ASKED OPALOGH, BLOMKAMP, AND VFX SUPERVISOR CHRIS HARVEY TO SHARE THEIR THOUGHTS ABOUT *CHAPPIE* AND THE SOUL OF A NEW MACHINE.

GROWING PAINS

Neill Blomkamp: I’m fascinated by imagery, and I love mixing that with other atmospheric aspects of filmmaking, like music, to create a full cinematic experience. My other interest is with concepts, presenting something new to the human experience. Combining those aspects tends to limit your genres, which explains why my films are often set in the near future. In this case, the initial concept was a robot intended for law enforcement that possessed human-like psychology and intelligence being nurtured by other people.

Trent Opaloch: We talked about it before kicking off *Elysium*, just the basic pitch and the character’s struggle. I was very excited by the idea and asked, “Dude is there any way we can do this one first?” Neill and his partner wrote the script during production.

Blomkamp: In appearance, Chappie looks the same as hundreds of thousands of robots, who all must be very dominating in appearance to function in law enforcement. From a design standpoint, you have to take this menacing figure and make him loveable. I used the [*Tetra Vaal*] design from 2003 as a starting point, and then employed artists who could bring this design forward, retaining the distinctive nontraditional face.

Chris Harvey: I began talking with Neill eight months out from shooting. Development on this was different from most films, where you go from concept art to building a physical model, and then to the digital version. On this show, it was very beneficial to involve VFX right away, since [principal vendor] Image Engine was going to create more than 980 shots with our lead character, and we were going to be seeing 22 different versions of him, ranging from damaged states to other robots of the same make.

Blomkamp: We sent our 2D concept art to modelers at Image Engine for 3D, and then tested the range of motion for each design iteration. That process was unbelievably beneficial in terms of design, proving Chappie could perform any of these human actions without geometry crashing through. When a human rotates his hand, turning palm from sky to ground, two wrist bones cross over one another. With the robot performing this, we had to figure out if it is just his hand rotating, or would the rotation take place up at the elbow? I’d never developed designs in this way before, but by the time we sent this stuff on to Weta [Workshop] to build our physical representation, his action was very fluid.

Opaloch: The whole design evolution is my favorite part of being on a Blomkamp film. Seeing how an element from one tangent combines with something totally different is fascinating. It also gives you a sneak peak at what that world is going to look like.

Harvey: We took the digital models to near-final status, so that huge development phase meant Image Engine had to go through a tremendous amount of R&D. We had to write a whole new IK [inverse kinematics] system because of the extremely complex set of joints. Mechanically it had to mimic the full range of human movement while still retaining a machine presence, which made for a very complicated rigging process.



Director Neill Blomkamp and A Camera Operator Manoel Ferreira



BIG RED MACHINE

Opaloch: We shot *District 9* on the Red One, and *Elysium* and *Chappie* on my Epic, which I had just converted to Dragon. There was a comfort level there, since Jim Jannard [Red Digital Cinema Founder] and Jarred Land [President, Red Digital Cinema] had been great supporters of the earlier films. We used Panavision anamorphics on the last two films, and the C-, E- and G-series this time. We shot two cameras on most dramatic stuff, C-cameras on specific days, and D- through H-cam for really big action sequences.

In terms of lighting, it was back to basics compared with the last two films. We had an opportunity to use DMX control boards and LED dimmable sources for the spaceship stuff, but here we change something by running up a ladder and doing it physically. It would have been overkill to go the other route on a show this size, so we planned the use of our assets more precisely. We did employ a lot more saturation on *Chappie*, especially in our lair set. We have lots of colorful fluorescents and practicals, and mood-wise we'd get what we could from the sources but make sure not to blow those out. We'd build on what you see in frame with hidden Kino Flos, the Celeb 200s and 400s, whichever would fit in the given space.



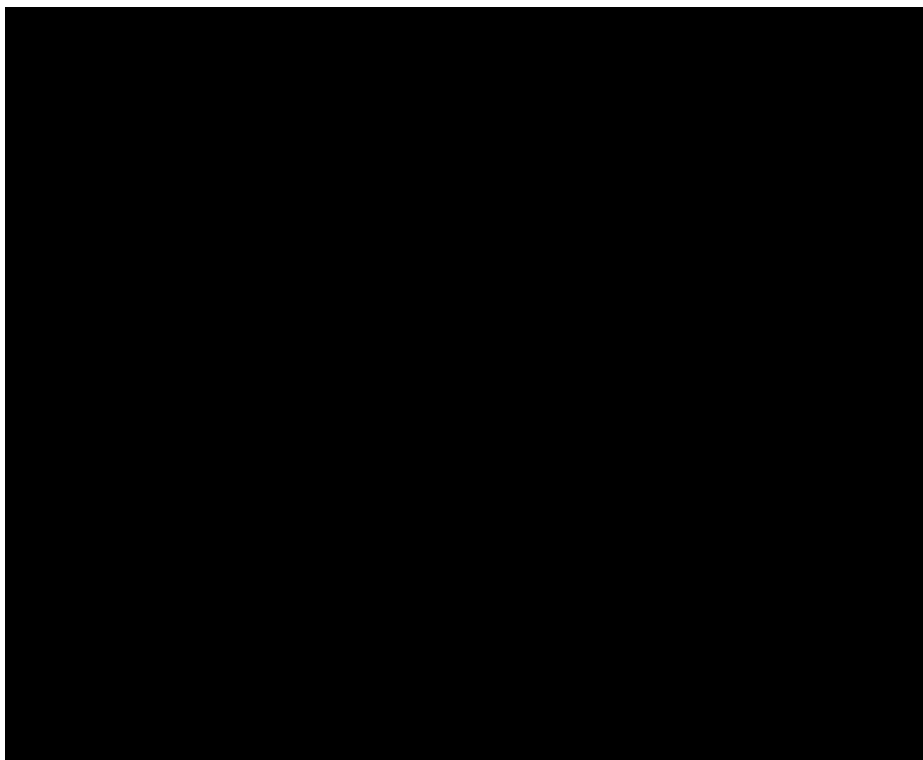
“Shooting Sharlto Copley [as Chappie] on set, I had the same freedom of camera movement on any other part of the film.” { CINEMATOGRAPHER TRENT OPALOCK }

JUST A REGULAR GUY

Opalock: Neill’s background in visual effects comes through when he demands a lot from the VFX supervisors, going back to *District 9*. Neill grew up seeing effects movies where everything might be handheld up until the big effects shots, and things would stop dead for that moment, and he didn’t want to ever have to be forced into accepting that lock-off. So when we shot Sharlto Copley performing Chappie on set, it was with the same freedom of camera movement I had on any other part of the film.

Harvey: Sharlto was present for most shots, which gave us a good head start on the performance. I made sure he wasn’t just in a gray suit; Weta Workshop built a chest piece that was like motocross armor, but matching Chappie’s unique chest shape. This box-like chest forced Sharlto to limit his motions in the same way the digital model would be constrained. Neill directed him to the desired performance, and then it was a matter of our animating the character’s performance over Sharlto, matching his choices as much as we could.

Blomkamp: The biggest challenges revolved around maximizing the budget and realizing your lead character was going to be digital. The good thing about that is that by getting the recipe right for this character, in terms of solving his photo-real appearance through a range of





environments, you could then go into a sausage-factory situation. You don't wind up having to do R&D for a lot of different subjects, like spaceships and aliens.

Harvey: It's a given you have to keep things looking like they are all taking place in the same world, but the performance aspect of *Chappie* went so far beyond that. People had to forget he was a robot or CG and relate to him as they would any other engaging character in a film. That meant devising more comprehensive ways to acquire data from set and then feed that back into the lighting of our digital character. As part of our look development, we'd set up shaders that would derive information from physically based lighting on-set.



We'd use the chrome ball and gray ball to get an idea of the environment, and we had the practical Weta robots to give us good reference, but for every situation Chappie was in, we also captured the geometry of the environment. We captured his movement through the whole volume of space, so if he walked through, we'd grab five chrome balls, representing his entire path of movement. Then we'd stitch those together before projecting them back onto the geometries. That gave us high-dynamic-range images that were lighting back onto him, showing the environment reflect off him as they would if the character was an actual physical presence at the location.

Opaloch: Having enough resolution to blow the image up and reposition is a major key, since every time we roll on a Blomkamp film, there's the potential it will wind up being a visual effects shot. [Using Red Cam] provides a built-in safety net, resolution-wise, and in terms of tracking, that can help us out if we do have to add something in post.



Harvey: Our team of lighters each had to push out at least sixty shots. To make that happen we had to tailor our pipeline for maximum efficiency, not to just crank the work out, but also to allow all the creative touches to be incorporated: visual flourishes that suggest expressions without actually having all the facial features that a human can employ to express himself. So we used his rotating ears and some structural elements around the face to suggest his responses and emotional state. Also, by using elements that looked real-world, like screws and bolts, we cue viewers with a subliminal sense of reality. Normally you try to avoid digital-to-human interaction because of credibility issues, but we went the opposite way because the more frequent the contact, the better the emotional bond. We also found that seeing a whole sequence of shots helped with the emotional connection, so it was taking a "big picture" view of things rather than just the shot in front of you.



ONE FROM THE HEART

Blomkamp: We did a lot of sound processing on the robot. Mainly it came from Sharlto and the voice he came up with for Chappie, because the heart of all this is the actor giving a performance. The robot would speak through the same physical larynx, but the sound pumping through it differs, and we tested those sounds quite a bit, trying to find the tones that let audiences feel for Chappie and grow to care about him.

Harvey: We didn't have any on-set reference for our bad-guy robot besides a guy holding a pole on-set, so the animators had to push hard to get that. We created scale references to build the menace, dressing him with small things that moved, relying on any bit of supplementary motion, which required [dynamic] simulation passes to get that naturalistic jostling action. I likened it to a tank, where you see bits of scale pieces demonstrating some random motion as it drives past. We ended up building one special rig just to simulate the vibrations of his motor. And he has his own POV look, as does Chappie.

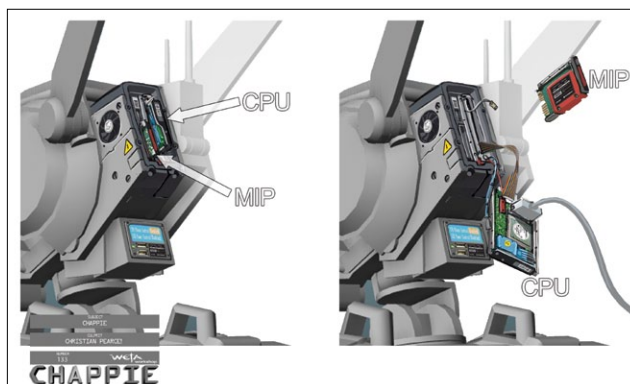
Opaloch: We had a Sony PMW-EX3 for some of the POV stuff, and we tried to have a GoPro mounted on Sharlto whenever possible while rolling. There was the issue of how much of our off-camera setup would be seen, since he's usually firing in the opposite direction from our cinematic cameras, looking offstage. We shot spherical to give a bit of a different look from the anamorphic, but that may not be evident because those shots are very heavily treated.

Harvey: [VFX vendor] The Embassy handled all Chappie POVs. With everything Neill does, he likes to have a very physical real base. So Chappie had to reflect, "What would you really build?" rather than just some out-there sci-fi notion, and that feeds right into the POV approach. They'd probably be using GoPros on police robots because of all the scuffling and action, because they'd need a unit that could sustain being beat-up while out in the field.

