



AKASO V50 PRO SE TECH SPECS

With an **adjustable angle of view**, native **4K video capture at 30fps** and the ability to take **stills up to 20MP**, the AKASO V50 Pro SE is a lot of action camera at an affordable price.

And thanks to **image stabilization** and being **waterproof up to 98ft**, the AKASO V50 Pro SE is ideal for a wide range of out door activities.

Its handy **2-inch touchscreen** makes the AKASO V50 Pro SE is easy to use. It saves images and footage to a **Micro SDHC** card, and has a **Mini USB** port and built in **Wi-Fi**. Plus, **remote control** capabilities from a distance of 32ft. **Mounts and accessories are included.**

Find out more about the AKASO V50 Pro SE action camera at:
www.akasotech.com



“A portion of every V50 Pro SE sale will go to support the Leave No Trace Access Fund”

World-famous rock climber Tommy Caldwell is an AKASO action camera ambassador.

Connect with AKASO at:

- www.facebook.com/akaso.official
- www.youtube.com/akaso_official
- www.instagram.com/akaso_official
- www.twitter.com/akaso_official



AKASO

Go Beyond



American Cinematographer

100th
ANNIVERSARY

1920 ~ 2020

An International Publication of the ASC



ONWARD

SHARON CALAHAN, ASC
ADAM HABIB

TALES FROM THE LOOP
JEFF CRONENWETH, ASC

TAKING ON 007

LINUS SANDGREN, ASC, FSF
AND DIRECTOR CARY JOJI FUKUNAGA

- FILMMAKERS AND GAME-ENGINE TECH
- ASC MASTER CLASS: FOCUS ON FILM

\$5.95 Canada \$6.95

0 74470 12797 0 0.4 >

Unrivaled image quality. Zero delay 4K & HD video.

Bolt 4K enables a true 4K HDR workflow with support for HDR10 and Dolby Vision. It features a brand new chipset and antennas designed to power through channel interference for a stronger wireless signal. The system transmits 4K and HD video with improved image fidelity and greater detail.

Bolt 4K





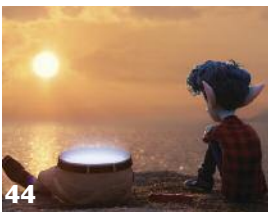
American Cinematographer

100TH ANNIVERSARY



On Our Cover: James Bond (Daniel Craig) and fellow double-0 agent Nomi (Lashana Lynch) face mounting dangers in *No Time to Die*, shot by Linus Sandgren, ASC, FSF. (Photo by Nicola Dove, courtesy of Danjaq, LLC and MGM.)

FEATURES



44

28 *No Time to Die* — Rehired Gun

Linus Sandgren, ASC, FSF and director Cary Joji Fukunaga frame the 25th official Bond outing

44 *Onward* — Quest for Magic

Cinematographers Sharon Calahan, ASC and Adam Habib capture an animated expedition

58 *Tales From the Loop* — Strange Machines

Jeff Cronenweth, ASC and director Mark Romanek track an unusual landscape

68 *Game Engines and Filmmaking* — Game On

AC explores how game-engine technology assists filmmakers with live-action and virtual productions

76 *ASC Master Class* — Film Class

Four Society members offer their perspectives on the recent film-focused Master Class

82 *AC: The 1950s* — Scale and Spectacle

Studios introduce large formats and other feature-film innovations to compete with the rise of television



58



68

DEPARTMENTS

- 10 Editor's Note
- 12 President's Desk
- 14 Shot Craft: The lens pupil • The Garutso lens
- 24 Short Takes: *Brotherhood*
- 88 New Products & Services
- 90 International Marketplace
- 91 Classified Ads
- 92 Ad Index
- 94 Clubhouse News
- 96 ASC Close-Up: Gregg Hescong

PRG Cinematography Spotlight

Lawrence Sher, ASC on JOKER

Lawrence Sher, ASC's work on JOKER has garnered universal praise for the way his cinematic contribution probes the depths of the soul of Gotham's most notorious hell raiser. Integral to the film were customized LED Enhanced EnvironmentsSM supported by PRG.



"I DON'T THINK PEOPLE REALIZE THAT THE SUBWAY SCENES IN 'JOKER' WERE DONE WITH AN ENHANCED ENVIRONMENT. For me the technology was essential to making that scene successful— I don't know any other way we could have done it."

- Lawrence Sher, ASC



VER Camera & Broadcast are now part of PRG

PRG.COM

Camera Prep Facilities: LOS ANGELES / NEW YORK / CHICAGO / NEW ORLEANS / ATLANTA / MIAMI

ASC Launches Documentary Award



▲ Hatidže Muratova is a Macedonian beekeeper who faces changing times in the documentary *Honeyland*. ◀ Cinematographers Fejmi Daut (left) and Samir Ljuma pose with their ASC Documentary Award.



“Documentaries are more important to our world today than ever before,” said Samir Ljuma, who shot *Honeyland* with fellow cinematographer Fejmi Daut. “I can’t express [enough] my feelings [of] gratitude to the ASC for opening the doors of their temple [to] documentary cinematography.”

These sentiments were part of the Macedonian cinematographers’ acceptance speeches for the inaugural ASC Documentary Award, initiated this year to recognize exceptional cinematography in non-fiction filmmaking.

Chaired by Jay Holben, the Documentary Subcommittee of the ASC Awards Committee brought this new honor to fruition. The subcommittee comprised Society members who are passionate about celebrating the art form, some of whom have photographed documentaries throughout their careers: Joan Churchill, Robert

Gantz, Michael Goi, Mark Irwin, Ellen Kuras, Charlie Lieberman, Stephen Lighthill, Don McCuaig, Steven Poster, Nancy Schreiber, Buddy Squires, Rodney Taylor, John Toll, Kees van Oostrum and Checco Varese — as well as associate members Bob Harvey and Suzanne Lezotte.

Honeyland, an intimate portrayal of a beekeeper working in a remote village of North Macedonia, was the Subcommittee’s selection — after numerous submissions from the Society’s active and associate members — as 2019’s best-shot documentary. The category’s other nominees were Evangelia Kranioti, for *Obscuro Barroco*, and Nicholas de Pencier, for *Anthropocene: The Human Epoch*.

American Cinematographer has a long tradition of documentary coverage dating back decades, and the magazine will continue to support this essential discipline in future issues. ◆

Tokina Vista. Beyond full frame.
Now available at Panavision.





The logo features the word "American" in a cursive script, "Cinematographer" in a large, bold, sans-serif font, and "100TH ANNIVERSARY" in a smaller, bold, sans-serif font below it. A yellow film strip graphic is positioned behind the text, and a yellow checkered pattern is visible in the upper right corner.

EDITOR-IN-CHIEF and PUBLISHER

Stephen Pizzello

WEB DIRECTOR and ASSOCIATE PUBLISHER

David E. Williams

EDITORIAL

SENIOR EDITOR Andrew Fish

TECHNICAL EDITOR Christopher Probst, ASC

SHOT CRAFT EDITOR Jay Holben

CHIEF TECHNOLOGY OFFICER and WEB PRODUCER Mat Newman

DIGITAL CONTENT CREATOR Samantha Dillard

CONTRIBUTING WRITERS

Benjamin B, Rachael K. Bosley, John Calhoun, Mark Dillon, Michael Goldman, Jim Hemphill,
David Heuring, Noah Kadner, Debra Kaufman, Michael Kogge, Iain Marcks,
Matt Mulcahey, Jean Oppenheimer, Lauretta Prevost, Phil Rhodes, Patricia Thomson

PODCASTS

Michael Goldman, Jim Hemphill, Iain Marcks

BLOGS

Benjamin B • John Bailey, ASC • David Heuring

ART & DESIGN

CREATIVE DIRECTOR Marion Kramer

ADVERTISING

ADVERTISING SALES DIRECTOR Angie Gollmann

323-936-3769 Fax 323-952-2140 e-mail: angiegollmann@gmail.com

ADVERTISING SALES DIRECTOR Sanja Pearce

323-952-2114 Fax 323-952-2140 e-mail: sanja@ascmag.com

CLASSIFIEDS/ADVERTISING COORDINATOR Diella Peru

323-952-2124 Fax 323-952-2140 e-mail: diella@ascmag.com

SUBSCRIPTIONS, BOOKS & PRODUCTS

CIRCULATION DIRECTOR Saul Molina

SHIPPING MANAGER Miguel Madrigal

ASC CEO Terry McCarthy

ASC SPONSORSHIP & EVENTS DIRECTOR Patricia Armacost

CHIEF OPERATIONS OFFICER Alex Lopez

MEMBERSHIP ADMINISTRATOR Salvador Maldonado

DIRECTOR OF FINANCE & ACCOUNTING Thanh Lai

ACCOUNTING Kim Pallares

American Cinematographer (ISSN 0002-7928), established 1920 and in its 100th year of publication, is published monthly in Hollywood by

ASC Holding Corp., 1782 N. Orange Dr., Hollywood, CA 90028, U.S.A.,

(800) 448-0145, (323) 969-4333, Fax (323) 876-4973, direct line for subscription inquiries (323) 969-4344.

Subscriptions: U.S. \$50; Canada/Mexico \$70; all other foreign countries \$95 a year (remit international Money Order or other exchange payable in U.S. \$).

Advertising: Rate card upon request from Hollywood office. Copyright 2020 ASC Holding Corp. (All rights reserved.) Periodicals postage paid at Los Angeles, CA and at additional mailing offices. Printed in the USA.

POSTMASTER: Send address change to American Cinematographer, P.O. Box 2230, Hollywood, CA 90078.



Signature Prime

Modern Lens. Timeless Look.

Ranging from 12 mm to 280 mm, the ARRI Signature Prime lenses offer a unique look never seen before in cinema.

Warm, smooth skin; open shadows with crisp blacks; and bokeh like looking through a window in the rain.



ARRI SIGNATURE PRIME LENSES. TRULY CINEMATIC.

www.arri.com/signature

ARRI 

PACIFIC NORTHWEST LENS SUMMIT

KOERNER
cinema series

2020

SATURDAY, MAY 2ND 2020 | 10AM - 5PM
2828 SE 14TH AVE. PORTLAND, OR 97202
REGISTER NOW AT LENSSUMMIT.COM



American Society of Cinematographers

The ASC is not a labor union or a guild, but an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as directors of photography and have demonstrated outstanding ability. ASC membership has become one of the highest honors that can be bestowed upon a professional cinematographer – a mark of prestige and excellence.

OFFICERS - 2019/2020

Kees van Oostrum
President

Stephen Lighthill
Vice President

Bill Bennett
Vice President

Paul Cameron
Vice President

Levie Isaacks
Treasurer

David Darby
Secretary

Curtis Clark
Sergeant-at-Arms

MEMBERS OF THE BOARD

- John Bailey
- Bill Bennett
- Stephen H. Burum
- Paul Cameron
- Dean Cundey
- David Darby
- George Spiro Dibie
- Frederick Elmes
- Lowell Peterson
- Steven Poster
- Rodney Taylor
- John Toll
- Kees van Oostrum
- Amy Vincent
- Mandy Walker

ALTERNATES

- Charlie Lieberman
- Christopher Chomyn
- Steven Fierberg
- Levie Isaacks
- Suki Medencevic

MUSEUM CURATOR
Steve Gainer

Multiverse® Wireless DMX

Multiverse® Transmitter

- Up to Nine Universes From One Transmitter
- 900MHz or 2.4GHz Operation
- sACN or Art-Net Input
- Built-In DMXcat Bluetooth User Interface
- Rugged Cast Aluminum Enclosure

Multiverse® Node

- Single Universe Transceiver, Multi Universe Receiver
- 900MHz or 2.4GHz Operation
- Simple Onboard User Interface
- Rugged Cast Aluminum Enclosure

CITY THEATRICAL
NEW YORK • LONDON

citytheatrical.com/multiverse



Anamorphic/i¹ Full Frame Plus

NEW
85mm MACRO

T2.8 85mm MACRO

Standard and SF versions



Image circle covers a full 24x36 still size sensor, with a 1.8 squeeze. Designed with a 1.8 squeeze to give you the best results for full frame anamorphic. At 2x you lose too many pixels. At 1.6x (100% of the pixels) you lose too much of the anamorphic character. Our solution at 1.8x gives the image a greater anamorphic feel with an aspect ratio of 2.40:1 whilst capturing 90% of the pixels. Well within industry resolution standards. Still want 100% of the pixels? That's an option with an aspect ratio of 2.70:1.