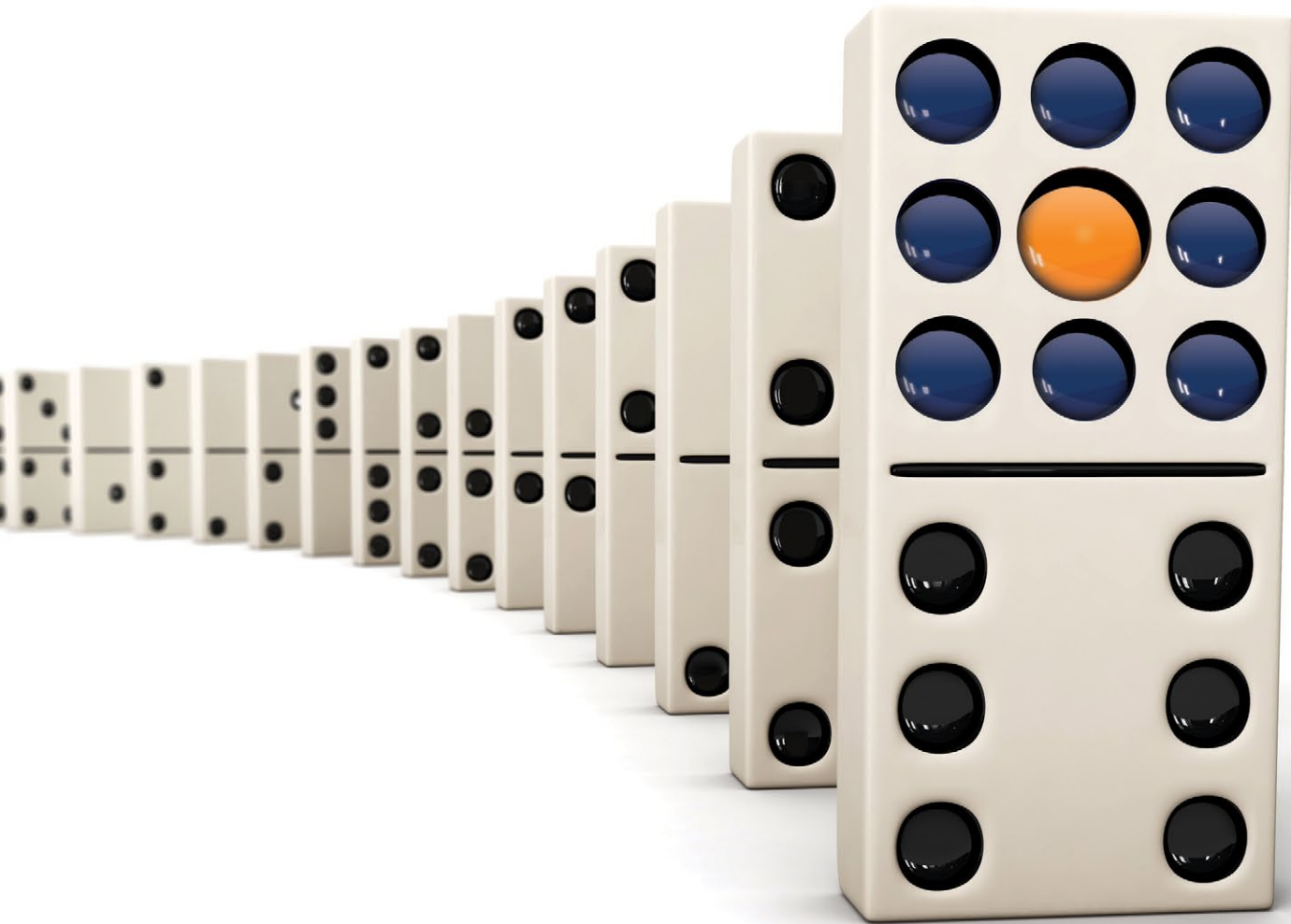
Opaloch: In terms of image treatment, we didn't go for a LiveGrade approach, as it wasn't appropriate to the style and scale of our shoot. DIT Richard Muller and I would sit in the tent and cook up a look for the wide, medium and tight shots that represented the skin tones, environment and desired contrast levels. We included those reference files in a folder so they'd carry all the way through to DI. I've been on several commercials since *Chappie* wrapped and am going to *Captain America 3* next, so those reference images are a good starting point for the colorist [Andrea Chlebak, supervising VFX colorist at Digital Film Central, Vancouver].

Blomkamp: The endless finessing in DI that can go on for months is, in my opinion, inefficient and uncalled for, where you spend 98 percent more effort and wind up with things looking one percent worse. It's like they are chasing something that wasn't ever planned for, which, for feature filmmaking, is not a cinematic approach. With all the tools available to twentieth-first century filmmakers, this methodology can really impact things, and this carries with it potential for a lot of strange and ugly outcomes. So

for me, having a solid idea up front of where I'm going is crucial; Chappie looks on screen very much as I imagined it back in 2011. 🎬



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MIRACLES ON THE SPOT

DIGITAL VFX IN COMMERCIALS REACH NEW LEVELS
OF CREATIVE AMBITION

by Pauline Rogers





THE COMMERCIAL MARKET TODAY IS AS MUCH ABOUT SELLING A BRAND OR LIFESTYLE AS IT IS A SINGLE PRODUCT. VISUAL STORYTELLING HAS REACHED SOARING LEVELS OF CREATIVITY, THANKS IN LARGE PART TO THE ADVANCES IN COMPUTER-GENERATED VISUAL EFFECTS. CONSEQUENTLY, GUILD DPS WHO ARE FLUENT IN THE LANGUAGE OF DIGITAL VFX HAVE A LEG UP IN THE SPOT WORLD.





Chrysler Motors *Miggy At The Bat* shot by Bill Ahrens/VFX frame grabs courtesy of Parachute

Take as an example a relatively “simple” spot by Chrysler Motors, shot by Bill Ahrens. *Miggy at the Bat* is an adaptation of the famous baseball poem Casey at the Bat. Rob Legato, Creative Director for The Doner Agency in Detroit, says the idea was to create a moment for MLB MVP Miguel Cabrera (who recently partnered with Chrysler) that perfectly aligns with the Chrysler brand’s narrative of hard work, dedication and attention to detail, culminating with the fully redesigned all-new Chrysler 200.

“Two big challenges,” Ahrens recounts, “were Miggy’s schedule – and the fact that we couldn’t shoot at an MLB field. That’s where VFX magic made it possible.”

“To maximize coverage, Bill and [director] Klaus Obermeyer shot three cameras at once – Phantom for high speed and two Red Epics,” relates Parachute VFX’s Sam O’Hare. “The green screen could only cover the area behind home base, so Bill shot the outfield angles knowing they would be roto-scoped afterward.” Footage of a pitcher against green screen and a body double as well as green

screen shots of extras for reactions were shot in L.A.

When the footage got to Parachute, O’Hare used Blackmagic Design’s Fusion to key and composite the plates. He also did multiple passes for atmosphere, creating the hazy glow Doner envisioned and adding moving lens flares and crowd camera flashes, as well as replacing the double’s face with Cabrera’s.

O’Hare says that such VFX is “becoming much more common for all sorts of projects. It’s regularly becoming a budget conversation – it’s cheaper to use CG or practical elements, with shrinking timelines and budgets.”

Another such example is Adidas’ series of Superstar spots. Cinematographer Mattias Montero explains that the commercial’s storyline is “about an inner journey through memories, emotions and dreams, a poetic state-of-mind experience anchored in the real world, showing that if you have a dream and a goal, don’t be afraid of following your inner path – we all have one.”



Adidas "Superstar" Spots shot by Mattais Montero / VFX frame grabs courtesy of a52

The spots feature celebrities like Pharrell Williams, David Beckham, Rita Ora and Damian Lillard – and Adidas Superstar Shoes. The idea is to “break down the current notion of what ‘superstar’ means in today’s culture,” adds Johannes Leonardo Agency’s Creative and Art Director Matthew Edwards.

Caviar Productions’ Karim Huu Do created a narrative to portray both the internal and external lives of the featured stars. “What was most interesting for us was his idea to portray the internal energy of the celebs by using nature: things like schools of rays, a murmuration of [migrating] starlings and volcano storms – not things that we associate with stars in today’s digitally driven world,” describes Edwards.

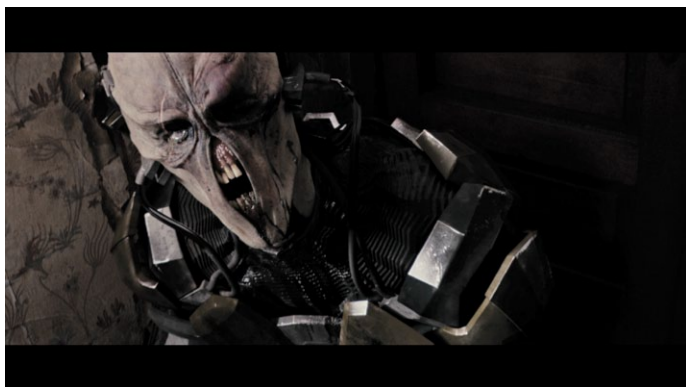
Conveying the images was a challenge for Montero – and VFX house a52. “Prior to the shoot we had countless meetings with Karim and Mattias to ensure that the production of the spot, specifically the VFX scenes, would have as little impact on their shooting schedule as

possible,” says a52 VFX Supervisor Patrick Murphy.

“One of the scenes that really conveys our vision – and the seamlessness of visual effects today – is where Rita Ora looks out toward the audience, and everyone in that audience rises up as a massive wave of people falling in toward her,” Montero relates. “It’s a great trigger for the rest of the film and what is about to come.”

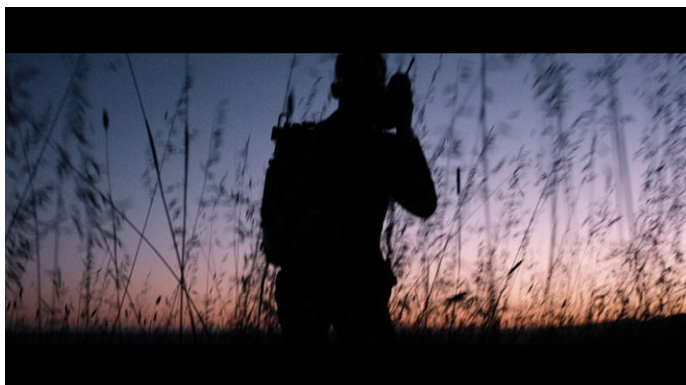
Murphy says all of the VFX scenes were shot on blue screen, “so we had to match the look of the rest of the film as well as add the specific magic to each VFX scene that you see,” he says. “This was accomplished using a wide range of FX tools – each scene was rotoscoped, some tracks were created where necessary, and a wide range of compositing was executed in Flame, using 2D and CG elements throughout the spot. In the case of the Rita Ora scenes, this would include CG stingrays; all of the water environment was created in post: light rays and a mix of 3D and 2D particles and bubbles.”

“VFX is a great toolbox of endless possibilities,”



“We literally created 100-percent animated aliens that moved and interacted with the live actors.”

{ CINEMATOGRAPHER ADAM KIMMEL DESCRIBING THE FIRST SPOT IN DIRECTOR HENRY HOBSON'S XCOM SERIES }



XCOM's *The Bureau* shot by Adam Kimmel, ASC / VFX frame grabs courtesy of The Mill

Montero adds. “There are so many new techniques out there, and that’s why the close collaboration between the VFX artist and me is so important. It really makes me happy when I meet VFX artists who understand how to use their skills to tell stories and don’t let the techniques take over the idea.”

That’s an approach on which cinematographer Adam Kimmel, ASC and director Henry Hobson heartily agree – especially because of the complexity of their recent XCOM series – where commercial and game images are nearly indistinguishable.

“Both the game and the spots [90-second pieces and short teasers] create a journey for the audience,” explains Kimmel. “The game audiences look at things differently, and that is taken into account by dropping little clues and detours in the films.

“For instance, in *The Bureau* spot,” he continues, “there’s a phone on a table, and if you take the time to freeze the frame and call the number, they had a recording on that line that tied into the story. The number started ringing within minutes of airing the spot.”

Director Henry Hobson was adamant that as much be done in camera as possible. “I wanted the pieces to be free

flowing,” he explains. “To allow Adam to be able to make camera moves where our ‘characters’ would bump into the camera, fall against a wall, then have the dust fall out. True, the idea wasn’t going to work 100 percent, but they [Team One and Recommend Media] trusted me to make everything realistic.”

The first piece for *The Bureau*, a version of a 1950s conspiracy-theory UFO cover-up and government involvement, featured alien spaceships and parallel stories that converge in the end. But it was for the second spot, *Aftermath*, that Kimmel says they took the concept to a whole different realm.