32, 40, 50, 75, 85 MACRO, 100, 135 and 180mm focal lengths.



CookeOpticsLimited

British Optical Innovation and Quality Since 1894.

cookeoptics.com

T: +44 (0)116 264 0700

Cooke Americas

cookeamericas.com

T: +1-973-335-4460



www.cookeoptics.tv



www.shotoncooke.com



THIS MONTH'S CONTRIBUTORS

Samantha Dillard is AC's digital content creator ("Film Class," p. 76).

Mark Dillon is a freelance writer ("Rehired Gun," p. 28).

Dawn Fratini is a film historian who teaches at Chapman University ("Scale and Spectacle," p. 82).

Jay Holben is a filmmaker and an associate member of the ASC (Shot Craft, p. 14; "Quest for Magic," p. 44).

Noah Kadner is a workflow specialist whose clients include Panasonic and Apple Inc. ("Game On," p. 68).

Jamie Stuart is a multidisciplinary filmmaker and photographer ("Strange Machines," p. 58).

Peter Tonguette is a freelance writer (Short Takes, p. 24).

EDITOR'S NOTE



James Bond movies always deliver cinematic spectacle, and the productions themselves test the mettle of every filmmaker who signs on to continue the 007 saga. Reminiscing to *AC* about his experiences on the 2002 entry *Die Another Day*, BSC member David Tattersall once recalled, "It was just nuts. While we were on our stage, blowing up a Russian cargo plane with Pierce [Brosnan] and Halle [Berry], the model unit was on another, blitzkrieging a 150-foot miniature of the North Korean DMZ; meanwhile, [second-unit director] Vic [Armstrong] was off with five or six cameras, flipping the Aston Martin over or ramming hovercrafts into each other."

Linus Sandgren, ASC, FSF, helps director Cary Joji Fukunaga raise the bar yet again with Bond's 25th official big-screen adventure, *No Time to Die*. Sandgren tells *AC* contributor Mark Dillon ("Rehired Gun," page 28), "[Cary] wanted Bond 25 to be an epic cinematic journey, both adventurous and emotional, that would make audiences close their eyes in fear, laugh and cry. To me, that is exactly what a Bond movie should be."

Our dossier on Bond 25 includes detailed coverage of Sandgren's work with Fukunaga and the rest of the production team; a spotlight on the movie's lenses; recollections from previous Bond cinematographers; and a Q&A with EON Productions producers Michael G. Wilson and Barbara Broccoli.

The Amazon Studios sci-fi series *Tales From the Loop* reteamed ASC member Jeff Cronenweth with pilot director Mark Romanek on an adaptation of Swedish artist Simon Stålenhag's futuristic universe, to which showrunner Nathaniel Halpern added homages to the work of iconic filmmakers Ingmar Bergman, Andrei Tarkovsky and Krzysztof Kieslowski. Romanek tells Jamie Stuart ("Strange Machines," page 58), "My mantra was: I'm not making a TV pilot, I'm making a film that I would want to see on a big screen."

Big-screen cinema entered a heyday during the 1950s, as the U.S. film industry sought to lure viewers away from their television sets with new exhibition formats. Historian Dawn Fratini's look back at these developments ("Scale and Spectacle," page 82) offers a snapshot of the era.

Amid today's realm of advanced imaging, game-engine technology can allow cinematographers to previsualize their work in simulated filmmaking environments, or serve as the actual creative medium. In his piece on the topic ("Game On," page 68), Noah Kadner explores how advancements in real-time interactive tech have led to synergy with traditional cinematography.

Jay Holben's equally forward-thinking overview of the new Pixar CG-animation production *Onward* offers a Q&A detailing the collaboration between Sharon Calahan, ASC (the show's director of photography: lighting) and Adam Habib (director of photography: camera). "There's a lot of content to look at and a lot of iterations that have to happen," Calahan notes ("Quest for Magic," page 44). "So it's nice to have a partner; we can share and collaborate and divide and conquer."

This issue also presents instructors' perspectives on an ASC Master Class specifically centered on film-based production ("Film Class," page 76), as well as a special focus on optics (Shot Craft, page 14).

A handwritten signature in black ink, appearing to read "Stephen Pizzello".

Stephen Pizzello
Editor-in-Chief and Publisher

SUMOSPACE™ LIGHTING SYSTEM

EXPAND IN ANY DIRECTION

Internal power supply and complete passive cooling.

MODULAR

A modular mounting system transforms the new SUMOSPACE+ into an even more powerful and versatile lighting system. With the Super 3 and Super 7 mounts or attached directly to truss poles, it offers a truly effective solution for both large and restricted spaces.



SUMOSNAP™

This new screwless quick release connector comes as a default attachment with every new SUMOSPACE+ and enables safe rigging whilst saving time with its one-click installation system.

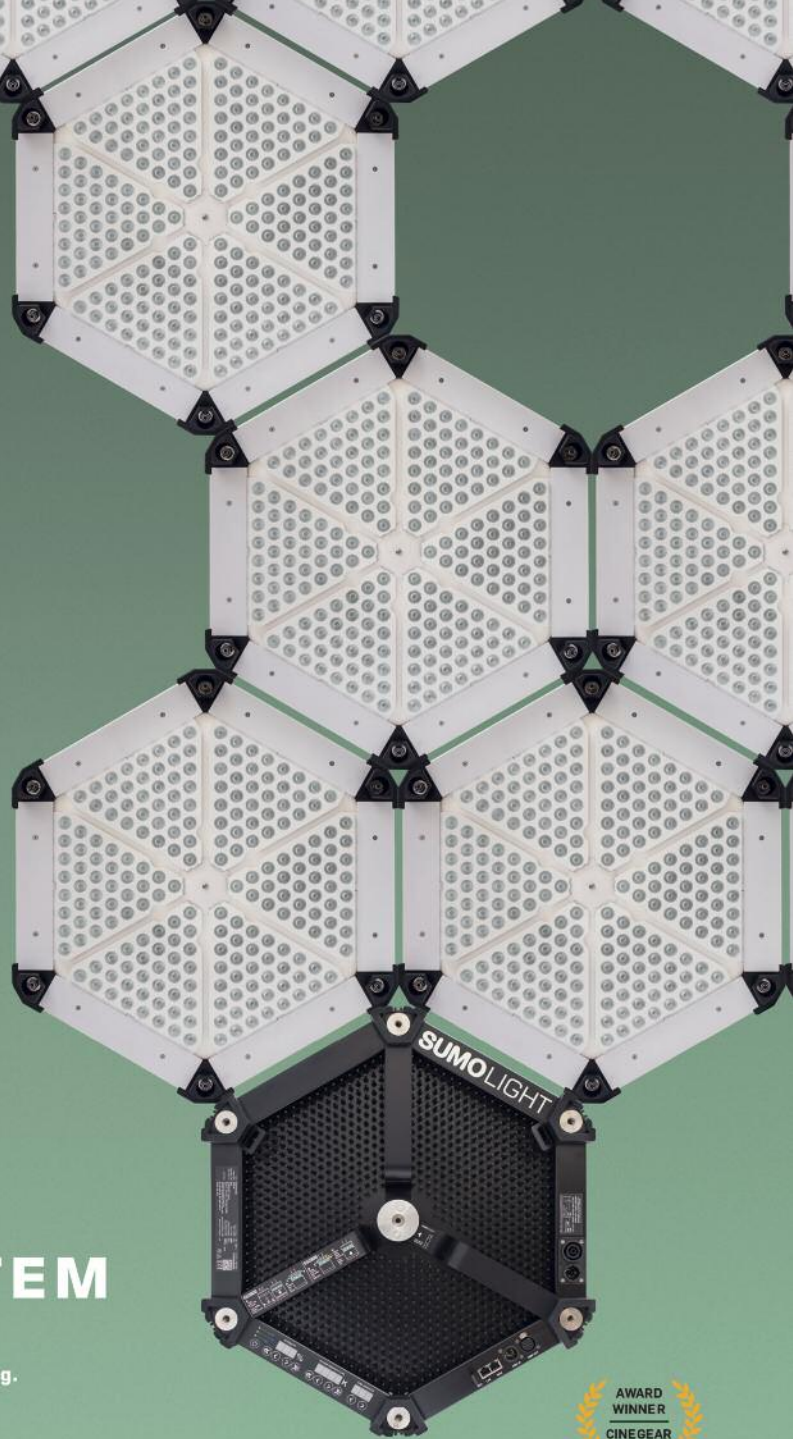


SOFT LIGHT TO LIGHT BEAM

Adaptable soft light with a range of light-shaping tools. The first light system with **interchangeable lenses**, giving the choice of 20/30/60 degrees of beam angles.



SUMOLIGHT. Reimagining the concept of studio lighting.



SUMOLIGHT



BRIGHTER LIGHTER BETTER
Made in Germany. sumolight.com

**AT THE RST VISIONS IN COLOR
BOOTH C11147, NAB SHOW**

April 18–22, 2020 | Las Vegas, NV, U.S.

VISIONS
in Color
SALES

PREMIER
LIGHTING & PRODUCTION
RENTALS

PRESIDENT'S DESK



The Art of Cinematography — Part One: The Tail That Wagged the Dog

Many years ago — actually, about 20,000 years — the artists of the Lascaux caves portrayed animals upon the walls with multiple heads, legs and tails, not to express mythical beasts, but to illustrate motion. Marc Azéma, a Paleolithic researcher and filmmaker at the University of

Toulouse in France, studied dozens of examples of such ancient images meant to imply motion, identifying two primary techniques that these artists used to accomplish this. The first is the juxtaposition of successive images, while the second is superimposition. In the latter, rather than appearing in sequence, variations on an image are piled on top of one another, lending a sense of movement. In that light, we could say that at that point, motion-picture images were born, establishing a distant precursor to the Art of Cinematography.

This idea was followed by a long tradition of suggesting movement throughout the history of visual art. The Romans illustrated Trajan's exploits as emperor (98-117 AD) upon stone in a film-like manner, with images spiraling around a towering triumphal column named after him. This was followed by the figure in da Vinci's famed 1490 drawing "Vitruvian Man," which depicts the subject with four arms and four legs. After this were the dramatic lighting and framing of the master painters such as Caravaggio, Rembrandt and Vermeer. Then came the provocative Impressionist approach to depicting color and motion by van Gogh and Monet. Then the first photographic experiments with chronophotographic studies of animals in motion, conducted by French scientist Étienne-Jules Marey — who, in the 1880s, set out to scientifically document the movement of a galloping horse, but in fact introduced the Art of creating a moving image through a photographic medium, the very foundation of what would become cinematography.

It was this simple foundation of technology that enabled such practitioners as Georges Méliès, Billy Bitzer, Gregg Toland, Gordon Willis, Vittorio Storaro and Roger Deakins — to mention just a few — to establish and refine motion-picture imagemaking to the degree that it would deserve the reference "The Art of Cinematography." That is, of course, if the world *would* unilaterally recognize cinematography as an art form, which, unfortunately, it still does not always do.

Past British Society of Cinematographers president and director of photography Barry Ackroyd, BSC published an interest-

ing article a few years ago in which he posed this very question: "But, Is It Art?" In the article, he memorializes his years of study inspired by Jean-Luc Godard. At that time he created his film-school thesis: "The Failure of Auteur Theory," in which Barry analyzes the inevitable belief of the French New Wave that put the director forward as the sole author of a movie. He describes it as a "nasty theory" that does not hold up in a world where box-office results seem to dictate the status of directors. But what I find fascinating is that *La Nouvelle Vague* also brought us some of the very best cinematographers, including Raoul Coutard, Sacha Vierny and Néstor Almendros, to name a few.

I find it interesting and remarkable that in the case of the New Wave, the art form of cinematography ultimately defied the proposed principle of "sole authorship." Barry also alludes to the collaborative nature of the filmmaking process:

"Cinematography is the first Art of filmmaking. Writing, directing, producing or acting are but radio plays until cinematography is added. No one can deny what a contribution cinematography has been to our vision of the world, and no right-minded producer or director would wish to separate the Art of cinematography from their vision. But, is it art? Cinematography has produced unforgettable images that have moved and inspired and stirred our emotions. It speaks in every language. The moving image captures your heart. It can bring you to tears, and take you to places unimaginable."

Voilà — here Barry proves it is "Art." Going back through my introduction of the history of the image in motion, all those examples were sooner or later recognized as Art. During his lifetime, Rembrandt was merely seen as a professional portrait painter — a hack, a gun for hire — and Van Gogh was largely ignored until well after his death. For that matter, we kind of know that great cinematography is seldom respected during production, when time is of the essence.

In 1912, at the dawn of cinematography, the Italian artist Giacomo Balla (1871-1958) introduced "Dynamism of a Dog on a Leash." The now-world-famous painting depicts a dachshund on a lead and the feet of a woman walking it, both in rapid motion, as indicated by the blurring and multiplication of their parts. It throws us back to the primitive drawings of the caves in Lascaux, but also it serves as an example that, in Art, the dog can wag the tail just as forcefully as the other way around. But more about that next month, in part two: "In the Doghouse."

A handwritten signature in black ink, appearing to read "Kees van Oostrum".

Kees van Oostrum
ASC President



**Large format.
Largest selection.**



www.panavision.com



SHOT CRAFT

By Jay Holben



◀ The entrance pupil of an 85mm Arri/Zeiss Ultra Prime T1.7 Planar, wide open at T1.7.

The Entrance Pupil of the Lens

Hold a lens up in your hand and look through it from the front. Can you see where the iris blades are? That's the entrance pupil. (Note: If you don't see iris blades, you may need to stop down the lens a bit. It also helps to hold the lens up to a solid white background.)

It's really that simple. End of lesson.

Wait ... what? This can't be a Shot Craft and be *that* simple.

But it kind of is!

After years of studying optical concepts, optical design and optomechanical design; testing lenses; *scrutinizing* lenses; and discussing acutance, contrast, resolution, bokeh and various aberrations, it took me a bit to wrap my head around this concept. Could it *really* be that simple?

Yup. The entrance pupil is the image of the lens' aperture stop as seen from the front of the lens — through the glass elements in front of the iris — and that is normally where the iris is located.

Why do we need to know this crazy-simple thing? I'll explain.

It Governs the Light

First, it's important to note the entrance pupil is the

image of the iris as seen through the front of the lens (assuming the iris is located at the aperture stop of the lens). What you're looking at is the iris *altered* visually by the lens elements in front of it. This can *optically* enlarge (or reduce) the *actual* physical size of the iris.

The *f*-stop of a lens is derived mathematically as the focal length of the lens divided by the diameter of the *entrance pupil* — not the actual size of the iris, but rather its magnified image as seen through the front of the lens. If we take a pair of calipers (a precision measurement tool) and hold it up to the front of a 50mm lens and measure a 25mm-diameter entrance pupil, that will be an *f*/2. This does not mean the actual physical iris/diaphragm inside the lens is 25mm in diameter; it *can* be significantly smaller (or in some cases larger) than that, but because the glass elements in front of the iris are magnifying it, the resulting entrance pupil is that size.

It is the entrance pupil that governs the amount of light passing through the lens. The size of the entrance pupil when the iris is wide open determines how fast a given lens can be. In fact, when designing lenses, an optical designer can place a large positive element at the front of the optical design that magnifies the entrance pupil and creates a faster lens. (Yes, you can also increase the speed of a lens by adding a magnifying glass in front of it — or a close-up attachment otherwise known as a diopter — but at the expense of increased image magnification and loss of angle of view, and the increase is really only enough to compensate for the increased effective focal length of the lens. To significantly change the speed requires a very powerful magnifying element, which brings with it many additional image aberrations, so it's not a practical way to get a faster lens. Leave this trick to the optical designers.)

The World Revolves Around the Entrance Pupil

The next thing to understand about the entrance pupil is that it's the center of *perspective* for the lens. The entrance pupil is sometimes incorrectly referred to as the *nodal* point. Optically speaking, every glass element within the lens has two nodal points, and the conjugate of all the elements forms four nodal points, but that is all academic. What people actually mean when they refer to the nodal point of a lens is its *no-parallax point*, or what could more simply be called the optical center of the lens: the entrance pupil.

If you position this no-parallax point at the center of rotation on a tripod head, you can pan without changing the parallax of the image. Knowing this position is incredibly important when you're shooting panoramics, or tiles to be stitched

Images courtesy of Jay Holben. Garutso article image courtesy of the AC archives.



TIFFEN DIOPTERS. SEE MORE.

NEW +1/8 AND +1/4



The Diopter Family Expanded.

The family of Tiffen Diopters expands with the new +1/8 and +1/4 full field diopters. Perfect for increasing close focus of anamorphic and vintage lenses and expanding the range of all professional optics to capture your vision.

Learn more at tiffen.com/diopters



FULL FIELD



SPLIT



LETTERBOX



STRIP



The Tiffen Company LLC.
90 Oser Avenue, Hauppauge, NY 11788

©2020 The Tiffen Company. All trademarks or registered trademarks are property of their respective owners.



◀ The exit pupil of the same 85mm Arri/Zeiss Ultra Prime T1.7 Planar, again wide open at T1.7. Note that it is significantly larger than the entrance pupil, due to magnification of the pupil through the optical elements of the design. ▶ The entrance pupil of a 50mm Lomo Super Speed T1.3, given the nickname “ninja star” for its aggressive pupil shape.

for backgrounds, or photogrammetry elements, or when you’re dealing with front- or rear-projection systems and you have to match the perspective of the projector to that of the camera.

The Pupil Marks the Focus Spot

The next thing to understand about the entrance pupil is that it is at that point — *not* at the film plane (or sensor plane) — from which focus should be measured. It’s a long-standing practice in cinematography to take focus measurements from the film or sensor plane of the camera, which is usually indicated on the side of the camera with a symbol consisting of a circle and a vertical line through its center, similar to the Greek letter Phi (ϕ).

In actuality, this is a cheat and not wholly accurate. The reason it was *probably* chosen is because this is one of the *fixed* dimensions for different cameras and lenses. However, at typical shooting distances of 6’ or more, a couple of inches between the image plane and the entrance pupil won’t make much of a difference and will be covered by depth of field. However, as our sensor/film-

plane sizes get larger and our focal-length lenses get longer (for a given field of view compared to smaller formats), our depth of field *drops*, and it becomes a bit more of an issue. It is *especially* an issue if you’re shooting extreme close-up, where the depth of field is extremely small and the difference of focal plane from the entrance pupil to the imager *can* make a significant difference! This is when you really need to know the entrance-pupil position and measure your focus from that point.

Why have we cheated this method for so many years in cinematography?

Why are we measuring to the film plane instead of the entrance pupil, which is more accurate?

We do this because the film/sensor plane is a known and fixed distance — it doesn’t change. There are even physical hooks on cameras at the film/sensor plane where you can latch on your tape measure! The entrance pupil, on the other hand, *does* change. Its position changes not only from lens to lens, but also with focus distance and zoom focal length, and if you have an extremely wide-angle lens such as a

fish-eye, the entrance-pupil position can change depending on what point in space the light is coming from! (It retreats further into the lens as the rays get more oblique.) So it’s literally a bit of a moving target.

To make matters worse, not all manufacturers readily provide entrance-pupil positions for their lenses, and the estimation procedure I detail here isn’t scientifically perfect, but it’s a good start. If you have a smart lens (see last month’s Shot Craft), it can provide metadata of the exact entrance-pupil position, or you can contact the lens manufacturer to get that information. But because it changes from lens to lens, and even within a lens as you alter other parameters, we have developed the habit of cheating. The faster your lens, the longer the focal length and the closer the object on which you’re focusing, the more the distance between the film/sensor plane and the entrance pupil will affect whether your subject is in focus.

It’s All About the Bokeh!

The shape of the entrance pupil is also what defines the shape of the out-



ARE YOU CARRYING A PREMISTA?

Premista

28-100MM AND 80-250MM LARGE FORMAT ZOOMS
— NOW DELIVERING —

Contact your favorite rental house or email thomas.fletcher@fujifilm.com
to arrange a test today!



FUJIFILM
FUJIFILMUSA.COM

PREMISTA SERIES
28-100 T2.9 | 80-250 T2.9-3.5

FUJINON
FUJINON.COM



A photograph of a monitor looking at the bokeh from a Lomo Super Speed during a lens test.

of-focus highlights (bokeh) in your image. (Actually, it defines the shape of *all* the out-of-focus points in the image, but we mostly notice it in the highlights.) It's popular to have a rounded, multi-bladed iris because that creates more organic ("pleasing" to some), circular, out-of-focus highlights. If your iris has sharp geometric shapes, then so, too, will your bokeh balls.

A front-anamorphic lens will have an elliptical/oval entrance pupil, as the cylindrical elements in front of the iris create a disproportionate magnification that "squishes" the entrance pupil into an oval shape. That's what gives front-anamorphic lenses that elliptical bokeh.

If you don't have an anamorphic lens but want this look, you can actually fake it by changing the shape of the entrance pupil (or the shape of the iris). You can do this with an oval cardboard cutout in front of the lens. (There are many DIY videos about this online.) You can also use a cutout in pretty much any other shape to turn those out-of-focus highlights into little stars, hearts, Christmas trees or even *Saturday Night Live* logos.

This look is so favored that Vantage offers a set of "hybrid" spherical lenses called MiniHawks, which have a special dual iris that forms an approximately elliptical shape and gives the image a pseudo-anamorphic bokeh. The MiniHawk lenses are *not* anamorphic at all, but they do provide a somewhat

anamorphic elliptical shape to the highlights.

A Peek Into the Optical Magic

What else can we learn from the entrance pupil?

Well, as you're looking at it from the front of the lens, try to figure out where its position is inside the lens. Hold your finger over the top of the lens barrel and estimate where that iris sits. Often, this won't necessarily align with the *actual* position of the iris inside the optomechanics, but don't worry about that. We want to know its *virtual* position.

Take note of where that spot is that you just estimated. Put a little piece of tape on the lens in that position. Now turn the lens around and look through the back. See the iris in there? Now we're looking at the *exit* pupil.

Yes, it's still really that simple: the exit pupil is the image of the iris as seen through the *back* of the lens.

You with me so far?

Put your finger on the lens barrel where the exit pupil *appears* to be inside the lens. Put a second little piece of tape there. Are they in the same place?

If yes, then you're looking at a symmetrical optical design. This is pretty common in "standard" focal-length primes that are often of a Double Gauss or modified Double Gauss design. Symmetrical means the optical elements inside the lens are pretty much exact

mirrors of each other, with the iris in the middle. This puts the entrance pupil and exit pupil in the center of the lens at the same position.

If the entrance pupil is significantly smaller than the exit pupil, it's most likely an inverse-telephoto (or retrofocus) optical design used on wide-angle lenses. This is because inverse-telephoto designs feature significantly powered negative (diverging) front elements and less-powered positive (converging) rear elements in the lens group in front of the iris, making the entrance pupil appear very small and the exit pupil look larger and closer to the back of the lens.

Inversely, if the entrance pupil is significantly larger than the exit pupil, the lens is most likely telephoto. This is because the design is the exact opposite of the retrofocus, with a significantly powered positive (converging) front element and a weaker negative (diverging) rear element in the lens group in front of the pupil magnifies the entrance pupil's perceived size.

If the exit pupil is deep into the lens, then the lens has telecentric properties, meaning the light rays exit the lens in a more parallel configuration that may make the lens more suitable for use with digital imagers.

If you look at the entrance pupil in a zoom lens, you can see its size and position change as you alter focal length. In some cases, you'll notice that the physical aperture inside the zoom will actually open up or close down as you zoom; this is a mechanical compensation for the optical change in entrance-pupil size to make sure that the relative amount of light you're shooting with (*f*-stop) remains consistent even if you're magnifying or de-magnifying the pupil. Without this compensation, you'll have a change in light passing through the lens, and that is called a "ramping" zoom.

So, while the definition of the entrance pupil seems simple, the practical implications are not.