“We literally created alien creatures, 100-percent animation, that moved and interacted with the live actors,” he describes. “There is so much movement and dimension created by the artists at The Mill that you really do take the journey with these two ‘real’ characters.”

In the live-action environment Hobson directed a fight scene, with a ‘man in black’ interacting with Kimmel. “Adam was very gung-ho with the camera [ALEXA with Zeiss Master Primes from Keslow] on his shoulder,” recounts Hobson. “The man in the black mat suit was interacting with the live actors in a live environment, and I reacted – as the real actor fights the ‘alien.’ We could

bounce the camera and create violent movement in a way that was real, so we could eliminate the feeling that our live actor was shadow boxing. Once The Mill got the pieces, they could completely replace our man in black.”

Kimmel even lit the images for live action – placing Tungsten/HMI mix lights outside the window, allowing for action inside the old Victorian house they used in Los Angeles to seamlessly blend into outside shots – matched with the VFX lighting.

“It was so carefully planned that even the off-camera images looked real – and vast – even though we had a six-by-six-foot porch to work with,” the DP says.

“We had an amazing realism this way,” adds Hobson. “VFX can bring so much to the table, but it’s all about what you give them. You have to plan so very carefully.”

“It’s always a tricky thing to shoot something that is not there,” elaborates The Mill’s VFX Supervisor Felix Urquiza. “Henry knows exactly how he wants the shot to look, and Adam knows exactly how to light it. The communication between us was very clear.”

Once in post, Urquiza’s team took the game-model asset and modified the model to film quality – then created high-quality costume textures for the skin and developed his look. There is also the rigging stage that allows the animator the control needed to animate the alien (modeling in Maya/zbrush, textured in Mudbox, animated in Maya, and rendered in Arnold with the FX in Houdini composited

in Flame). After the costume texturing was complete, costume shaders were built for the skin, breaking down each layer to bring as much realistic material to the creature as possible.

“It was an extended dive into developing the correct shader,” Urquiza describes. “Once the key elements were in place, we took all the HDRs shot from the locations where the alien would be placed, and I captured all the lighting and started the development of the shots. This process of post is super important since you are basically taking all of Adam’s beautiful cinematography [onset light readings and measurements with the ARRI+ Light Ball] and adding it to the CG.”

As Urquiza observes, echoed by the creative cinematographers, directors and VFX artists in this piece, “the bar of visual effects has been set really high with movies like *Planet of the Apes*, which integrated full CG characters in a live-action world so perfectly. This pushes VFX studios and artists to raise the bar that much more.

“Most people can tell what looks CG nowadays because of all of the amazing movies, game cinematics, and commercials that bring such amazing VFX,” Urquiza continues. “Some of the most exciting and most satisfying moments are when a director comes with an amazing idea, and the challenge in VFX [and cinematography] is how to make that happen.” 🎬

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RETURN TO TOMORROW

A NEW BOOK ABOUT THE MAKING OF *STAR TREK: THE
MOTION PICTURE* PROVIDES A FLASHBACK TO THE DARK,
EARLY DAYS OF THE VFX BLOCKBUSTER

by Kevin H. Martin



Star Trek: The Motion Picture (1979)



2001: A Space Odyssey (1968)

Visual effects–driven films released in the massive wake of Stanley Kubrick’s *2001: A Space Odyssey* (1968) often suffered by comparison, and with the notable exception of Douglas Trumbull’s *Silent Running*, this was especially true of science-fiction films in the early- and mid-1970s.

Although inventive work was being done in the “disaster film” genre, including a trio of films cited by the Academy – *The Poseidon Adventure*, *Earthquake* and *The Hindenburg* – other VFX-heavy efforts, like *Logan’s Run*, *King Kong* and *Damnation Alley* were all hit-and-miss affairs, owing in part to poor planning and also to unrealistic expectations. Most of *Alley*’s elaborate post-nuclear skies – produced through innovative use of a krypton laser – had to be laboriously tracked into plates shot wild, which, with that era’s technology, was as nightmarish as the story’s locations. *Logan* hyped the use of actual moving holograms within one set, but since the oddly prismatic visuals were photographed conventionally, the illusion of

depth was lost on screen.

Everything, of course, changed in 1977 with George Lucas’ *Star Wars* and, a few months later, Steven Spielberg’s *Close Encounters of the Third Kind*. The latter showcased Trumbull’s VFX mastery in an earthbound setting, while the former, supervised by Trumbull’s *Silent Running* protégé John Dykstra, became a worldwide sensation. The optical wizardry and computer-driven motion-control camera systems used on these mega-hits created an expectation on the part of audiences that filmmakers would not be able to duck with future genre efforts – even known commodities, like the big-screen debut of *Star Trek*, which would feature the crew of the starship Enterprise from the 1966-1969 TV series.

Fan passion for the series had dominated the 1970s with perpetual syndication reruns fueling the mania, which manifested in *Star Trek* conventions that drew tens of thousands of attendees. Blueprints and a technical manual became New York Times Bestsellers, and a write-in



Close Encounters of the Third Kind (1977)



Star Wars (1977)

campaign caused President Gerald Ford to rename the first space shuttle Enterprise. With interest in the phenomena at an all-time high during the film's postproduction, genre magazine *Cinefantastique* dispatched Preston Neal Jones to write a double-sized issue on the picture. Thirty-five years later, the results of that assignment have at last been published as *Return to Tomorrow: The Filming of Star Trek: The Motion Picture*.

Jones' earlier *Heaven and Hell to Play With: The Filming of The Night of the Hunter* featured a round-robin presentation of quotes from interviewees. *Return* employs a similar chronological recounting from its sixty participants that

not only covers the making of the feature but also includes various false starts, including director Phil Kaufman's *Planet of the Titans*. Cancelled by Paramount the same month *Star Wars* debuted, the project carried an impressive pedigree, with Jordan Belson to provide his unique brand of opticals and *James Bond* vets Ken Adam and Derek Meddings for art direction and miniatures. Paramount had also planned a new TV series, for which new Enterprise sets with "functional" controls were built at considerable expense. By the end of 1977, the pilot for that series became the basis for the feature, directed by Robert Wise. Much of the book's commentary revolves around the



Special automotive paints were used to differentiate details in the hull of the U.S.S. Enterprise, creating an iridescent effect on the model when exposed to a raking light source.



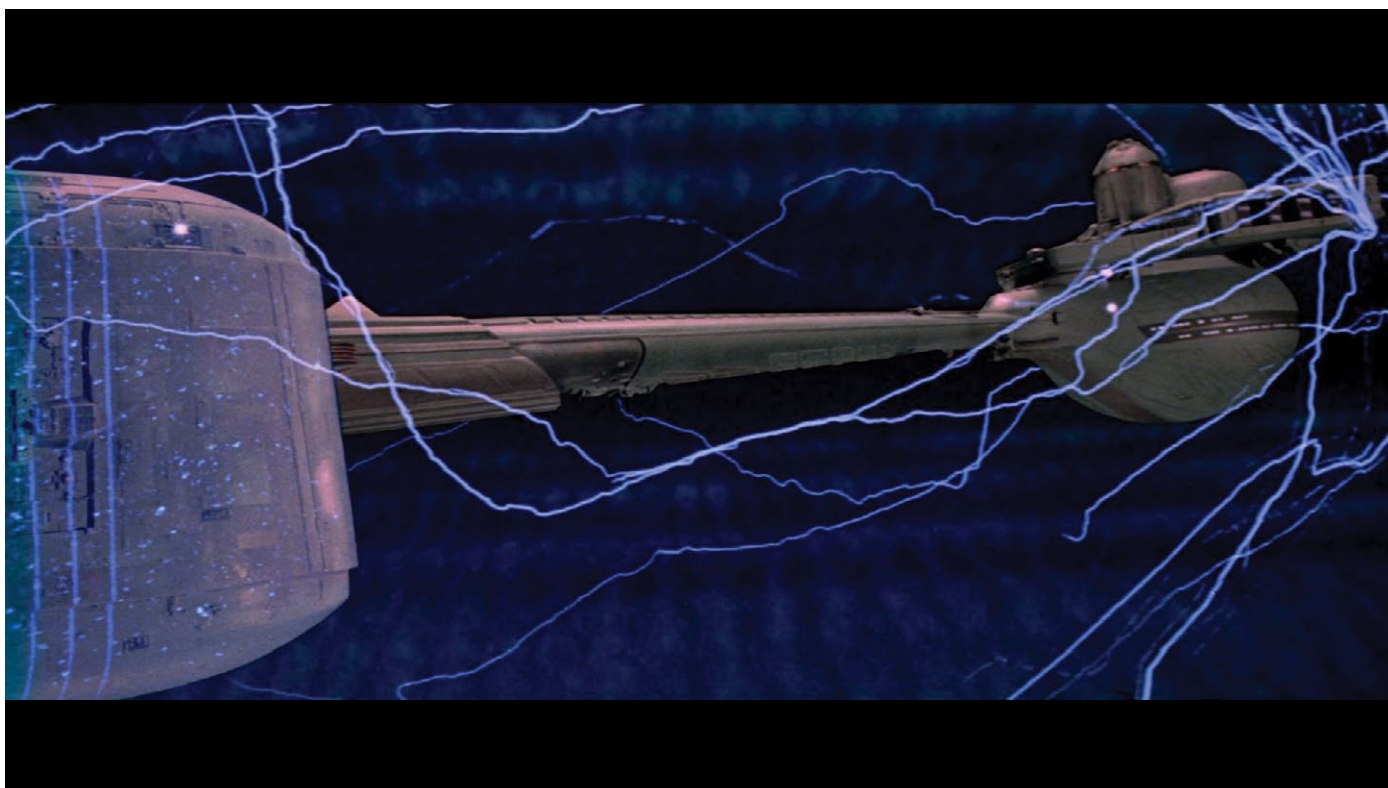
This elaborate matte shot depicting life in 23rd Century San Francisco combined multiple live-action plates shot on Paramount's largest stage with a painting by Matthew Yurich.

production's "ticking clock," an unalterable release date of December 7, 1979, manifesting as a financial imperative, lest the studio be held accountable for millions in advance payments by theater owners.

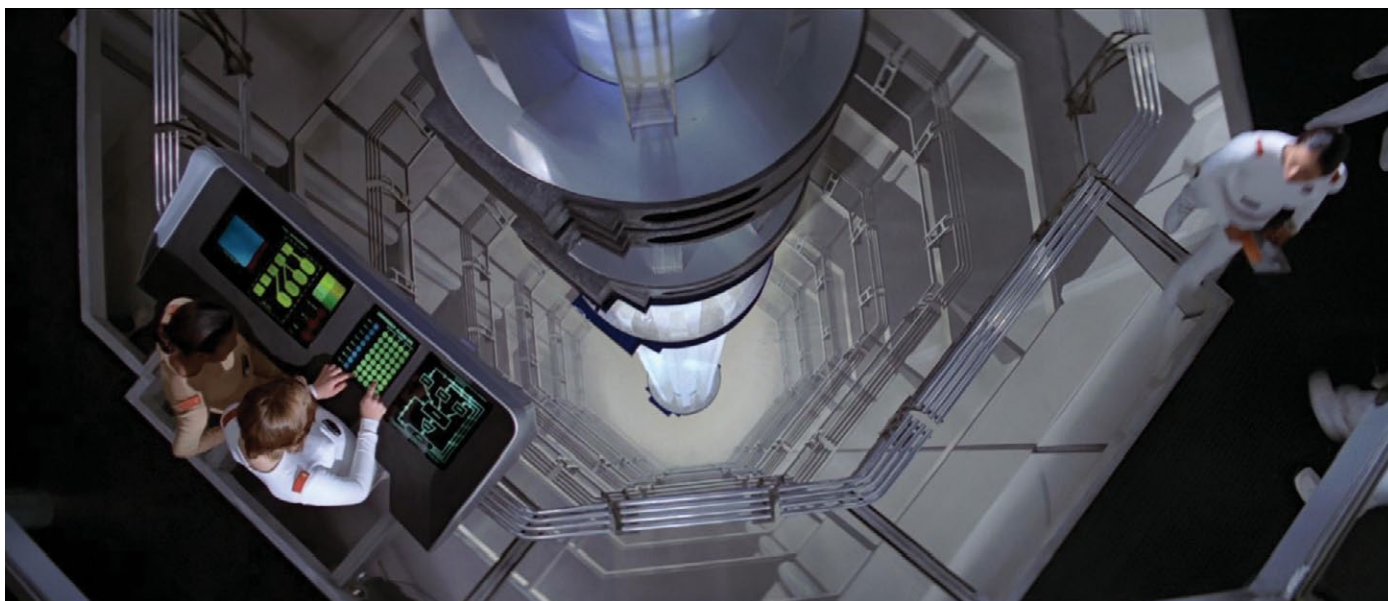
Divided into sections on preproduction, production and post (the latter making up more than half the book's 670-plus pages), *Return* juxtaposes perspectives on each sequence in a way that illuminates production objectives and woes. Unresolved script issues cause budgeting to remain a blue-sky affair, impacting effects planning, which in turn increases interdepartmental friction, especially between the art department and ASTRA (A Star Trek/

Robert Abel) Image, the visual-effects facility formed by Robert Abel & Associates that was originally contracted for all VFX.

Neither Abel nor his art director Richard Taylor is interviewed, and Doug Trumbull, tasked by Paramount with salvaging the project after ASTRA's departure, is represented only indirectly. So while the devastating fallout from Abel's year-long involvement is clearly delineated — leaving the studio less than a year from release without any functional motion-control cameras and no completed effects scenes — the reasons for it remain tantalizingly unclear (as does Paramount's willingness to tolerate the



Klingon ship miniature was photographed by John Dykstra's Apogee. Laser scans of the model and electrical discharges were combined to depict the vessel's seeming obliteration.



Multi-story engine room was revised heavily from existing set built for unmade second *Star Trek* TV series. Scenic backing was employed on the stage floor to extend apparent height of engine core, which is illuminated via kinetic lighting developed by Sam Nicholson, ASC.

Douglas Trumbull (working with Dykstra's newly formed Apogee) had to deliver as many VFX shots as *Star Wars* and *Close Encounters* combined – **in just nine months.**

situation, especially when it impinges on various live-action first-unit shoots).

For the big-screen *Trek*, Trumbull reassembles his *Close Encounters* crew, with Dykstra's new company, Apogee, subcontracting several sequences. This meld of talent is doubly appropriate, since the film requires them to deliver as many effects shots as *Star Wars* and *Close Encounters* combined – in just nine months. Most concepts left over from Abel's tenure are discarded outright, complicating the issue of already-shot plates being made to work for new shot compositions, but increasing the film's scope. The film's key design challenge is depicting the interior and exterior of an antagonistic 78-kilometer-long living machine, most of which emerges from the mind of conceptual artist Syd Mead on his first film project.

Interestingly, for a film sold as the state-of-the-art in new optical wizardry, *ST-TMP* used a lot of old-school ingenuity. Several participants invoke the name of William Cameron Menzies, and the aesthetic values that venerated production designer espoused for cinematic art direction definitely have a bearing on this *Trek*, especially with respect to original concepts for several matte shots.

All of those involved point to Wise as the glue that holds everything together. Even while progress on VFX is stymied, the director cajoles and inspires brands of in-camera magic that prevent a production shutdown. Sam Nicholson, ASC, and Brian Longbotham, working on their first major film, devise a dynamic kinetic-light solution for the Enterprise engine room, redesigned for the feature by production designer Harold Michelson. The pair later apply similar tools on a vastly larger scale within the tricky set used in the film's climax, for which director of photography Richard Kline, ASC, uses "almost every HMI" in California. To maneuver his camera around a multi-level bridge set where more than half the film takes place, Kline and crew implement an overhead scissor-rig monorail, permitting flexible and fluid moves. His clever use of a beamsplitter, 3M material and a pan of water provides the illusion of clothes magically "beaming onto" an actress's body at one point, *sans* opticals.

Since the book is not sanctioned by Paramount, it contains no illustrations. While that omission renders some tech-heavy passages less than clear, the "Enterprising" reader can go online to hunt up appropriate visuals to



L to R is Leonard Nimoy, Gene Roddenberry, Robert Wise (sitting), DeForest Kelley and William Shatner



Interactive light on set employed powerful Xenon source. In order to extract the technician controlling the light, Apogee had to project each shot onto mylar and then 'squeeze' his image out, then rephotograph the scene and then add an animated effect that echoed vger animation done by Robert Swarthe on the Trumbull team.

complement this comprehensive volume. Websites for Trumbull (www.douglstrumbull.com/films) and Abel art director Richard Taylor (www.richardtaylor.com/feature-films/star-trek) feature relevant imagery, as does an informative fan site (ottens.co.uk/forgottentrek/category/the-motion-picture/).

With increasingly compressed post schedules in the digital era, the ramifications of decisions made in prep and on set become increasingly more critical. The lessons

learned – and not learned – during the making of *Star Trek: The Motion Picture* still merit consideration, while also making for a compelling, if sometimes exhausting, tale. Read long and prosper. 🎬

Return to Tomorrow: The Filming of Star Trek: The Motion Picture is available exclusively through creaturefeatures.com. The limited edition sold out; a second printing is slated to sometime this year.

Production Credits

COMPILED BY TERESA MUÑOZ – AS OF FEBRUARY 1, 2015

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James Chressanthis, ASC, GSC
Assistants: Brice Reid, Brian DeLorenzo, Charlie Nauman, Nancy Piraquive
Steadicam Operator: Nicholas Davidoff, SOC
Steadicam Assistant: Brice Reid
Film Loader: Billy Salazar

2ND UNIT

Dir. of Photography: James Chressanthis, ASC,
GSCv

"BONES" 10TH SEASON

Dir. of Photography: Greg Collier
Operators: Bobby Altman, Gerry O'Malley
Assistants: Steve "Spike" Barnes, Gary Johnson, Maurizio "Nino" Dotto, Jennifer Stuart
Steadicam Operator: Gerry O'Malley
Utility: Kara Rittenhouse

"EMPIRE"

Dir. of Photography: Sidney Sidell
Operators: Faires Sekiya, Joe "Jody" Williams
Assistants: Chris Dame, Mitch Koepp, Andy Borham, Jason Bonner
Loader: Betsy Peoples
Digital Utility: Mollie Nye
Still Photographer: Chuck Hodes

"GLEE"

Dir. of Photography: Joaquin Sedillo
Operators: Andrew Mitchell, SOC, Duane Mieliwocki, SOC
Assistants: Penny Sprague, Ben Perry, Kenneth Little, Yusef Edmonds, Joe Pacella
Steadicam Operator: Andrew Mitchell, SOC
Steadicam Assistant: Penny Sprague
Digital Imaging Tech: Raul Riveros
TechnocraneTech: Steve Olsen
Remote Head Tech: Jay Sheveck
Still Photographer: Adam Taylor, Eddy Chen

"MODERN FAMILY"

Dir. of Photography: James Bagdonas, ASC
Operators: Trey Clinesmith, Toby Tucker, Mark LaBonge
Assistants: John Stradling, Michael Bagdonas, Noah Bagdonas, Rebekah Martz Spenser, Sean O'Shea, Corey Gibbons
Camera Utility: Gavin Wynn
Digital Utility: Angelina Newman
Still Photographer: Hopper Stone, Danny Feld

"NEW GIRL"

Dir. of Photography: Russ Alsobrook, ASC
Operators: Case Hotchkiss, SOC, Paul Horn
Assistants: Jason Garcia, Rigney Sackley, Tim Kane, David "Clean" Berryman
Camera Utility: Richard Kent
Digital Utility: Pablo Jara, Josh Benavidez, Eliza Wimberly
Still Photographer: Nicole Wilder, Adam Taylor

"SLEEPY HOLLOW"

Dir. of Photography: Tod Campbell, Glen Keenan
Operators: Matt Doll, Mike Repeta, Mark LaBonge
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Digital Loader: Rachel Magnum

"TED 2"

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Operators: Joe Chess, Dan Gold
Assistants: Michael Weldon, Bob Hall, Harry Zimmerman, Kirk Bloom, Chris Sloan, Tulio Duenas
Steadicam Operator: Joe Chess
Steadicam Assistant: Michael Weldon
Digital Imaging Tech: Mike DeGrazzio
Loader: Blake Collins

50/50

"WORKAHOLICS"

Dir. of Photography: Grant Smith

Operators: Adam Newacheck, Justin Browne
Assistants: Thomas Bango, Mike Guaspari, Andrew Laboy, Will Schmidt
Steadicam Operator: Justin Browne
Steadicam Assistant: Mike Guaspari
Jib Arm Operator: Adam Newacheck

ABC STUDIOS

"CASTLE"

Dir. of Photography: Bill Roe, ASC
Operators: Stephen Collins, Andrew Bikichky
Assistants: Dave Egerstrom, Matt Guiza, Chris Garcia, Tim Roe
Digital Downloader: Jeff Stewart
Digital Utility: Charlie Murphy
Still Photographer: Ron Jaffe, Nicole Wilder, Adam Taylor, Michael Desmond

"CRIMINAL MINDS"

Dir. of Photography: Greg St. Johns
Operators: Darcy Spires, Mike Walsh, Gary Tachell
Assistants: Ryan Parks, Keith Peters, Thane Characky, Todd Durboraw
Steadicam Operator: Mike Walsh
Steadicam Assistant: Ryan Parks
Digital Imaging Tech: Tony Matulic, Aaron Moore
Camera Utility: Alex Dobbs

"GREY'S ANATOMY"

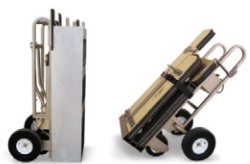
Dir. of Photography: Herb Davis
Operator: Mark Jackson, Steve Ullman, Leslie Morris,
Assistants: NickMcLean, Chris Johnson, Scott Leyse, Marte Post
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Utility: Leslie Puckett

"HOW TO GET AWAY WITH MURDER"

Dir. of Photography: Michael Price
Operator: Paul Sanchez, John Hankammer, SOC
Scott Boettler
Assistants: Heather LeRoy, Vanessa Morehouse, Darrell Herrington, Michael Rush, Mark Sasabuchi
Digital Imaging Tech: Andrew Osbourne
Still Photographer: Ron Jaffe

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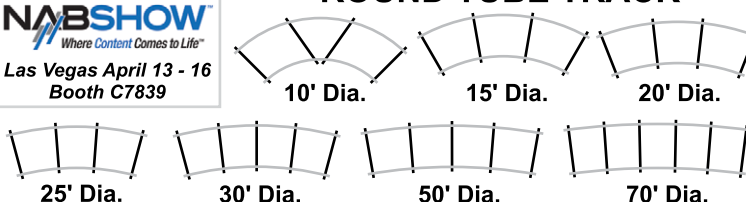
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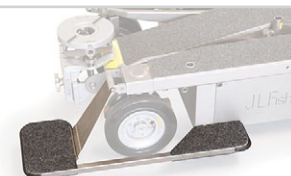


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Lighting Director: Christian Hibbard
Operator: Randy Gomez, Parker Bartlett,
Ritch Kenney, Kris Wilson, Garret Hurt, Marc
Hunter, Mike Malone
Camera Utility: Scott Spiegel, Travis Wilson,
Randy Pulley
Video Controller: Guy Jones
Still Photographer: Danny Feld, Karen Neal,
Michael Desmond, Adam Larkey

2ND UNIT

Dir. of Photography: Jimmy Lindsey

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Dir. of Photography: Cynthia Pusheck, ASC,
John Smith
Operators: Tom Schnaidt, Jay Herron
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Dir. of Photography: Ken Wilcox
Operators: Harriet Uhl, Lou Espinosa, Keith
Lisle, Jeff Mydock, Mayo Partee, Easter Xua,
Greg Cook
Assistants: Steve Law, David Makhanian,
Bazza Keefer

BLACK LABEL MEDIA

"DEMOLITION"

Dir. of Photography: Yves Belanger
Assistants: Paule Bode, Stephen Kozlowski
Digital Utility: Camilo Mendoza
Steadicam Operator: Brant Fagan, SOC
Still Photographer: Anne Marie Fox
Publiist: Linda Colangelo