With gratitude for his consultation, I'd like to thank optical consultant and ASC associate Iain Neil. Based in Switzerland, Neil holds more than 100

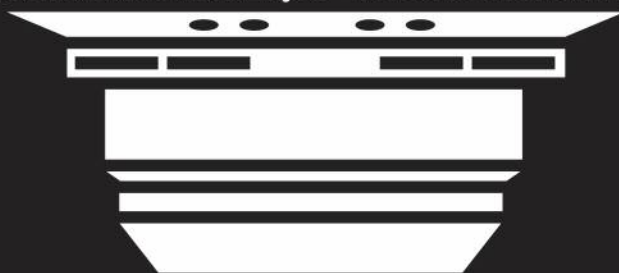
STRANGER THINGS  **WESTWORLD OFFICIAL SECRETS FARGO**
MENTADA DE PADRE
AMERICAN GODS RIVERDALE BALLERS
DOGS OF BERLIN

THE NEW POPE **THE BRAVEST** **DEEP STATE**
ANNA **THE GOOD FIGHT** **SILICON VALLEY**
GREENLEAF **PORTRAIT DE LA JEUNE FILLE EN FEU**

LEATHAL WEPON **EL CASA DE PAPEL**
BARRY **HELLBOY - CALL OF DARKNESS** **MR. ROBOT**
GUTTERBEE **CRIMINAL MINDS** **RAY DONOVAN**
GEMINI MAN **THE RESIDENT**
13 REASONS WHY

ONE SECOND **EMPIRE RUSSIAN DOLL**
IBIZA **MENTAL** **CLOAK & DAGGER** **MINDHUNTER**

IT CHAPTER TWO
SUCCESSION **GOOD OMENS**
TURMA DA MÔNICA: LAÇOS **NINGUÉM TÁ OLHANDO**



Crafted to shape
great stories.

worldwide optically related patents and has garnered 12 Academy Awards and two Emmys for optical design.

Historical

AC published four articles — one in 1949 and three in the 1950s — about Garutso Lenses, a unique lens series that provided extreme depth of field and were used on just a handful of films. I researched Garutso for *Cine Lens Manual*, my upcoming book co-authored with AC technical editor Christopher Probst, ASC, and thought it would be interesting to include something about them here. What follows is an excerpt from *Cine Lens Manual*, and then a November 1952 AC article by Hal Mohr, ASC. The magazine also covered the Garutso lens in September 1949 (as Garutzo), July 1950 and October 1952.

The Garutso Lens

Depth of field is a property of the focal distance, aperture size and focal length of the lens. While we know that actual perceived depth of field in an image is phenomenally subjective and dependent on many variables, it remains a property of physics, and no matter what lens manufacturers claim, it cannot be cheated or altered.

Except it can be, sort of ... Russian inventor and camera manufacturer Dr. Stephen E. Garutso (1895-1964) did just that in 1950, when he invented the “balanced lens” system, which increased depth of field for any lens, even at its widest aperture.

Garutso discovered that by inserting an additional annular element — a ring or “donut-shaped” lens with a hole in its center — into the lens, he could not only correct peripheral spherical aberration, but also greatly increase depth of field. The annular element is added inside an existing lens somewhere between the front and rear optics. Depending on the design of the existing lens, it may require multiple annular elements to accomplish the “balance,” or Garutso Principle. This balancing was also said to increase contrast, most likely by

A page from Hal Mohr, ASC’s article about his use of the Garutso lens that ran in the November 1952 issue of AC.

reducing spherical aberration.

A June 1950 article in *Popular Mechanics* claimed the Garutso process increased depth of field up to 500 percent, with sharp focus from roughly 24" to infinity. Additionally, there was no appreciable loss of light from the annular elements being added into the lens.

Garutso developed this process over 25 years and patented two aspects of it, the annular balancing element (U.S. patent 2550685) and the implementation of those elements into an existing lens (U.S. patent 2591535). An initial set of altered lenses, renamed

Garutso Lenses, consisted of 25mm, 30mm, 35mm, 40mm, 50mm, 75mm and 100mm focal lengths and was exclusively offered for rental by California dealer Dr. E. Goulden.

Cinematographer Hal Mohr, ASC, who had pioneered the use of the perspective-control lens in motion pictures, was an early adopter of Garutso Lenses, using them on *The Big Night* (1951, d. Joseph Losey), *The Four Poster* (1952, d. Irving Reis), *The Member of the Wedding* (1952, d. Fred Zinnemann) and *The Wild One* (1953, d. Laslo Benedek).

By 1953, however, Garutso

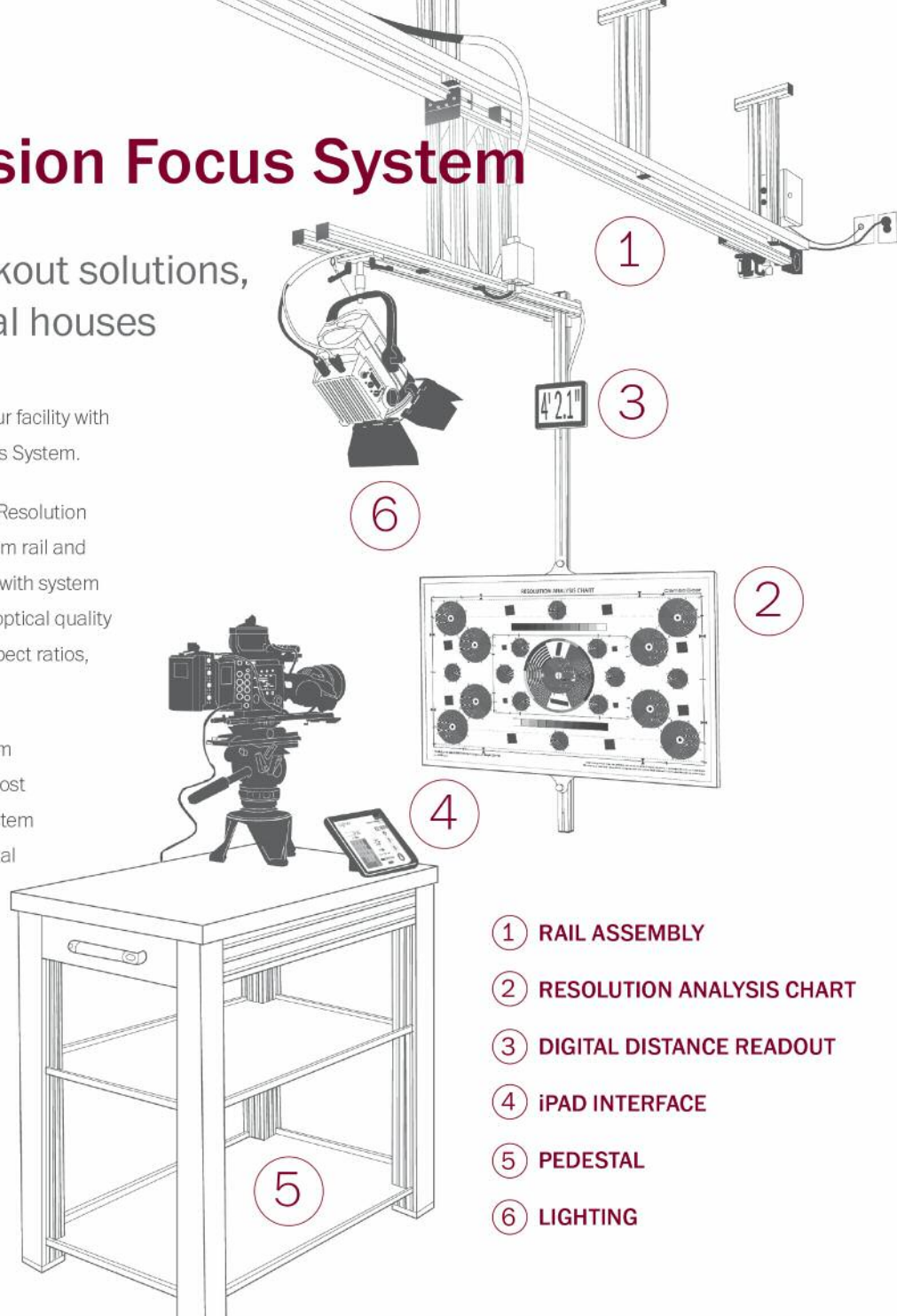
Cameo Precision Focus System

Custom camera checkout solutions,
purpose-built for rental houses

Transform the camera prep experience in your facility with the fully customizable Cameo Precision Focus System.

At the heart of the system is the 40" Cameo Resolution Analysis Chart, mounted on a sleek, aluminum rail and carriage assembly. The chart, in conjunction with system components, evaluates focus accuracy and optical quality of cameras and lenses at a wide range of aspect ratios, resolutions and focal lengths.

Designed by AbelCine engineers for maximum precision, speed and efficiency, there are a host of options for the Cameo Precision Focus System to fit your space and budget, including a digital distance readout for manually controlled units or a fully motorized system with touchscreen interface. Each component can be purchased individually or together in various configurations and installed to your exact specifications. Custom branding of the Resolution Chart is also available.



Learn more at www.cameogear.com
Contact us to schedule your consultation:
info@cameogear.com

CameoGear

AbelCine

Lenses had fallen out of popularity, most likely lost in the format wars of the 1950s (see page 82). But the lens-alteration process re-emerged in Germany under the name "Garutso-Plastorama" and was used by cinematographer Hans Schneeberger on *Eine Liebesgeschichte* (*A Love Story*, 1954, d. Rudolf Jugert), which won a silver German Film Award for Best Cinematography.

Other films that employed the Garutso Lens included:

- Deputy Marshal* (1949, d. William Berke, c. Carl Berger, ASC)
- Apache Chief* (1949, d. Frank McDonald, c. Benjamin H. Kline, ASC)
- Tough Assignment* (1949, d. William Beaudine, c. Benjamin H. Kline, ASC)
- Three Husbands* (1950, d. Irving Reis, c. Franz Planer, ASC)
- Cyrano de Bergerac* (1950, d. Michael Gordon, c. Franz Planer, ASC)
- The Scarf* (1951, d. Ewald André Dupont, c. Franz Planer, ASC)

Why I Used the Garutso Lens in Filming *The Four Poster*

By Hal Mohr, ASC
November 1952

Shooting sustained action in lengthy takes required a lens able to keep the major portion of the set in sharp focus at all times without need for excessive illumination.

The Four Poster is the second Stanley Kramer production to be photographed with the Garutso balanced lens. With the production staged in a single setting, as in the stage play from which the screenplay was adapted, and using a cast of essentially stage players, it was natural that the picture should be planned, staged and photographed to some extent in the manner of a stage play, utilizing continuous takes of sustained action.

This meant, of course, that the players would require the full scope of the set in which to move about during filming; that often one player would be well

toward the front of the set in extreme close-up while the other would be fully upstage. Shooting the action in lengthy, continuous takes without the benefit of cuts to close-ups, etc., meant that the camera lens used would have to keep the major portion of the set in sharp focus at all times, and that only a highly efficient depth of focus lens could accomplish this and still permit the use of nominal low key lighting. [Ed. Note: At the time, "depth of focus" was used to describe what we now call "depth of field." Today "depth of focus" technically refers to the area behind the lens, in the image space, where the film/sensor plane can sit to record an in-focus image.] To have followed the conventional method of employing the usual lenses stopped down to gain depth would mean building up the illumination level beyond the point where it could any longer be properly controlled, and would therefore not compliment the mood of the story. ...

Here was a picture in which the entire action takes place on a single set,

NEW! DOCKING STAND

Professional gear requires professional support! Dock cameras, monitors, and gimbals safely, ready to operate on Matthews' world-class stands.

BOTH SLIDER STAND AND MONITOR STAND II CAN BE COUPLED WITH THE VERSATILE DUTTI DOCK AND MOUNTED ON OUR HEAVY DUTY ROCK N' ROLLERS™ WHEEL SET, READY TO CONQUER ANY TERRAIN!

Rock n' Rollers
ALSO WORK WITH THE MATTHEWS MONITOR STAND!

MONITOR STAND II PN 249568

DUTTI DOCK PN 395415

DOCKING STAND PN 999045

SLIDER STAND PN 249561

"ROCK N' ROLLERS" OPTIONAL

ROCK N' ROLLERS™ MONITOR STAND II PN 366075

www.msegrip.com **matthews** studio equipment. **NAB BOOTH #C6040**

with only two players, both invariably together in every scene. To permit them the greatest freedom of movement, it was necessary to keep both players in focus at all times. ...

Most of the scenes were photographed with the Garutso balanced lens set at $f/2.8$, its maximum stop. In spite of this wide aperture, the desired depth of focus was achieved, and at the same time the full quality inherent in the lens at its widest aperture was retained. The depth of focus thus obtained is comparable to that made possible with other lenses working at approximately $f/4.5$ to $f/5.6$

... Steven E. Garutso, an optical researcher, [solved] the problem of deep focus along basically revolutionary lines. He succeeded by adding a secondary plane of focus at a predetermined distance from, and in relation to, the established focal plane of the basic lens itself. His method consists of adding to the basic lens an annular optical element that interferes with a portion of the actual lens area itself. This added element

Dr. Stephen E. Garutso invented the “balanced lens” system, which increased depth of field for any lens, even at its widest aperture.

is carefully prescribed and ground so that the center portion allows an uninterrupted transmission of the image to be photographed through a sufficient area of the original objective lens. Thus, there is projected on the film an image comparable to that normally produced by the original basic lens. In addition, the outer area of the added element creates, through the portion of the original lens obstructed by this area, a second image

of a predetermined added plane of focus. This second image is placed in perfect registration over the image projected by the uninterrupted portion of the lens, with the result that the [one] lens now has become virtually two, each projecting its own image, of a different plane of focus, directly over the other, and in perfect relation thereto. The final result is a picture that contains within itself two completely detached planes of focus. ...

Irrespective of some opinions to the contrary, it has been my finding that, aside from the technical advantages afforded by the Garutso lens, which are undeniable, the results to the objective viewer do appear to have an added aesthetic quality. This is due, of course, to the general increased usable sharpness of all essential planes, thereby eliminating to a great extent the distortion that is usually present in all out-of-focus areas which, through the use of this device, have been substantially reduced. ♦

Chroma-Q® Brute Force™ A powerful alternative

The Chroma-Q® Brute Force 6™ is a powerful new, LED alternative to traditional light sources.

Capable of delivering up to 140,000 lumens, drawing just 15 amps @ 240V, the Brute Force 6 is a highly versatile, controllable fixture that could change your approach to lighting.

See us at NAB April 19-22 or learn more at www.chroma-q.com/bf

North American dealer:
A.C. Lighting Inc.
416-255-9494, northamerica@aclighting.com
www.aclighting.com



Brute Force 6™



Chroma-Q
BRILLIANT SOLUTIONS

chroma-q.com

SHORT TAKES



A chance encounter with brothers Malek and Chaker Mechergui during a trip to Tunisia inspired director Meryam Joobeur and cinematographer Vincent Gonville to return and cast the two, along with their younger brother Rayene, in the Oscar-nominated short *Brotherhood*.

Returning Home

By Peter Tonguette

Some cinematographers and directors work together because they share a way of looking at the world. Others form partnerships because they have similar tastes in lighting or composition. The unique collaboration between cinematographer Vincent Gonville and Meryam Joobeur, however, is rooted first and foremost in trust.

“Vincent is my closest creative collaborator,” says Joobeur, a U.S.-born, Canada-based director who attended Concordia University in Montreal, Quebec, with Gonville. “We’ve known each other since film school, and I haven’t done a film without him.”

“Meryam is so passionate, and her pitches are so good, that you almost feel stupid not to get involved,” says Gonville. The Quebec native has teamed with Joobeur on four short films to date: the recent Oscar nominee *Brotherhood*, nominated for Best Live-Action Short, as well as the documentary short *Gods, Weeds and Revolutions* (2012) and the

fictional short *Born in the Maelstrom* (2017).

In 2016, the filmmakers had an experience that would solidify their confidence in each other — and each other’s instincts — once and for all. They were in the midst of a road trip in Tunisia, where Joobeur’s family has its roots, when they encountered two young redheaded brothers escorting a herd of sheep alongside a road. Intrigued by their faces, the filmmakers asked the brothers if they could take their photographs. The abrupt answer was, “No.”

A year and a half later, having developed a screenplay inspired by her memory of that encounter, Joobeur recruited Gonville to return to Tunisia to find the boys. That trip resulted in the production that evolved into *Brotherhood*, which follows a Tunisian patriarch, Mohamed (Mohamed Hassine Grayaa), whose existence is upended when one of his three sons, Malek (Malek Mechergui), makes his way home after a period of fighting in Syria — a period during which he also got married to a Syrian woman. Mechergui and his brother Chaker were the shepherds the filmmakers first encountered on the road. Another brother, Rayene, also appears in the film.

Brotherhood images courtesy of the filmmakers.



◀ Joobeur and Gonneville observe a scene.
 ▲ Gonneville takes a break during the shoot.

Gonneville and Joobeur met in a documentary-film class at Concordia. When Joobeur pitched a project that revolved around her Alzheimer’s-stricken grandfather’s experience of the Tunisian Revolution of 2011 (the short ultimately released as *Gods, Weeds and Revolutions*), Gonneville volunteered to participate. “At the beginning, I was supposed to be the sound operator,” he says. “But the cinematographer dropped the project a couple of weeks before the trip to Tunisia, so I became the cinematographer.”

During that first collaboration, shot with a Canon EOS 5D DSLR, Gonneville and Joobeur were “discovering filmmaking,” he says. “I didn’t even know what an ND filter was. It was really like a beginning, and we developed this brother-and-sister relationship. Creatively, it’s been very easy since then to collaborate — very natural.”

However, “natural” and “easy” were not words that sprang to mind when they embarked on the project that became *Brotherhood*. Returning to Tunisia to locate the men who inspired the script was akin to searching for a needle in a haystack. “We didn’t really remember which road we had taken a year earlier,” Gonneville says. “There

were so many possibilities.”

Joobeur recalls that they selected “an approximate location” and proceeded to describe the men to strangers they met along the way. “We spent a full day doing that with no leads, with a lot of comic moments,” she says. Some passersby were either suspicious or intentionally pointed them in the wrong direction. “Finally, as we were giving up, we kind of took a back road, and Vincent recognized a pile of rocks that was next to the boys when we first met them.” A nearby shepherd pointed the way to the right house.

The prescience of Joobeur and Gonneville’s initial instincts surprised even them when, six months later, in March 2018, they returned to Tunisia to make the movie and discovered that the first-time actors could deliver the goods. “The boys ended up being really good actors, and everything unfolded in such a natural and cool way,” Gonneville says. “We kind of felt there was something special from the beginning.”

Gonneville used an Arri Alexa Mini, recording 3.2K ProRes 4:4:4:4. “That format was well suited for our workflow and the reality of our small production,” he says. “I shot 3.2K because although there is only a 3mm

difference in the width of the image-area size compared to the 2K image-area size, I really feel that difference. A 50mm lens suddenly becomes larger and more pleasing, less ‘TV.’”

The filmmakers decided to emphasize people as much as places in compositions. Gonneville was influenced by Canadian photographer Larry Towell, who “lives on a farm and has been taking pictures of his family there for many years,” he says. “There’s something so intimate about it, so beautiful, and we really wanted to get that with the family [in *Brotherhood*]. The script itself has a really intimate view on the struggle of the fighters coming back to their families.” Joobeur adds, “We wanted to make the film a portrait of the people and the landscape.”

To reinforce the intimacy, Gonneville proposed framing in the 1.33:1 aspect ratio. “It gives a lot of importance to faces, and because this movie is like a portrait, [that frame] was just perfect,” says the cinematographer. “Personally, I like to compose a frame that’s more square than rectangle; I find it more pleasing.”

Although Joobeur had not previously worked in 1.33, she was won over by the test shots Gonneville made on



Gonneville utilized the small windows inside the house as a source of natural light for interior scenes.

kind, but during the final color grade at Outpost Montreal, he and colorist Martin Gaumond added a film-like texture to the image, working on Blackmagic Design DaVinci Resolve. “We tried many different mixes of LUTs and looks and ended up building a special recipe,” Gonneville says. “Martin and I have since been contacted many times by people who want to know whether we shot film or

proved fortuitous when it came to staging scenes featuring the brothers, who were unfamiliar with the concept of blocking. “On the first day, we realized blocking was not going to be a real option,” Gonneville says. “A lot of the mise en scène was [giving] them a space where they would improvise, and then I would improvise with the camera and dance around them.”

The main location was a house belonging to the brothers’ great-uncle. “We wanted a house that was a bit more isolated [than their own home],” Joobeur says. “It was kind of a forgotten place, surrounded by nature.” The house turned out to be a dream in terms of lighting setups, offering a big door facing south and two tiny windows, one facing north and the other west. “I could get a different lighting setup in a matter of seconds just by closing one window and opening another,” Gonneville says. “Natural light was sufficient most of the time.” For some interiors, he augmented with an Arri M18 to maintain a consis-

location. “I really felt like it could lend well to that idea of portraiture,” she says.

Gonneville used a single 50mm Sigma Cine High Speed Prime lens throughout the shoot. “Instead of putting the 105mm on the camera and getting farther away for a close-up, you just keep the 50mm and go closer,” he says. He avoided using filtration of any

digital!”

After toying with the idea of complex setups, the filmmakers decided to enhance the raw, documentary-style vibe by shooting entirely handheld. “We had no money and a very, very small team — I was my own gaffer,” Gonneville says. “There was no dolly. It was purely handheld.”

The fly-on-the-wall aesthetic

Q5

COLOR

BY Fiilex

FIILEX @ NAB 2020
BOOTH C7944



175W LED FRESNEL
15-50° SPOT/FLOOD

IP24 WEATHERPROOF
HIGH CRI CCT + EFFECTS MODES

www.fiilex.com

tent level of light.

Though the main characters were portrayed by nonprofessionals, the professionals in the cast — including Salha Nasraoui, who plays the young men’s mother — validated Gonneville’s sensitive methods. Joobeur recalls, “Salha told me she loved working with Vincent because it was the first time she felt that a cinematographer was actually seeing her, seeing the performance. Every time [we] cut, the first person she would make eye contact with was Vincent. She could see in his eyes her performance.”

For his part, Gonneville counts *Brotherhood* as one of his most cherished projects. “It’s the most amazing filmmaking experience I’ve had so far. It’s just so incredible that Meryam had this instinct three years ago, and now here we are!”

Joobeur maintains that she couldn’t have taken that leap of faith without her go-to cinematographer. “Vincent is one of my favorite people in the world. I feel his humanity is what



To reinforce the intimacy of the story, Gonneville focused his framing on faces and used a single 50mm Sigma Cine High Speed Prime lens to get in close to the subjects.

makes my films much stronger and more human.”

She and Gonneville are currently preparing *Motherhood*, a feature-length adaptation of *Brotherhood*. “When we were shooting the short, Meryam felt there was a lot of room to expand the story, and she wanted the opportunity to explore more themes and the wider

societal experience with ISIS foreign fighters,” says Gonneville. “We plan to start production later this year.”

Meanwhile, he is happily fielding calls from prospective collaborators. “Since *Brotherhood* I’ve had a big boom in my career,” Gonneville says. “I’ve been contacted by a lot of producers and filmmakers from all around the world.” ♦

IT'S A GAME CHANGER!

Introducing

CINEO
REFLEX R15

TRP WORLDWIDE exclusive SNAP accessory kit

CINEO LIGHTING AND TRP WORLDWIDE ARE CHANGING THE GAME.

The R15 light reflector can easily be removed and replaced with a variety

of TRP WORLDWIDE SNAP accessories, including

the SNAPBAG® OCTA 3', 5', 7', SNAPGRID®, LANTERN and

SPACELIGHT BAGS for a structured soft lighting solution.