BLUE RIBBON CONTENT

"MORTAL KOMBAT X: GENERATION"

2ND UNIT

Dir. of Photography: Brian Barbellini
Assistants: Kenichiro Tanaka, David W.
McDonald, Marshall L. Rao
Still Photographer: Darren Michaels

BLUMHOUSE

"SINISTER 2"

Dir. of Photography: Amy Vincent, ASC
Operators: Chris Glasgow, John Connor
Assistants: Paul Janossy, Will Schmidt,
Robert Schierer, Michael Kleiman
Loader: Winona Wacker
Digital Imaging Tech: Chase Abrams
Still Photography: Elizabeth Morris

"SOUTH OF HELL"

Dir. of Photography: Walt Lloyd, ASC
Operator: Dan Ayers, SOC, Michael Frediani,
SOC
Assistants: Nan Segler, Justin Urban,
Jarrod Oswald, Will Hand
Loader: Nick Brown
Still Photographer: Jackson Lee Davis

BONANZA

"CONSTANTINE"

Dir. of Photography: Evans Brown, Scott
Kevan
Operator: Bob Gorelick, Ramon Engle,
Peter Hawkins, Scott Ippolito
Assistants: Mary Stankiewicz, Adam Castro,
Tom Jordan, Nate McConnell, Cameron
Schwartz
Steadicam Operator: Bob Gorelick, Ramon
Engle
Digital Imaging Tech: Nick Hiltgen
Data Manager: Matt Evans
Camera Utility: Jordan McKim

PRODUCTION CREDITS

"THE FOLLOWING" SEASON 3

Dir. of Photography: David Tuttleman
Operator: Peter Ramos, Pyare Fortunato
Assistants: Lee Vickery, John Romer, Aleksander Allen, Marcos Rodriguez-Quijano,
Sebasitan Slayter, Chloe Walker
Steadicam Operator: Pyare Fortunato
Digital Imaging Tech: Jeff "Dr. Realtime" Cirbes

2ND UNIT

Dir. of Photography: Bill Klayer

"THE ORIGINALS"

Dir. of Photography: Kurt Jones, Roger Chingirian
Operators: Ian Forsyth, Brian Davis
Assistants: Matt Brewer, Ryan Abrams, Uly Domalaon, Trevor White
Steadicam Operator: Ian Forsyth
Digital Imaging Tech: Dustin Diamond
Digital Utility: Bill Mueller
Still Photographer: Quantrell Colbert, Tina Rowden

"THE VAMPIRE DIARIES" SEASON 6

Dir. of Photography: Darrren Genet, Mike Karasick
Operators: Geoff Shotz, Rob Robinson
Assistants: Al Cohen, Trevor Rios, Colin Duran, Nichole Castro
Digital Imaging Tech: Eric Henson
Digital Utility: Kelly Poor

"TWO BROKE GIRLS"

Dir. of Photography: Christian LaFountaine
Operators: Brian Sweeney, George LaFountaine,
Chris Wilcox, Kevin Haggerty
Assistants: Jeffrey Johnson, Brian Lynch, David Colclasure, Jeff Roth, Vicky Beck,
Camera Utilities: Darla Anderson, Shaun Wheeler
Digital Imaging Tech: Ryne Niner
Video Controller: Andrew Dickerman

BREAKOUT KINGS PRODUCTIONS

"SALEM"

Dir. of Photography: Mark Vargo ASC
Operators: James Reid, Allen Easton, SOC, Bob Forster
Assistants: David Leb, Charlie Nauman, Ry Kawanaka
Loader: Stephen Vicari
Digital Utility: Caitlin Costello

BROWN HILL PRODUCTIONS

"SILICON VALLEY"

Dir. of Photography: Tim Suhrstedt
Operator: Jeff Greeley, Harry Garvin
Assistants: Dan White, Jerry Patton, Derek Smith, Eliza Wimberly
Steadicam Operator: Harry Garvin
Loader: Jazo Zavko
Still Photographer: Ron Jaffe

CAREGIVING PRODUCTIONS, INC.

"FUNDAMENTALS CAREGIVING"

Dir. of Photography: Giles Nuttgenns
Operator: Ramon Engle
Assistants: Christian Satrezemis, Warren Brace, Bret Lanius
Digital Loader: Nick Hiltgen
Still Photographer: Jackson Lee Davis

CBS

"BLUE BLOODS" SEASON 5

Dir. of Photography: Craig DiBona, ASC, Don Thorin, Jr.
Operators: Alan Pierce, David Taicher
Assistants: Chris Trova, Peter Keeling, Geoff Frost, Roman Lukiw
Steadicam Operator: David Taicher
Digital Imaging Tech: Ryan Heide
Digital Imaging Tech (Mobilab): Steve Calalang
Loader: Martin Peterson, Anthony DeRose

"C.S.I." SEASON 15

Dir. of Photography: Christian Sebaldt, ASC, Crescenzo Notarile, ASC
Operators: Timothy D. Beavers, SOC, Nikhil Paniz
Assistants: Gary Muller, Rob Magnano, Ryan Pilon, Jason Kinney, Nathan Lopez
Steadicam Operator: Timothy D. Beavers
SOC
Steadicam Assistant: Gary Muller
Technocrane Operator: Corey Checketts
Remote Head Tech: John Cambria
Still Photographer: Bill Inoshita, Robert Voets,
Ron Jaffe
Photo Publicist: Kathleen Tanji

VFX UNIT

Dir. of Photography: Nikhil Paniz
Assistant: Bob Brown

"C.S.I. CYBER"

Dir. of Photography: Marshall Adams
Operator: Joseph Broderick, Matt Credle
Assistants: James Thibo, Oliver Ponce, Beaudine Credle, Tim Clarke
Loader: Jennifer Preach
Still Photographer: Ron Jaffe

"ELEMENTARY" SEASON 3

Dir. of Photography: Ron Fortunato, ASC, Tom Houghton, ASC
Operators: Alan Mehlbrecht, SOC, Jeremy Weisharr
Assistants: Kate Larose, Charlie Foerschner, Jason Cleary, Kyle Blackman
Steadicam Operator: Alan Mehlbrecht, SOC
Steadicam Assistant: Kate Larose
Loaders: Nathalie Rodriguez, Patrick O'Shea

"ENTERTAINMENT TONIGHT"

Dir. of Photography: Kurt Braun
Operators: Ed Abalo, Vince Longo, Jim Patrick, Tim Newman, Ira Brenner, Rodney

McMahon,
Anthony Salerno, Kevin Egan
Video Controller: Larry Hutchinson

"JANE THE VIRGIN"

Dir. of Photography: Lowell Peterson, ASC, John Cl Flinn, III, ASC
Operators: Rory Knepp, SOC, Paul Plannette
Assistants: John C. Flinn, IV, John Pouncey, Peter Norkus, Don Burton
Steadicam Operator: Rory Knepp, SOC
Steadicam Assistant: John C. Flinn, IV
Camera Utility: Jefferson Fugitt
Still Photographer: Danny Feld, Ron Jaffe

"MELISSA & JOEY"

Dir. of Photography: Jim Roberson
Operators: Tim Tyler, Jack Chisholm, Stephen A. Jones, Peter Wilson
Assistant: Alicia Brauns, Brian Lynch
Sketch Pasinski
Digital Imaging Tech: Gary Taillon
Still Photographer: Bruce Birmelin

"NCIS LOS ANGELES"

Dir. of Photography: Victor Hammer
Operators: Russell McElhatton, Terrence Nightingall
Assistants: Keith Banks, Richie Hughes, Peter Caronia, Jaqueline Nivens
Digital Imaging Technician: John Mills
Digital Utility: Greg Gerardo
Steadicam Operator: Russell McElhatton, Terrence Nightingall
Steadicam Assistant: Keith Banks, Richie Hughes
Still Photographer: Ron Jaffe, Danny Feld, Adam Taylor, Michael Desmond

"OMG! INSIDER"

Dir. of Photography: Phil Browne
Operators: Randy Gomez, Jr., Eric Howland, Bob Vallejo, Rodney McMahon, Anthony Salerno, Kevin Egan
Camera Utility: Terry Ahern
Video Controller: Mike Doyle

"PUBLIC MORALS" SEASON 1

Dir. of Photography: Will Rexer
Operator: Jeff Muhlstock, Tim Norman
Assistants: Mike Burke, Mike Cambria, Ian Camody, Olga Abramson
Loader/Utility: Manny Smith
Digital Imaging Tech: Luke Taylor

"SCORPION"

Dir. of Photography: Ken Glassing, Bobby LaBonge
Operator: Paul Theriault, Robert Newcomb, Chris Duddy
Assistants: Scott Ronnow, Chris Mack, Kevin Huver, Tim Sheridan
Digital Imaging Tech: Scott Peck
Digital Utility: Tyler Ernst
Still Photographer: Adam Taylor, Ron Jaffe



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Dir. of Photography: Fred Murphy, ASC,
Tim Guinness
Operators: Peter Nolan, William Sandy Hays
Assistants: Scott Koenigsberg, Dean
Martinez,
Rene Crout, Justin Whitacre
Steadicam Operator: William Sandy Hays
Loader: Jonathan Monk, Sara Scrivener

"THE MCCARTHY'S"

Dir. of Photography: Chris LaFountaine
Operators: George La Fountaine,
Bruce Reutlinger, Chris Wilcox, Kris Conde
Assistants: David Colclasure, Jeff Roth
Utilities: Chris Todd, Craig LaFountaine,
Vicki Beck
Digital Imaging Tech: Shaun Wheeler
Video Controller: Ryne Niner, Kelsey Niner

"THE TALK"

Lighting Director: Kim Killingsworth
Ped Operators: Art Taylor, Mark Gonzales,
Ed Stebler
Hand Held Operators: Ron Barnes, Kevin
Michel Jeff Johnson
Jib Operator: Randy Gomez
Head Utility: Charlie Fernandez
Utility: Steve Deaver, Doug Bain,
Mike Bushner, Joe Zuccaro, Robert Cade
Video Controller: Richard Strock

Still Photographer: Ron Jaffe

CENTRAL CITY "THE FLASH"

Dir. of Photography: Jeff Mygatt

CENTRAL PRODUCTIONS "ANOTHE PERIOD"

Dir. of Photography: Carle Herse
Operator: Jason Oldak
Assistants: Barron Elmore, Mark Legaspi,
Devon Taaffe, Emily Zenk
Digital Imaging Tech: Bret Suding

COLUMBIA "JEOPARDY"

Dir. of Photography: Jeff Engel
Operators: Diane L. Farrell, SOC,
Ray Reynolds, Mike Tribble, Jeff Shuster,
L. David Irete
Jib Arm Operator: Marc Hunter
Head Utility: Tino Marquez
Camera Utility: Ray Thompson
Video Controller: Gary Taillon
Still Photographer: Carol Kaelson

"WHEEL OF FORTUNE"

Dir. of Photography: Jeff Engel
Operators: Diane Farrell, SOC, Randy
Gomez, Ray Gonzales, David Irete, Ray
Reynolds, Jeff Schuster
Assistants: Fortino Marquez, Ray Thompson,

Mike Corwin
Video Controller: Gary Taillon
Still Photographer: Carol Kaelson

COMEDY CENTRAL "TOSH.0" SEASON 5

STAGE CREW
Operator: Jason Cochard
Camera Utility: Benjamin Steeples, Marie
Chao

FIELD CREW
Dir. of Photography: Andrew Huebscher
Operator: Jason Cochard
Assistants: Marie Chao, Benjamin Steeples,
Justin Gamboa

CONACO "CONAN"

Operator: Kosta Krstic, Chris Matott,
Bruce Oldham, James Palczewski, Bart Ping,
Ted Ashton, Seth Saint Vincent

CUTE DOG PS, LLC "COOK"

Dir. of Photography: Sharone Meir
Operators: Colin Hudson, Eric Leach
Assistants: Rocker Meadows, Keith Rash,
Andy Sydney, Joaquin Castillo
Digital Utility: Alexander Paul
Remote Head Tech: Jay Sheveck
Still Photographer: Darren Michaels
Publicist: Guy Adan

PRODUCTION CREDITS

DANNI PRODUCTIONS

"NCIS: NEW ORLEANS"

Dir. of Photography: Gordon Lonsdale
Operators: Adam Ward, Greg Morris, Tony Politis
Steadicam Operator: Adam Ward
Assistants: Peter Roome, Houstin Franklin, Joe Waistell, Jeff Taylor, Penelope Helmer, David Edwards, Jose Figueroa
Camera Utility: Sienna Pinderhughes
Still Photographer: Skip Bolden

EYE PRODUCTIONS

"MADAM SECRETARY"

Dir. of Photography: Jonathan Brown, ASC
Operators: Learan Kahanov, Peter Vietro-Hannum
Assistants: Stephanie Simpson, Jamieson Fitzpatrick, Michael Lobb, Damon Lemay
Digital Imaging Tech: Keith Putnam
Loader: : Somer Stamps, Autumn Moran
Still Photographer: Mark Schafer

"THE MESSENGERS" SEASON 1

Dir. of Photography: John Newby, ASC
Operators: Jason Ellson, Lynn Lockwood, Phil Pfeiffer
Assistants: Nick Shuster, Chris Norris, Gave Pfeiffer, Rob Salviotti, Bret Latter, Lason Seigel
Steadicam Operator: Jason Ellson
Steadicam Assistant: Nick Shuster
Digital Imaging Tech: Tim Gregoire
Still Photographer: Ursula Coyote

FAIR HARBOR PRODUCTIONS

"LOOKING"

Dir. of Photography: Xavier Grobet, ASC
Operator: Stephen Buckingham
Assistants: Pat McArdle, Henry Nguyen, Dennis Rogers, Anne Lee
Digital Imaging Tech: Jordan Livingston
Camera Utility: Aaron Kirby
Still Photographer: Richard Foreman

FINNMAX, LLC

"THE VOICE"

Dir. of Photography: Alex Van Wagner
Operators: Jeff Wilkins, Christian Mack, Graham Steele, Marc Carter, John Sandoval, Brad Jimenez, Ben Gamble, Greg Taylor, Dom Zanghi, Sam Ameen, Tony Cobbs
Assistants: Jeremiah Thorne, Jess Fairless, Tom Kizy, Hunter Sandison, Randy Barnhardt, Craig Asato, Austin Drouguett, Alex Scott, Clint Moran

FREEMANTLE PRODS.

"FAMILY FEUD"

Dir. of Photography: Neil McDonald
Operators: John Kelly, Sharon Wilder, Gerard E. McClain, Scott Jennison, Mark Gonzalez, Jeff Wheat
Camera Utility: Chester Brown, Jim Meunster
Video Controller: Jeff Cave, Stuewe Prudden
Still Photographer: Danny Feld

FTP PRODUCTIONS, LLC

"BLACK'ISH"

Dir. of Photography: Rob Sweeney
Operator: Jens Piotrowski, Brian Pitts
Assistants: Art Martin, Tiffani Stephenson, Lou DeMarco, Tony Muller
Digital Loader: Josh Schnose
Digital Utility: Pablo Jara

"RAGTAG AGENTS OF S.H.I.E.L.D."

Dir. of Photography: Felix Parnell, Allan Westbrook
Operators: Kyle Jewell, Bill Brummond
Assistants: Coby Garfield, Derek Hackett, Josh Larsen, Tim Cobb
Steadicam Operator: Bill Brummond
Steadicam Assistant: Josh Larsen
Digital Imaging Tech: Ryan Degrazzio
Digital Utility: Josh Novak

GEMINI 3 PRODUCTIONS

"FACE OFF"

Dir. of Photography: Bruce Dorfman
Operators: Dave McCoul, David Gaines, Jaso Ippolito, Brandon Benning, Matt Ferguson
Assistants: Matt Hayes, Clarence Nelson, Dustin Penn, Kevin Hooper, Carlos Carmona
Steadicam Operator: Scott Dropkin
Still Photographer: Jordan Althaus, Dale Berman

HALF A YOGURT

"GIRLS" SEASON 4

Dir. of Photography: Tim Ives
Operators: Herman Otano, Aaron Medick
Assistants: Michael Garofalo, Julian Delacruz, Adriana Brunetto Lipman, Patric Bracey
Digital Imaging Tech: Ben Cain
Loader: Rodrigo Millan Garce
Still Photographer: Mark Schafer

HBO

"BALLERS"

Dir. of Photography: Jaime Reynoso, AMC
Operators: Brian Nordheim, Aiken Weiss
Assistants: Anthony Zibelli, Marvin Lee, April Crowley, Nelson Moncada
Digital Imaging Tech: Greg Vanzyck
Utility: Ian Hernand

"VEEP" SEASON 4

Dir. of Photography: Spencer Combs
Operators: Bo Webb, Sean Maxwell
Assistants: Jeff Graham, Thom Lairson, Kurt Parlow, Janice Min
Digital Imaging Tech: Matt Goetz
Still Photographer: Patrick Harbron

HOP, SKIP & JUMP PRODUCTIONS

"TOUGH COOKIE"

Dir. of Photography: Eric Haase
Operator: Paul Sanchez, BJ McDonnell
Assistants: Ethan McDonald, Ryan Brown, Robby Hart, Hannah Levin, Matt LeRoche
Steadicam Operator: BJ McDonnell
Loader: Ben Molyneux

IT'S A LAUGH PRODS.

"GIRL MEETS WORLD" SEASON 2

Dir. of Photography: Michael Franks
Operators: Gary Allen, Boris Price, Ray Liu, Ray Gonzalez
Camera Utility: Veronica Davidson, Steve Wollenberg, Richard Woodard, Dave Napoli
Video Controller: Stuewe Prudden
Still Photographer: Bruce Birmelin

"LAB RATS"

Dir. of Photography: Thomas T. Eckelberry
Operators: Ron Hirshman, Bryan McKenzie, Tim Heinzel, Jeff Barnes
Camera Utility: John Gofort, Alicia Brauns
Video Controller: Brian Dobbs
Still Photographer: Bruce Birmelin, Dale Berman, Nicole Wilder

"LIV/MADDIE"

Dir. of Photography: Tom Eckelberry
Operators: Tom Conkright, Mike Denton, John Gofort, Tim Heinzel
Camera Utility: Adan Torres, Cory Gunter, Mike Pusatere
Video Controller: Keith Anderson

"SUPER AWESOME KATE"

Dir. of Photography: Joseph W. Callway
Operator: Ed Horton

"YOUNGER"

Dir. of Photography: John A. Thomas
Operators: Jonathan Beck, Yousheng Tang
Assistants: Michael Sun, Michael Swearingen, Kyle Knudson, James Daly, Trevor Wolfson
Steadicam Operator: Yousheng Tang
Steadicam Assistant: Kyle Knudson
Digital Imaging Tech: James Strosahl
Still Photographer: Ali Goldstein

KIKI TREE PICTURES, INC.

"THE ACCOUNTANT"

Dir. of Photography: Seamus McGarvey, ASC
Operator: Dave Emmerichs, Bob Gorelick, Peter Hawkins
Assistants: Donal Steinberg, Matthew Haskins, Mary Stankiewicz, Hugh Braselton
Steadicam Operator: Dave Emmerichs
Still Photographer: Chuck Zlotnick
Publicist: David Linck

KING BOLDEN, LLC

"BOLDEN"

Dir. of Photography: Neal Norton
Operators: Frank Godwin
Assistants: Dennis Seawright, Patrick Borowiak, Dale White, John McIntyre
Loader: Sean Yapple
Digital Imaging Tech: Mark Gilmer
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KING TAKES KING PRODUCTIONS, LLC "HOUSE OF CARDS" SEASON 3

Dir. of Photography: Martin Ahlgren,
Pete Konczal

Operators: Gary Jay, David Dunlap, Peter
Gulla

Assistants: Erin Henning, Caitlin Machak,
Ian Axilrod, Vanessa Viera
Still Photographer: David Giesbrecht

2ND UNIT

Dir. of Photography: Pete Konczal

MARK BURNETT PRODS. "SHARK TANK"

Dir. of Photography: Alex Van Wagner
Operators: Jeffrey Wilkins, Willie Nunez,
Andrew Martinez, Rob Palmer, Phil Kerns,
Scott Kaye, Mark LaCamera, Suzanne Ebner,
Jeff Wheat, Kary D'Alessandro, Ed Staebel,
John Armstrong
Assistant: Robby Lowell
Steadicam Operator: John Perry
Remote Head Operator: Joe Bohman
Camera Utility: Charly Fernandez
Still Photographer: Kelsey McNeal,
Michael Desmond

MIRRORTREE PRODUCTIONS "SOUTH OF HELL"

Dir. of Photography: Lex duPont
Operator: Scott Steele, Brooks Robinson
Assistants: George Olson, Cheri Barnard,

Chris Norris, Tristan Chavez
Steadicam Operator: Brooks Robinson
Loader: Bryan Jones

MTV "AWKWARD"

Dir. of Photography: Steve Gainer, ASC
Operators: Todd Barron, Joseph Arena
Digital Imaging Tech: Aaron Picot
Assistants: Shereen Saleh, Jonathan
Goldfisher
Neal Morell, Michael Stradling
Steadicam Operator: Joseph Arena, SOC
Steadicam Assistant: Jonathan Goldfisher
Digital Loader: Scott Reese
Still Photographer: Sam Urdank

"FAKING IT" SEASON 2

Dir. of Photography: Doug Emmett
Operator: Massi Trevis, Brian Freesh, SOC
Assistants: Buddy Allen Thomas,
Scott Johnson, Joey Joyce, Yen Nguyen
Digital Imaging Tech: Ben Booker
Steadicam Operator: Brian Freesh, SOC
Steadicam Assistant: Scott Johnson
Still Photographer: Scott Everett White

MUSIC CITY PRODUCTIONS "NASHVILLE"

Dir. of Photography: Michael Lohmann
Operators: Shawn Maurer, Bob Scott,
Tim Sutherland
Assistants: Ron Peterson, Jeremy Curtis,
Kenny Bazal, Tyler Bradley, Mark Reilly,

Justin Noel
Digital Imaging Tech: Casey Nearing
Digital Utility: Ry Ellingson
Still Photographer: Mark Levine

NBC UNIVERSAL "ABOUT A BOY"

Dir. of Photography: Tim Bellen
Operators: Scott Steele, David Hirshmann,
Chris Haifley
Assistants: Steve Bellen, Erik Emerson, Jim
Nygren, Jeph Folkins, Jessica Ramos, William
Dicens
Loader: Jay Elkayam, Ana Amortegui
Digital Utility: Nicole Ferris, James Dunham

"CHICAGO FIRE"

Dir. of Photography: Lisa Wiegand
Operators: Reza Tabrizi, Jayson
Crothers Assistants: Luis Fowler, Hunter
Whalen,
Zach Gannaway, Matt Rozek
Camera Utility: Matt "Chef" Feasley
Digital Loader: Derek M. Ashbaugh
Still Photographer: Elizabeth Morris

2ND UNIT

Dir. of Photography: Jayson Crothers

"CHICAGO PD"

Dir. of Photography: Ron Schmidt
Operators: James Zucal, Will Eichler,
Scott Thiele

PRODUCTION CREDITS

Assistants: John Young, Don Carlson,
Chris Wittenborn, Phil Walter
Steadicam Operator: Will Eichler
Loader: Jamison Acker
Digital Utility: Ron Ruanphae

2ND UNIT

Dir. of Photography: James Zucal, Will Eichler
Assistant: Jorge Sanchez

"STATE OF AFFAIRS"

Dir. of Photography: Yasu Tanida
Operators: James Goldman, Coy Aune
Assistants: Brian Wells, Rich Floyd,
Jay Hager
Loader: Shane Carlson
Still Photographer: Michael Desmond

"THE JACK & TRIUMPH SHOW"

Dir. of Photography: Bernard Berner
Operators: Alain G. Onesto, Patrick Miniotta,
Carol Wetovich, Jimmy O'Donnell
Assistants: Deborah Lipman, Jack Berner
Camera Utility: Michael Joyce, Gary Parker,
Jim Tomlinson
Digital Imaging Tech: Thomas Guadarrama
Video Utility: Michael Hawrylak