TRPWORLDWIDE.COM

CINEO
LIGHTING™
A NBCUNIVERSAL COMPANY

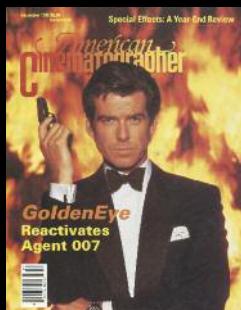
Spring 2020

www.TRPWORLDWIDE.com

www.cineolighting.com/reflex



TRP OCTA 7'



A Bond With the Audience

By Stephen Pizzello



After 58 years and 25 official motion pictures, James Bond movies remain a reliable box-office draw. The British superspy's globe-trotting adventures promise an escape from the mundane drudgeries of daily life — a tour of exotic locations spiced with life-threatening thrills, tricked-out cars, fabulous settings populated by beautiful people, and a hero whose arrogant charisma, mordant wit and snobbish connoisseurship might stir deep-seated feelings of envious inadequacy in the male demographic.

The modern era's more enlightened Bond, as portrayed by Daniel Craig, has curbed some of the character's more chauvinistic tendencies. Prior to his fourth outing as 007 in *Spectre* (2015), Craig told *The Guardian*, "Hopefully my Bond is not as sexist and misogynistic as [earlier incarnations]. The world has changed. I am certainly not that person. But he is, and so what does that mean? It means you cast great actresses and make the parts as good as you can for the women in the movies."

Beyond this evolution, Bond has retained the lethal efficiency, raffish charm and libidinous inclinations originally envisioned by author Ian Fleming. The outlandish plots of Bond's big-screen adventures virtually ensure that filmmakers working on the franchise will face daunting logistics spurred by an ethos of ever-escalating spectacle. The first 007 film, *Dr. No* (1962), is more modestly scaled and grounded in reality than most of the entries that followed; by the 1969 arrival of the action-packed *On Her Majesty's Secret Service* (the sixth Bond film, and the first covered in *AC*), cinematographer Michael Reed, BSC had to contend with scenes in which Bond eludes gun-toting assassins chasing him on skis, survives an avalanche, hangs suspended from gondola cables, and grapples with iconic villain Ernst Stavro Blofeld in a hurtling bobsled.

Other productions have left us with equally indeli-

ble movie memories: brutal hand-to-hand combat in the close quarters of a train compartment; a megalomaniac gold fetishist's attempt to rob Fort Knox; Bond accelerating a car through a complete midair flip while traversing a broken wooden bridge; attacks by assassins whose weapons include a razor-brimmed bowler hat, a solid-gold gun, steel teeth, and a dagger protruding from a shoe; supervillain lairs constructed atop mountains and under the sea; cars that can turn invisible or transform into a submarine; and a series of ingenious gadgets that include a weaponized briefcase, X-ray glasses, a ski-pole rifle, a laser-equipped wristwatch and a crocodile-shaped mini-submersible.

Over the years, the promise of jaw-dropping visuals has lured a succession of other top cinematographers into service, including Ted Moore, BSC; Freddie Young, BSC; Oswald Morris, BSC; Alan Hume, BSC; Alec Mills, BSC; Phil Méheux, BSC; Adrian Biddle, BSC; David Tattersall, BSC; French cinematographers Claude Renoir and Jean Tournier; Roberto Schaefer, ASC, AIC; Roger Deakins, ASC, BSC; and Hoyte van Hoytema, ASC, FSF, NSC.

For *No Time to Die*, Linus Sandgren, ASC, FSF reported for duty alongside American director Cary Joji Fukunaga, the first non-British director to helm an official Bond movie. (American Irvin Kershner helmed 1983's *Never Say Never Again*, which was made outside the canon of 007 films supervised by EON Productions.)

Our article on the latest Bond production, which also features recollections of 007 cinematographers from years (and decades) past, continues a nearly unbroken streak of *AC* coverage dating back to *The Living Daylights* in 1987, along with a number of previous productions. Sit back and enjoy it with an expertly crafted martini — shaken, not stirred.

Rehired Gun



Retired British intelligence agent James Bond (Daniel Craig) is recruited to help rescue a kidnapped scientist in the 25th Bond feature, *No Time to Die*.

Linus Sandgren, ASC, FSF shoots 007

By Mark Dillon

Just when he thought he was out, they pulled him back in.

As *No Time to Die* opens, James Bond, Agent 007 (Daniel Craig), is soaking up the sun. Following events depicted in *Spectre* (shot by Hoyte van Hoytema, ASC, FSF, NSC; AC Nov. '15), the superspy has retired from British intelligence and settled in Jamaica for some much-needed recuperation. It seems like an idyllic epilogue to a career marked by violence and tragedy, but another chapter begins when a CIA pal, Felix Leiter (Jeffrey Wright), pays a visit and recruits him to rescue a kidnapped scientist. Unexpected perils mount as the mission leads Bond to a mysterious villain (Rami

Malek) armed with dangerous new technology.

This 25th Bond extravaganza — which debuts in U.S. theaters on April 10 — was directed by Cary Joji Fukunaga, the series' first American helmer, and shot by Oscar-winning cinematographer Linus Sandgren, ASC, FSF. Fukunaga reached out to Sandgren shortly after boarding the project. "I'd seen a few of Linus' films, but it was his visceral work on *First Man* [AC Nov. '18] that made me think he'd be perfect for Bond," Fukunaga says. "I liked how he pulled off a mixture of highly technical cinematography and simple but elegant lighting approaches to night exteriors and interiors."

"In that first discussion with Cary, I realized we have a similar attitude toward filmmaking," says Sandgren, speaking to *AC* from *EFilm* in Hollywood, where he is grading *No Time to Die* with supervising digital colorist Matt Wallach. "Watching

Cary's work, from [features] *Sin Nombre*, *Beasts of No Nation* and *Jane Eyre* [AC April '11] to [TV series] *True Detective* and *Maniac*, you see a confident filmmaker who isn't afraid of anything. He takes projects as far as he possibly can, and I love that. He wanted Bond 25 to be an epic cinematic journey, both adventurous and emotional, that would make audiences close their eyes in fear, laugh and cry. To me, that is exactly what a Bond movie should be. And based on Cary's previous projects, I felt he was going to go all the way and [take the franchise] in an exciting direction."

Sandgren was invited to London, where he met with Fukunaga and producers Michael G. Wilson and Barbara Broccoli, who welcomed him onto the project. "I was very excited for the opportunity," says the cinematographer. "Bond was definitely a different challenge from my other projects. The Bond films inspired me as a teen to make shorts



Director Cary Joji Fukunaga (left) and cinematographer Linus Sandgren, ASC, FSF discuss a scene.

on Super-8 film and eventually become a cinematographer.”

While recent Bond movies could be characterized as somber and gritty, Sandgren notes that he appreciated Fukunaga’s desire to steer *No Time to Die* toward raw, intimate

storytelling, while being “faithful to the heart of the Bond genre.” The team would ultimately incorporate the kind of grand, global escapade — or “classic romantic adventure,” the cinematographer says — as seen in the franchise’s earlier chapters, while

telling a human tale. “We love the old Bond movies, and we all worked in that vein, but this was also going to be, as Cary emphasized, an emotional story, which gave us a wide range of human feeling to work with. We have a lot of very physical, realistic action, but it’s not cynical — it’s exciting. The story is also full of humor. To me, the cinematography of a film is like the music in a film; it’s there to express a feeling, and ideally you should be able to understand the emotions from just the images. And the more emotional layers a film has, the more expressive you can be.”

Still photographs and mood boards were a chief way that Fukunaga, Sandgren, gaffer David Sinfield and production designer Mark Tildesley shared ideas. “We worked to create great variety in the lighting and the colors of scenes to create a palette that was as rich as

7 Questions for the 007 Producers

EON Productions’ Michael G. Wilson and Barbara Broccoli together steer the James Bond franchise. The stepson and daughter of producer Albert “Cubby” Broccoli — who, with partner Harry Saltzman, launched the series in 1962 with *Dr. No* — took time out from a busy postproduction schedule on *No Time to Die* to answer seven questions from *AC*.

American Cinematographer: What criteria do you apply when hiring a director of photography for a Bond film?

Michael G. Wilson and Barbara Broccoli: We always collaborate with the director when hiring department heads. In the case of Linus Sandgren [ASC, FSF], we were all very impressed with his work on *La La Land* and *First Man*. He has a strong visual style that Cary Fukunaga liked, and he is also very adept at visual effects and at shooting both epic and intimate scenes.

As this is Bond 25, did you want to visually reference some of the previous films?

Cary and Linus discussed this with us, and we thought it was a great idea to stay true to the classic Bond style and reference previous films while also integrating a contemporary edge in the look.

In terms of film vs. digital, do you allow Bond filmmakers to pursue the format of their choice?

We considered the pros and cons of digital and film with Cary and Linus, who both felt very strongly that they wanted to use film in order to capture the realistic qualities they were after.

Given the variety of locations, they felt film would provide depth and realism and [convey the] lush nature of the settings.

How involved are you in developing the major action sequences for which Bond films are known?

The action sequences are designed by the director, the 2nd unit, and the stunt and special-effects teams, who develop them during preproduction. They are story-led, and the style of the film is integrated into the look of the sequences.

Why was it important to shoot some sequences in Imax this time around?

Given the dramatic landscapes in the film, we felt it could benefit from some of the action being shot in Imax. We are very excited that audiences will get to see sequences shot in this format.

Will we see spinoff films from the Bond franchise? Nomi [Lashana Lynch] seems like a strong candidate for one.

Currently, our entire focus is on making the Bond film, and we have not planned to do any spinoff films.

Looking back on Bond’s rich history, what are some of your favorite shots and sequences?

The incredible mountain jump in the opening of *The Spy Who Loved Me*, the dam jump in the opening of *GoldenEye*, the black-and-white opening sequence of *Casino Royale* that introduces Daniel Craig as James Bond, and the Matera car chase in *No Time to Die* are just a few of our favorites.

— Mark Dillon

possible,” says Sandgren. “I also always try to find metaphorical inspiration for the lighting from the various themes in the story or from the characters themselves.”

But Fukunaga also sought consistency. “The bigger questions were around how to give each of the film’s expansive locations a unique look while making it feel like the same film,” Fukunaga says. “It was about finding that balance.” The filmmakers certainly wanted to emphasize the contrast between the warmth of Jamaica and Italy, and the cold, nearly monochromatic feel of Norway and of such institutional interiors as the chamber where former SPECTRE head Ernst Stavro Blofeld (Christoph Waltz) speaks with Bond.

The production was captured on a combination of 35mm and 65mm film negative. The filmmakers wanted smooth transitions between the two gauges, so entire sequences were designed for one format or the other, with no intercutting. The extended pre-credit sequence (shot in Norway), in which Safin hunts down victims on a frozen lake, will play in Imax in theaters that are so equipped, and then the first scene following the credits is anamorphic widescreen. Other Imax sequences include a car chase in ancient Matera, Italy, and an action scene in Cuba involving Bond and Nomi (Lashana Lynch) — a fellow double-0 agent with elite skills, who’s promised to give the super spy a run for his money.

“Framing for 1.43 while protecting for 2:40 is not as challenging as you might think,” Sandgren notes. “It can be a lot of work to make sure the sets are covered in all formats, but regarding the composition, the 2:40:1 aspect ratio in the center of the image will still be where your eyes are looking when the movie is projected in Imax. The additional top and bottom of the Imax frame is really the periphery; it’s used for atmosphere and to [further] immerse the audience in the movie. →



▲ Safin (Rami Malek) makes his way across a frozen lake.
◀ Sandgren lines up an Imax camera while filming on location in Norway. ▼ The cinematographer and crew ready an Imax camera while shooting in Italy.



“Achieving the charm of a Bond movie is so much easier [when shooting on] film [because you can] work impressionistically with the image, and colors are richer,” says Sandgren. “Cary and I were determined that that was the right way to go, and I think everyone agrees it was the right decision. The producers were very supportive in wanting to accommodate our creative wishes.”

Fukunaga adds, “We didn’t test any digital cameras — I wasn’t interested in it for this movie.”

Michael Reed, BSC (*On Her Majesty's Secret Service*, 1969)

For the ice-rink sequence in which Bond [George Lazenby] reunites with Tracy [Diana Rigg], the temperature had changed and the rink that had been set up in the hotel carpark was beginning to thaw. The scene [which had been planned for the following day] was [therefore] shot that night, which was just as well because by morning, the ice rink was no more than a flooded carpark!