"THE SLAP"

Dir. of Photography: Frank DeMarco
Operators: Peter Reniers, Todd Armitage
Assistants: Greg Pricipato, Stephen
Kozlowski,
Steve Search, Joe Metzger
Digital Imaging Tech: Bjorn Jackson
Loader: Maria Gonzales, Justin Matthew
Wong

NICKELODEON

"100 THINGS TO DO BEFORE HIGHT SCHOOL"

Dir. of Photography: Mike Mickens
Operator: Houman Forough, Dale Vance, Jr.
Assistants: David Leyse, Sean Mennie,
Layna McAllister, Ryan Sullivan
Digital Imaging Tech/Camera Utility:
Matthew Goodwin

"BELLA & THE BULLDOGS"

Dir. of Photography: Michael Franks
Operators: D.J. Diomedes, Brian Gunter,
Gavin Ames, Bob McCall
Camera Utility: Ryan Eckelberry, Mike
Pusatere
Video Controller: Ryne Niner

OPEN 4 BUSINESS PRODS., LLC

"GRIMM"

Dir. of Photography: Fernando Arguelles,
ASC
Eliot Rockett
Operators: Timothy Spencer, Mike McEveety
Assistants: Will Estrada, Jerry Turner,
Eliza Plumlee, Patrick Lavalley
Steadicam Operator: Timothy Spencer
Steadicam Assistant: Will Estrada
Digital Imaging Tech: Danielle Eddington

Loader: Nate Goodman
Still Photographer: Scott Patrick Green

"PARENTHOOD"

Dir. of Photography: David Miller, ASC
Operators: Andy Graham, Arthur Africano,
Eric Schilling
Assistants: Josh Williamson,
Michael Cruickshank, Maryan Zurek,
Christopher Garland, Aaron Bowen,
William Evans
Digital Loader: Matthew Pontell
Still Photographer: Danny Feld,
Colleen Hayes, Adam Taylor

"THE MINDY PROJECT"

Dir. of Photography: Marco Fagnoli
Operators: Nick Franco, SOC, Patrick
Rousseau
Assistants: Doug Oh, Mark Bain,
Jeff Saldin, Marcus Del Negro
Digital Imaging Tech: Ryan Polack
Digital Utility: Robyn Buchanan
Still Photographer: JohnFleenor

PACIFIC 21

"PARKS AND RECREATION"

Dir. of Photography: Tom Magill
Operators: Jacob Pinger, Johnny Martin
Assistants: Will Emery, Adam Tsang,
Dustin Fruge
Digital Imaging Tech: Jajaira Corria
Digital Utility: Erin Crankshaw
Still Photographer: Danny Feld

"SLEEPY HOLLOW" SEASON 2

Dir. of Photography: Tod Campbell,
Glen Keenan
Operator: Matt Doll, Mike Repeta
Assistants: Alan Aldridge, Matt Heath,
Courtney Bridgers, Will Cooper,
Marshall Johnson
Steadicam Operator: Matt Doll
Loader: Rachel Mangum

PARAMOUNT

"MARRY ME"

Dir. of Photography: David Hennings
Operators: Mick Froelich, Chris Squires
Assistants: Chris Flurry, Summer Marsh,
Kevin Potter, Kevin Miles
Digital Loader: Tim Bauer
Digital Utility: Jacob Laguardia
Still Photographer: Adam Taylor, Vivian Zink

"NCIS"

Dir. of Photography: William Webb, ASC
Operators: George Loomis, SOC,
Christos Bitsakos
Assistants: Chad Erickson, Kim Erickson,
James Troost, Victoria Ketcham
Still Photographers: Ron Jaffe,
Mike Kubeisy, Adam Taylor

PIG NEWTON

"LOUIE" SEASON 4

Dir. of Photography: Paul Koestner

Assistants: Nadine Martinez, Katie Waalkes
Camera Utility: Luke Taylor

POP FILMS

"FINDING CARTER"

Dir. of Photography: Alison Kelly
Operators: Brina Gunter, Andrew Fisher
Assistants: Steve Hampton, Mike Torino,
Nick Gianneschi, Cait Rockwell
Steadicam Operator: Mike Karavite
Digital Imaging Tech: Wiley Schott
Camera Utility: Nubia Rahim

"HINDSIGHT"

Dir. of Photography: Mark Doering-Powell
Operator: Paul Varrieur, Grayson Austin,
Chris Jones, Deke Keener, Allen Facemire
Assistants: Steve Latham, Mike Torino,
Suzanne Trucks, Nick Gianneschi,
Marc Casey
Steadicam Operator: Grayson Austin
Steadicam Assistant: Steve Latham
Data Manager: Wiley Schott
Digital Utility: Cristi Hahn
Still Photographer: Annette Brown

PRODCO, INC.

"BABY DADDY" SEASON 3

Dir. of Photography: Paul Maibaum, ASC
Operators: Keeth Lawrence, Dave Levisohn
Randy Baer, Richard Price
Assistant: Steve Masias
Camera Utility: John Weiss,
Miss Toy-Ozeas
Digital Imaging Tech: Doug Degrazzio
Still Photographer: Kelsey McNeal,
Bruce Birmelin

"SWITCHED AT BIRTH"

Dir. of Photography: Carlos Gonzalez
Operators: Jason LeBlanc, Rick Drapkin, SOC
Assistants: Chris Cobb, Steve Whitcomb,
Alfredo Rosado, Betty Chow
Steadicam Operator: Rick Drapkin, SOC
Loader: Adam Kolkman
Still Photographer: Kelsey McNeal

"THE FOSTERS"

Dir. of Photography: Kees Van Oostrum, ASC
Operators: Wally Sweeterman,
Denis Moran, SOC
Assistants: Matt Alper, Aaron Schuh,
Tammy Fouts Sandoval, Nick Neino
Digital Utility: Robin Charters
Still Photographers: Ron Tom, Tony Rivetti,
Jr.,
Kelsey McNeal

"NAKED AND AFRAID"

Dir. of Photography: Ed Dally

RDF PRODUCTIONS, INC.

"STEVE JOBS"

Dir. of Photography: Alwin Kuchler
Operator: Geoff Haley, Jeff Greeley,
Lou Weinert, Steve Condiotti
Assistants: Greg Irwin, Jeph Folkins,

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Dennis Rogers, Henry Nguyen,
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Camera Utility: Will Weprin
Loader: Aaron Kirby
Still Photographer: Francois Duhamel
Publicist: Guy Adan

RIGHT HERE, RIGHT NOW PRODUCTIONS, LLC
"BLUNT TALK"

Dir. of Photography: Joe Gallagher
Operator: Dan Ayers
Assistants: Anthony Martin, Aldo Porras,
Mark Laskowski, Rob Monroy, Darin Krask
Steadicam Operator: Dan Ayers
Digital Imaging Tech: Bobby Hatfield
Digital Utility: Jared Wilson

SAN VICENTE
"BLACKLIST" SEASON 2

Dir. of Photography: Michael Caraciolo,
Eric Moynier
Operator: Thomas Weston, Saade Mustafa
Assistants: Hollis Meminger, Aileen Taylor,
Gareth Manwaring, James Sylvia
Loader: Tricia Mears

SHOWTIME
"EPISODES"

Dir. of Photography: Rob Kitzmann
Operators: Richard Davis, Tim Walker
Assistants: Max Neal, Joe Torres,
Skip Mobley, Elizabeth Algieri
Steadicam Operator: Richard Davis
Steadicam Assistant: Max Neal
Digital Imaging Tech: Anders Yarbrough
Digital Utility: Josh Benavidez

SONY
"THE GOLDBERGS"

Dir. of Photography: Jason Blount
Operators: Scott Browner, Bonnie Blake,
Scot Browner
Assistants: Nathan Havens, Aldo Porras,

Tracy Davey, Gary Webster, Rob Monroy,
Arturo Rojas
Digital Imaging Tech: Kevin Mills
Digital Utility: Jared Wilson
Still Photographer: John P. Fleenor

STALWART FILMS, LLC
"THE WALKING DEAD"

Dir. of Photography: Michael Satrazemis
Operators: Stephen Campbell, Robert
Carlson
Assistants: David Galbraith, Bruce Robinson,
Matt McGinn, Matt Horn, Robert Velicky,
Claire Busic
Steadicam Operator: Rob Carlson
Loader: Lauren Gentry
Still Photographer: Gene Page

2ND UNIT
Dir. of Photography: Steve Campbell

"TURN" SEASON 1

Dir. of Photography: Marvin Rush, ASC
Operators: Chris Haarhoff, Jim Contner
Assistants: Liz Heslep, Tim Risch, Sean
Sutphin,
Shawn Mutchler

STRANGE FROG PRODUCTIONS, INC.
"TRUCE"

Dir. of Photography: Bill Pope, ASC
Operator: Robert DeAngelis
Assistants: EJ Misisco, Billy McConnell,
Liam Sinnot, Ryan Rayner
3D Tech Lead: Jeff Rios
3D Tech: Manny Tillman
3D Digital Imaging Tech: Britton Cyrus
3D Operator: Kevin McGill
Camera Utility: Linda Wu
Still Photographer: Glen Wilson
Publicist: Greg Brilliant

TNT
"HAWAII FIVE-O" SEASON 5

Dir. of Photography: Alan Caso, ASC, Mike

Martinez
Operators: Greg Lundsgaard, Jim Jost,
Dave Homcy
Assistants: Rick Brock, Jeff Pelton,
Kanoa Dahlin, Michael Prioste, Kaliko Maii,
Brian Matsumura
Steadicam Operator: Greg Lundsgaard
Steadicam Assistant: Rick Brock
Digital Imaging Tech: Scott Lee Mason
Digital Loader: Caleb Lucero
Digital Utility: Ezekiel Honohano
Still Photographer: Norman Shapiro

TRACKDOWN PRODUCTIONS, INC.
"GRACELAND" SEASON 1

Dir. of Photography: Edward Pei, ASC
Operators: Mike McGowan, SOC,
Paul Krumper
Assistants: Michael McLean, Peter Farber,
Bill McConnell, Billy Wells
Steadicam Operator: Mike McGowan, SOC
Digital Imaging Tech: Greg Vanzyck

"THE AMERICANS" SEASON 2

Dir. of Photography: Richard Rutkowski
Operators: Sung Rae Cho, James Callanan
Assistants: Rory Hanrahan, Brendan Russell
Rob Bullard, Yusuke Sato
Loader: Christian Bright
Utility: Dan Brosnan

"THE HALF HOURS"

Dir. of Photography: Jay LaFayette
Operators: Robert Del Russo, Lyn Noland,
Michael Fuchs
Assistants: Bianca Bahena, Rob Pittman,
Michael Csantos, Marty Hoffman
Digital Imaging Tech: Matt Conrad

TURNER NORTH PRODUCTIONS, INC.
"THE LAST SHIP"

Dir. of Photography: Cort Fey, ASC,
David Geddes, ASC
Operators: Bud Kremp, SOC, David
Sammons, SOC

PRODUCTION CREDITS

Assistants: Stephen Pazanti,
Michael D. Alvarez, Haydn Pazanti,
Roger Spain
Steadicam Operator: Bud Kremp, SOC
Steadicam Assistant: Stephen Pazanti
Digital Imaging Tech: Evan Nesbit
Digital Utility: Will Cotton
Still Photographer Karen Ballard, Ron Jaffe

"PUBLIC MORELS" SEASON 1

Dir. of Photography: Willaim Rexer
Operator: Timothy Norman
Assistants: Michael Burke, Michael Cambria,
Ian Carmody, Olga Abramson
Digital Imaging Tech: Luke Taylor
Loader: Deborah Fastuca, Imanuel Smith

TV BY FOX

"LAST MAN ON EARTH"

Dir. of Photography: Christian Sprenger
Operator: Julie Kirkwood, Jeff Bollman
Assistants: Justin Watson, Alyssa Soetebier,
Jacqueline Stahl, Devn Hoff-Weekes
Steadicam Operator: Grant Culwell
Steadicam Assistant: Alyssa Soetebier
Digital Imaging Tech: Chris Hoyle
Digital Utility: Peter Brunet

TVM

"THE COMEDIANS"

Dir. of Photography: Anthony Hardwick
Operators: Steve Clancy, Mark Schwartzbard
Assistants: Ryo Kinno, Jihane Mrad,
John Waldo, Jason Goebel
Data Manager: George Ballenger
Still Photographer: Ray Mickshaw

"THE MARC MARON PROJECT" Dir. of

Photography: Joe Kessler
Operators: Peter Geraghty
Assistants: Scott Ronnow, John Rodriguez,
Chris Mack, Gaston Richard
Data Wrangler: Mauricio Gutierrez

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"SAN ANDREAS"

Dir. of Photography: Steve Yedlin
Operator: Mark Goellnicht, Kim Karks
Assistants: Bob Hall, Dan Schroer,
Mark Spath, Dave O'Brien
Steadicam Operator: Kim Marks
Loader: Ann Lee
Data Manager: Jordan Livingston
Still Photographer: Jamie Trueblood,
Stephen Vaughan
Publicist: Amanda Brand

2ND UNIT

Dir. of Photography: Jaron Presant
Operator: Mark Moore, Kim Marks
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Dennis Rogers, Jeph Folkins
Steadicam Operator: Mark Moore
Digital Imaging Tech: Jordan Livingston
Data Manager: Aaron Kirby

UNIVERSAL

"LAW & ORDER-SVU" SEASON 15

Dir. of Photography: Michael Green
Operators: Jonathan Herron, Mike Latino
Assistants: Chris Del Sordo, Soren Nash,
Matt Balzarini, Jeff Smith
Camera Utility: Chris Cafaro
Loader: Ian Bracone

"GO JERROD GO" PILOT

Dir. of Photography: Gary Baum
Operator: Marvin Shearer, Tim Tyler,
Richard Price, Gary Alleen
Assistant: Jason Herring
Utility: Dan Lorenze, Sean Askins
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Dir. of Photography: Dave Perkal, ASC
Operators: Eric Fletcher, SOC, John Sosenko,
SOC
Assistants: Joel Perkal, James Barela,
Josh Greer, Jojo Sutera
Camera Utility: Chris Burket
Still Photographer: Ron Jaffe

WARNER BROS.

"FOREVER" SEASON 1

Dir. of Photography: Jack Donnelly
Operators: Ted Chu, Francis Spieldenner
Assistants: Eddie Effrein, Gus Limberis,
Greg McMahan
Loader: Lenny Gomez

"PERSON OF INTEREST" SEASON 3

Dir. of Photography: Dave Insley, Manuel
Billeter
Operators: Ron Baldwin, Tom Weston
Assistants: Andy Smith, Jelani Wilson,
Greg Wimer, Dan Casey
Loaders: Brent Weichel, Suren Karapetyan
MPOV Tech: Kevin Kasarda

"PRETTY LITTLE LIARS" SEASON 5

Dir. of Photography: Larry Reibman
Operator: Craig Fikse, Carlos Arguello,
Ken Lehn
Assistants: David Dowell, Chuck Katz,
Gretchen Hatz, Rocio Meda
Steadicam Operator: Craig Fikse
Steadicam Assistant: Chuck Katz
Digital Imaging Tech: Conrad Hunziker
Digital Utility: Jordan Keslow
Technocrane Operator: Brett Folk

2ND UNIT

Dir. of Photography: Carlos Arguello

"STALKER"

Dir. of Photography: Darran Tiernan
Operator: Cedric Martin, Dennis Noyes
Assistants: Paul Metcalf, Norris Fox,
Andrew Crankshaw, Larron Julian
Digital Imaging Tech: Jamie Metzger
Digital Utility: Peter Parson

"THE MENTALIST"

Dir. of Photography: Tom Camarda,
Alex Napomniaschy
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Romero
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Digital Utility: Lauro Avila
Still Photographer: Adam Taylor, Greg
Gayne,
Ron Jaffe

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Dir. of Photography: Blake Evans
Operator: John Joyce, SOC, Bret Harding
Assistants: Jefferson Jones, Nathan Crum,
Bryan Haigh, Emily Goodwin
Steadicam Operator: John Joyce, SOC
Steadicam Assistant: Jefferson Jones
Loader: Vanessa Manlunas

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Operator: John Dechene, Brian Brockway,
Jamie Hithcock, Brian Armstrong
Assistants: Nigel Stewart, Chris Hinojosa,
Steve Lund, Meggins Moore,
Jeannette Hjorth, Colin Brown
Loader: Marianne Franco

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"BETTER CALL SAUL"

Dir. of Photography: Arthur Albert
Operator: Harry Garvin, Philip Holahan
Assistants: Toby White, Cherilyn Barnard,
Jordan Slovin, Tristan Chavez
Steadicam Operator: Harry Garvin
Steadicam Assistant: David Morenz
Digital Utility: Bryan Jones
Digital Loader: Aaron Lieber
Phantom Digital Imaging Tech: Dane Brehm
Still Photographer: Ursula Coyote

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Dir. of Photography: Stefan von Bjorn,
Attila Szalay, ASC
Operators: Eric Roizman, Mark Moore,
Andy Strahorn
Assistants: James Rydings,
Blair Rogers, Kelsey Castellito, John Kurt
Steadicam Assistant: James Rydings
Utility: Nate Lewis
Digital Loader: Scott Resnick
Technocrane Operator: Nico Bally
Remote Head Tech: Jay Sheveck

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Digital Imaging Tech: Elhanan Matos

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Dir. of Photography: Eric Schmidt
Operator: Alan Caudillo
Assistants: Lila Byall, Shelly Gurzi,
Carrie Lazar
Digital Imaging Tech: John Spellman

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Dir. of Photography: Carl Nilson
Assistant: Maria Beltran, Zoraida Luna
Digital Imaging Tech: Alex Ramirez

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Assistant: Christian Carmody
Digital Imaging Tech: Paul Schilens

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John Takenaka
Digital Imaging Tech: Erica McKee
Jib Arm Operator: Jeff Comfort
Phantom Tech: Andrew Bethke

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Dir. of Photography: John Lindley, ASC
Assistants: Pergrin Jung, Roxanne Stephens

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Dir. of Photography: Phedon Papamicheal, ASC
Assistants: Jeff Porter, Phil Shanahan,
Sarah Brandes, Jonathan Clark
Digital Imaging Tech: Dane Brehm, Nick
Lantz (Codex Tech)

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Dir. of Photography: Steve Yedlin
Assistants: Stephen Cook, Alan Newcomb,
Tadesse Bantiweson, Chris Lymberis,
Monica Barrios-Smith
Digital Imaging Tech: Jeremy Ball

"MOUNTAIN DEW"

Dir. of Photography: Steve Yedlin
Operator: Nicole Lobell
Assistants: Stephen Cook, Christian Shonts,
Chris Lymberis, Monica Barrios-Smith,
Tadesse Bantiweson
Digital Imaging Tech: Jeremy Ball

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Bob DiGiacomo
Digital Imaging Tech: Mariusz Cichon

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Andrew Pauling, Scott Forte
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Digital Imaging Tech: Dan Moses

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Dir. of Photography: Jon Peter
Assistants: Stephen Taylor-Wehr

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Assistant: Chris Horne

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Benedict Baldabuff
Digital Imaging Tech: Adrian Jebef,
Dane Robert Brehm
Camera Utility: Todd Sansone
Remote Head Operator: Christopher
DeFranco

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Operator: Gary Grieg
Assistants: Reed Koppen, Matt Caulk,
Chris Horne
Digital Imaging Tech: Matt Riggier

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Dir. of Photography: Karl Walter Lindenlaub, ASC
Assistants: Jimmy Jensen, Brent Egan
Digital Imaging Tech: Steve Harnell

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Assistant: John Glaser
Digital Imaging Tech: Donald Cornett

MOXIE

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Operator: Alan Caudillo
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Digital Imaging Tech: John Spellman

MTV

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Dir. of Photography: Chuck Ozeas
Assistants: Chris Slany, Jay Hardie
Digital Imaging Tech: Steve Harnell
Steadicam Operator: Liam Clark

OFFHOLLYWOOD

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Operators: Charlie Anderson, Danny Sariano
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Nicalena Iovino
Digital Loader: Carrie Willis

O POSITIVE

"ADIDAS"

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Operator: Tyson Wisbrock
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O'Shaughnessy,
Danielle Carroll, Suzy Dietz
Digital Imaging Tech: Sean Rawls

"VERIZON"

Dir. of Photography: Tami Reiker, ASC
Operators: Dan Hersey, Kyle Repka
Assistants: Walter Rodriguez, Mike Indursky,
Jeff Taylor, Ema Rees-Scanlon
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ORIGINAL FILM

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Assistants: Scott Kassenoff, Madion Dyer
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Dir. of Photography: Lance Acord, ASC
Assistants: Mike Blauvelt, , Natalie Carr
Steadicam Operator: Ari Robbins
Digital Imaging Tech: Steve Harnell

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Assistants: Shaun Mayor, Isaiah Fortajada,
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Digital Imaging Tech: Dane Brehm

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"SAFE AUTO INSURANCE"

Dir. of Photography: Richard Henkels
Operator: Michael Merriman
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Dir. of Photography: Darren Lew
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Digital Imaging Tech: Gus Sacks

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Digital Imaging Tech: Jason Johnson

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April Kelly, Lorna Leslie, Phoebe Krueger
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Digital Imaging Tech: Zak Sandberg

RSA FILMS

"AD COUNCIL"

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Assistants: Verlon Allen, Rochelle Brown
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Steadicam Operator: Thom Valko

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Dir. of Photography: Matthias Koenigswieser
Assistants: Shaun Mayor, Luke Groder
Digital Imaging Tech: Dane Brehm

SMUGGLER

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Assistants: Lila Byall, Laura Goldberg,
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Digital Imaging Tech: John Spellman

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Operator: Vince Foeillet
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Warren Russell
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Digital Imaging Tech: Kyo Moon

TWENTY NINE BLACK

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Digital Imaging Tech: Charlie Weston

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Dir. of Photography: Jay Hunter
Assistants: Markus Mentzer
Digital Imaging Tech: Wilson Chung

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Dir. of Photography: Franck Tymezuk
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Kaiju Fury

Sundance 2015

This image from the set of *Kaiju Fury!*, provided by The Stan Winston School of Character Arts and New Deal Studios, depicts the titular monster leading a devastating attack on a city after a dark energy experiment goes wrong. *Kaiju Fury!* is the first miniature live-action 3D 360-degree virtual reality (VR) experience and was featured in New Frontiers at Sundance – one of many VR projects showcased this year in Park City. Shot by Local 600 cinematographer Michael ANAMAL Off on the Jaunt 3D VR camera system, *Kaiju Fury!* was directed by Ian Hunter, a three-time VES award winner and Oscar nominee. See the trailer now in 3D VR on Google Cardboard, available at the Google store, before there's nothing left of your city!

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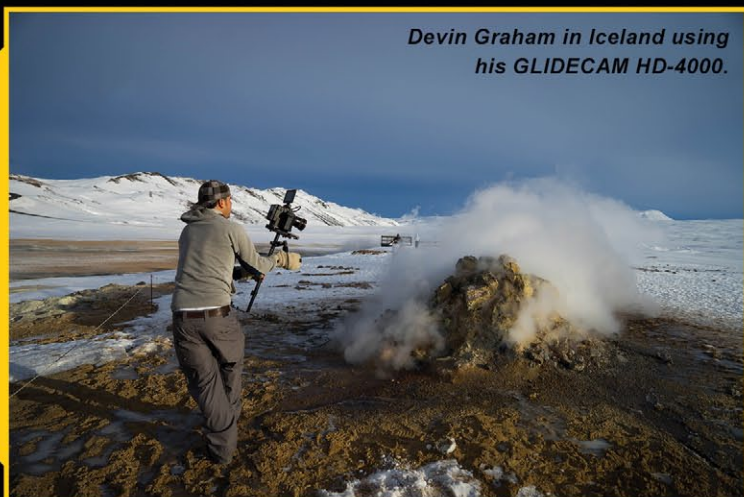
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