We used front-projection for the close-ups of the fight between Bond and Ernst Stavro Blofeld [Telly Savalas] on the bobsleigh — and we used a white painted drum that, when rotated at speed, gave the impression of Blofeld's head being smashed against the ice wall of the bobsleigh run. For the close-ups of Diana and George [which also called for front-projection] in the stock-car sequence, I had the construction crew make up a circular rotating rig, [fitted with] a series of lights [placed] at different distances, which we hung just above the windscreen of their car. When rotated, they would be reflected in the windscreen of Tracy's car, matching the overhanging lamps on the racetrack perfectly.

OHMMMS was one of the best pictures I worked on and one of the most challenging!

Alec Mills, BSC (*The Living Daylights*, 1987, and *Licence to Kill*, 1989)

I had operated on *On Her Majesty's Secret Service*, *The Spy Who Loved Me*, *Moonraker*, *For Your Eyes Only* and *Octopussy* for cinematographers Michael Reed [BSC]; Claude Renoir; Jean Tournier; and Alan Hume [BSC], so I knew I would have big shoes to fill when my chance to light a Bond film finally came.

On *The Living Daylights*, we used the new Panavision E Series Anamorphic Primes, which worked well for the film's overall feel. I liked to keep it nice and clean, without the need for major diffusion, and I always felt pretty safe with Kodak's 5247 and 5294 stocks. This was important because although we had

good technical support from Samuelson Film Service in Vienna and at Pinewood, we did not have this luxury in Ouarzazate, Morocco.

On *Licence to Kill*, a tricky set was Acapulco's Villa Arabesque, used as the home of villain Franz Sanchez [Robert Davi]. It was completely white, and while the human eye could just about stand it in the bright Mexico sun, the backgrounds seemed to almost explode on film if I wasn't careful to balance the light properly.

Deluxe Laboratories in Los Angeles were marvelous. They used a one-light printing system — different from graded rushes in the U.K. — which didn't take long to get used to, and my ego soared when I saw how consistent my printer lights were. I was pleased with the final look, knowing how hard we had worked to achieve it.

Phil Méheux, BSC (*GoldenEye*, 1995, and *Casino Royale*, 2006)

Martin Campbell and I had just finished shooting *No Escape* when he was approached to direct *GoldenEye*. He rang me shortly after his meeting and asked what I thought. I had enjoyed the Bond films since their inception but was concerned about their recent photographic style, thinking it wasn't our style. But Martin assured me that EON was prepared for us to 'do our own thing.' However, we both felt there was a legacy in the character and the films that we should at least pay homage to — [which included] the glossy, world-cinema look that was established by Ted Moore, BSC with *Dr. No*. We wanted to preserve that along with the [widescreen] aspect ratio that came along with *Thunderball* and has been used ever since.

With *Casino Royale* came a chance to go back in time, as it was based on the first novel by Ian Fleming. We decided on a black-and-white, quasi-period look for the opening scene. I shot that on black-and-white film stock using *The Ipcress File* as a crib sheet for the [style of the] office scene, and then took a more modern approach — two handheld cameras — for the fight in the toilet.

David Tattersall, BSC (*Die Another Day*, 2002)

Die Another Day was a special anniversary edition, the 20th Bond movie in the franchise's 40th year. The aim was to create a thoroughly entertaining movie packed with original and memorable action sequences — bigger, faster, more exotic, more gadgets, more expensive destruction and more fun all around. This was slap-in-your-face moviemaking with saucy one-liners and enough C-4 [plastic explosive] to level a small city. Large sets were designed to be destroyed with high-caliber automatic weapons or vaporized in huge, slow-motion, cinematic fireballs!

We had a hovercraft chase through a Korean minefield; a dawn surf raid on the world's largest, most dangerous wave; a supercar chase on a frozen Icelandic fjord; a couple of epic sword-fights — one with Bond and his arch-enemy using medieval claymores and samurai katanas, and another between Halle Berry and Rosamund Pike in the hold of a blazing Russian Antonov cargo plane; and an almost throwaway title sequence in which Pierce Brosnan is tortured with scorpions under Madonna's catchy theme song.

Shooting a Bond movie is a cinematographer's dream. The scale and variety of sets and locations [on other projects] are rarely as interesting or challenging. And you only occasionally get the chance to experiment with such an exotic array of camera and lighting equipment — we had an insane number of kilowatts burning on the 007 Stage to light up the Ice Palace set.

It was thrilling to be part of one of cinema's longest-lasting and all-time-favorite franchises.

Roberto Schaefer, ASC, AIC (*Quantum of Solace*, 2008)

Director Marc Forster, production designer Dennis Gassner and I had a very unified idea: We wanted the movie to have a retro *Goldfinger* feel, reflecting [production designer] Ken Adam's types of sets and the qualities of that mid-century look. That's why we replicated

The image shows a perspective view down a circular tunnel. The ceiling is a complex grid of yellowish-gold panels, with several bright, vertical light strips illuminating the center. The walls are dark and feature large, oval-shaped cutouts. At the bottom of the frame, a circular metallic fixture with a hexagonal pattern is visible.

**CINEO
REFLEX r15**

Introducing Cineo ReFlex R15: a whole new category of hybrid media production lighting.

Dedication to creating lighting products that fulfill the expectations of motion picture and television professionals has been Cineo's passion since our first high-power LED soft-light studio fixtures. And now with ReFlex we've applied patented, groundbreaking technologies to create a high-output, focusable-beam, fully dimmable hard light which exceeds the capabilities of traditional lighting tools. ReFlex also re-defines versatility by delivering both high-output hard lighting combined with soft lighting capabilities.

ReFlex R15 delivers 125,000 lumens of flicker-free and color stable digital lighting with less than a 1,500 watt AC power draw. By providing constantly variable CCT, it can replace a 10K tungsten, a 6K HMI and everything in-between. Beam angle adjustment from 15 to 75 degrees is accomplished without mechanical movement, making it remotely adjustable; and the Advanced Beam Control opens a whole new realm of possibilities. The reflector can easily be removed and replaced with a variety of TRP Worldwide Snap accessories, including the Snapbag® Octa 3', 5', 7', Snapgrid®, Lantern and Spacelight bags for a structured soft lighting solution.

Cineo has completely re-designed its control strategy, making it as easy to use as your smart phone. A full complement of remote control protocols are supported including DMX/RDM and CRMX wireless, with sACN, ArtNet and Bluetooth soon available. All this in a completely integrated, waterproof package weighing under 60 lbs.

Leveraging our years of experience in solid-state lighting and material sciences, ReFlex uses Cineo-designed, custom-built LEDs and control electronics deliver the same bright, beautiful color rendering and extended deep-red spectrum as our Remote Phosphor fixtures. Unlike other digital sources, Cineo's color spectrum remains consistent throughout the life of the fixture with no color shift or need for calibration.

ReFlex continues our high standard of durability through quality manufacturing, designed for field service and backed by a 2-year warranty.



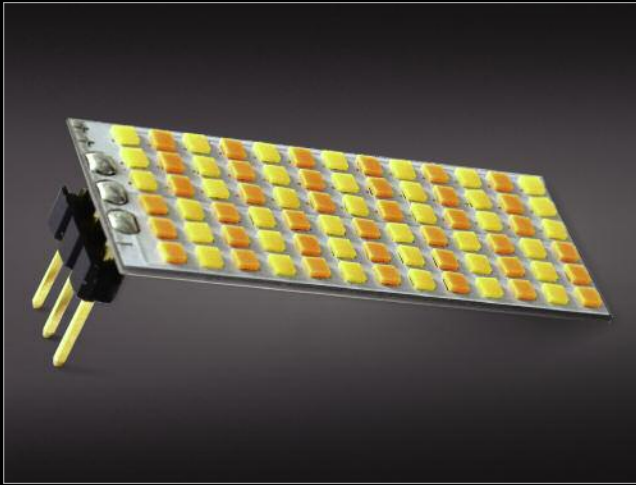


CINEO

CINEO REFLEX R15 Rev 1.2 18788 0000 - Load OK

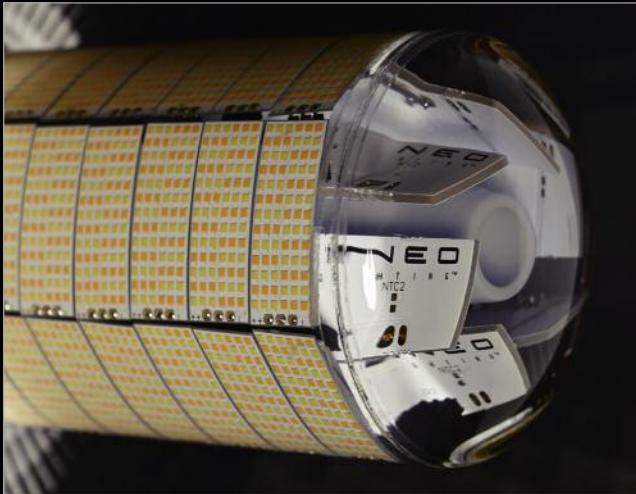
Task	Focus	Shutter	Log	16
6-11	Back Lock	1		
Card	Back	Back 2		
				GO DMX

ReFlex R15: Pure innovation at its core



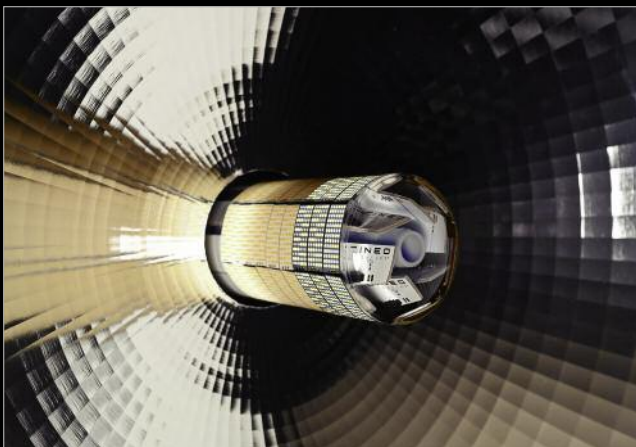
CSP Arrays

Cineo has partnered with Intematix to create next generation high-output multi-diode light engines using patented Chip Scale Package (CSP) technology. The LED dies are mounted directly to an aluminum nitride substrate, delivering power density of 100 watts per square inch. ReFlex R15 uses 54 of these CSP arrays as its light engine.



Immersion Cooling

ReFlex uses an optically transparent dielectric fluid to manage the high-density thermal mass generated by the ReFlex light engine. This patented technology opens new opportunities for high intensity digital lighting beyond passive or air-cooled methods employed of the past. The refractive index of the fluid and CSP phosphors have been tuned to deliver Cineo-quality white light at any color temperature from 2700 to 6500K.



9-zone Beam Shaping

The ReFlex Radial Light Engine uses nine individually controlled concentric light sources to derive beam angle, shape and CCT. The advantages are many:

- Electronic beam angle control – from Spot to Flood – with no moving parts
- A completely uniform beam shape from 15° to 75°
- Advanced controls to change the beam shape and CCT for specific applications
- All beam functions are digitally adjustable locally and remotely

Peerless versatility

R15 is the first high-powered hard source that can effectively work in a variety of soft lighting situations. The faceted reflector is easily removable, turning the R15 into a 180° Lambertian light source. An elegant mounting ring transforms the R15 into a perfectly illuminated Snapbag®, Lanterns or Spacelights.



Standard Reflector



Open Face



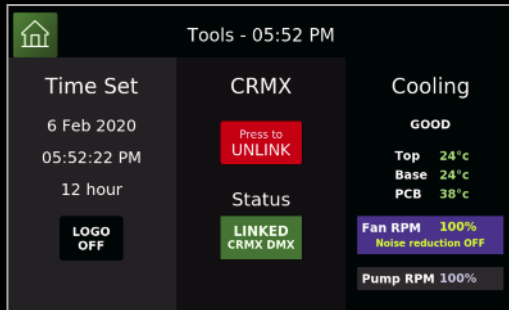
Snapbag® Lantern – 3', 5' (5' shown)



Snapbag® Octa – 3', 5', 7' (7' shown)

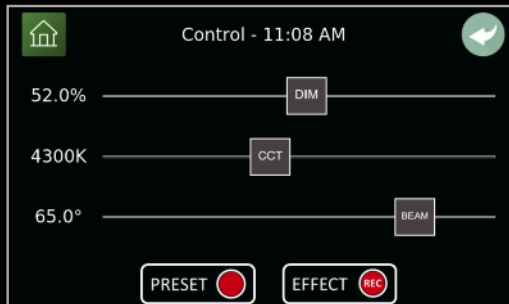
Simple, powerful control

Cineo has completely re-designed its user interface to incorporate a high resolution touchscreen, linux-based 64-bit processor, 32GB memory and a precision real-time clock. This platform is used in all future Cineo fixtures as a familiar, easy-to-use control strategy. Remotely, the R15 offers complete control via DMX/RDM, CRMX, wired and wireless networking.



Tools

System settings, as well as overall health status of the R15 is managed in the Tools window.

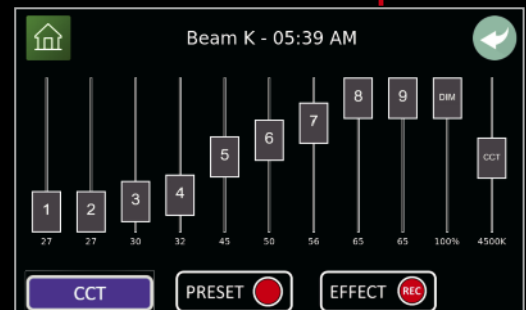
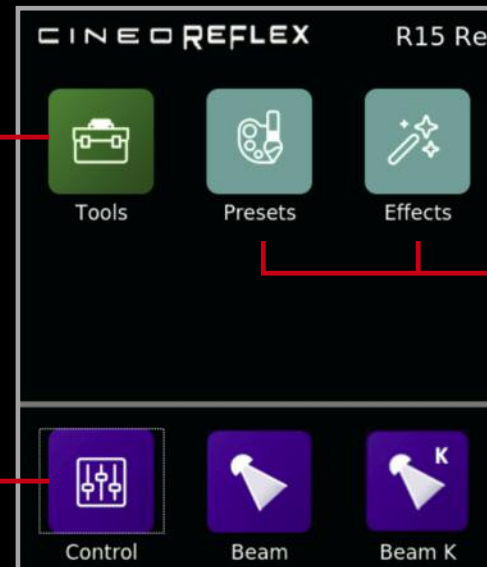


Local Control

Three familiar controls are provided: Intensity, CCT and Beam Angle (Spot/Flood). Due to the unique tunability of the R15 light engine, a completely uniform beam field is realized between 15° and 75°.

Home Screen

All functions of the fixture are available locally from the Home Screen, organized in three sections: Functions, Controls and Remote Operations.



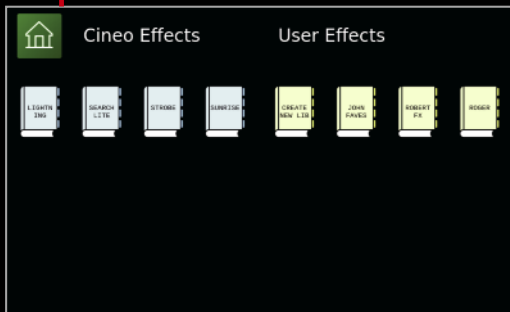
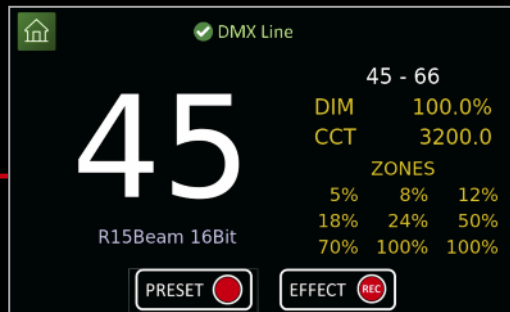
Advanced Beam Control

When a specialized beam shape is desired, the Beam Shape control allows customizable control of both brightness and CCT in nine areas of the beam. For example, you can make the center of the beam brighter and warmer than the outside edges.



Logs

ReFlex keeps a time-stamped log of all activities within the fixture at all times when the fixture is on. This provides diagnostic information and allows users to review settings from earlier days, weeks or months of fixture operation.



Presets/Effects Libraries

The state of the fixture can be saved as either a Preset (static) or Effect (time-based). ReFlex ships with a standard set of presets and effects, with the option for User Libraries to be created, managed and transported via USB or network connections.

Remote Operation

Remote operation variables include communication protocols, operating modes and device addressing. Once remote operations are initiated, the start address for the fixture is displayed, along with all relevant operating data.

Connections

ReFlex includes (3) DMX ports: DMX In, DMX Out and DMX Bridge. The DMX Bridge output re-generates the DMX input from whatever control input is selected for the fixture. Any ReFlex fixture can be used to bridge and regenerate from the selected input control signal to standard wired DMX out.



Features at a Glance

125,000 Lumen digital hard light

ReFlex's high output relies on the patented design of its light source. Utilizing 54 high-density CSP arrays, the ReFlex Radial Light Engine consists of 9 concentric light sources around its liquid cooled core.

Comprehensive control options

In addition to its intuitive touchscreen controls, ReFlex has been designed to take advantage of all existing control protocols including DMX/RDM, CRMX, Ethernet, WiFi and Bluetooth. Fixture settings, user libraries and software updates utilize the unit's built-in USB port.

Electronically variable, 15°-75° spot/flood beam control

The ReFlex light engine technology permits the beam angle to be controlled continuously from 15° to 75° electronically, both locally and remotely, with no moving parts.

Uniform Field Lighting Area

Due to the way the light engine is controlled, the exposure level across the selected beam angle is perfectly uniform: no hot spots or dark areas.

User-controlled beam shaping

If a more customized beam shape is needed, individual controls of all 9 lighting sources (both intensity and CCT) are available both locally and remotely.

2700K to 6500K hybrid output

ReFlex can do the work of both HMI and incandescent hard lights without bulb replacement for the life of the fixture.

100% to 0% dimming – zero flicker, zero color shift

Like all Cineo Lighting fixtures, dimming is controlled over the full range from zero to full output, at all CCTs with no color shift and no flicker at frame rates up to 10,000fps.

110/220v household circuit operation

At full power, ReFlex requires less than 1500 watts, making it a simpler solution for remote setups where auxiliary power is impractical.

Interchangeable reflector and light shaping accessories

The hard reflector is easily removable, creating a 180° Lambertian light source. Soft accessories like Snapbag®, Snapgrids®, lanterns and spacelight bags turn ReFlex into a high-powered soft lighting source with controllable shape.

Total weight: 60lbs.

ReFlex is completely self-contained: no ballasts or external power supplies. The unique cooling system and compact electronics of ReFlex make for a total weight easily handled by one person.

Weatherproof

ReFlex's sealed electronics and cooling systems provide for safe use in wet locations without additional protection.

70,000 hour L70 life span

The extremely robust proprietary arrays used in ReFlex deliver uncompromised output for the long life of the fixture.



ReFlex R15:
Durable, modular
construction, designed
for service.

Specifications

125,000 lumen output

Variable white light: 2700-6500K

CRI Re: 90-96

All functions available locally via touchscreen

DMX/RDM plus DMX re-gen.

CRMX wireless control. sACN/ArtNet capable; bluetooth ready

Electronically variable uniform field beam angle: 15° to 75° (FWHM)

Digitally controlled beam shape, combined with beam-variable CCT

Flicker-free dimming, 0-100%, 10,000fps

Removable reflector with optional soft lighting accessories

Removable mounting yoke with Junior Pin

(3) Reinforced hang points for top-hanging

Input Power: 110-240VAC. 1,500 watts max. Integrated power supply.

Fixture size (with reflector): 19"l. x 31.5"w. x 26" dia. (48.3cm l. x 80cm w. x 66cm d.)

Weight (with reflector): 60 lbs. (27.3kg.)

Environmental temperature range: -20° C - +40° C Max. temperature rise: +40° C

Quiet, active cooling

ETL, cETL, CE pending

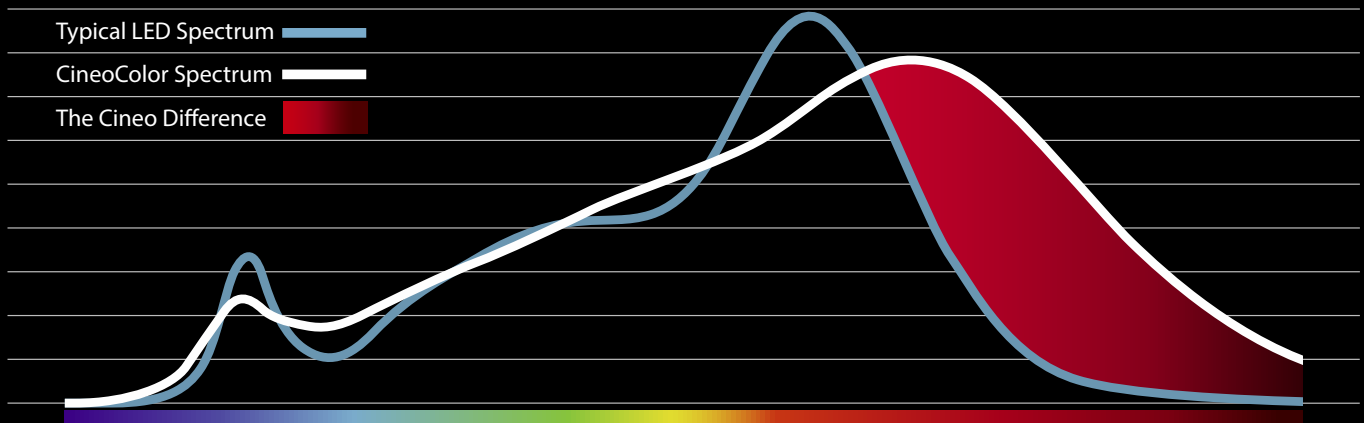
Light Output Measured at 30 feet

CCT	Flood (50°) FC/Lux	Spot (15°) FC/Lux
2700	44/474	263/3154
3200	57/614	342/3681
4300	93/1001	503/5414
5600	69/743	415/4467
6500	55/592	330/3552

CineoColor

Designing an accurate color spectrum goes well beyond traditional measurement standards. Although all Cineo fixtures demonstrate outstanding ratings for CRI, CRI Re, CQS and TLCI, Cineo fixtures extend the color gamut to deliver vibrant skin tone and better rendering of saturated colors. We use specially formulated, wide spectrum phosphor blends, striving for a

spectral shape that is smooth and natural and full of deep red. Cineo Lighting provides the most natural spectrum of any production LED source. Our focus on spectrum stability extends the long-term value of your investment, producing beautiful, reliable light quality that remains consistent unit to unit, year after year.



Other Cineo Products



LB 800 – High-power soft light

Input Power: 110-240VAC, 900 watts max.
Output: 50,000 lumens
Fixture Size: 24" x 48" x 5" (610mm x 1220mm x 127mm)
Weight: 55 lbs. (25 kg.)
Touchscreen control
Variable white: 2700K-6500K
Variable saturated color
Local and Remote dimming, 0-100%, calibrated in f-stops
DMX/RDM, CRMX wireless control
sACN/ArtNet capable; WiFi and bluetooth ready
8 or 16-bit DMX control
HSI+CCT or RGB+CCT color control
Control of up to 10 independent zones
Record, recall and transfer unlimited Presets and Effects
Completely flicker-free operation
Silent, passive cooling



Lightblade Edge Series – Modular, linear soft lights

Input Power: 110-240VAC
80W/5,000 lm, 160W/10,000 lm, 320W/20,000 lm.
Fixture Size: 2' (610mm) and 4' (1220mm) lengths: 1, 2 or 4-bank configurations
Weight: 1.4lbs - 16lbs.
Variable CCT: 2700K-6500K
Local and Remote dimming, 0-100%, calibrated in f-stops
Selectable 8-bit / 16-bit DMX control
HSI+CCT or RGB+CCT color control
Completely flicker-free operation
Silent, passive cooling



Maverick – Small, portable Remote Phosphor fixture

Input Power: 110/220VAC, 10.5 - 28 VDC, Battery
150 watts max
Output: 8,000 lumens
Fixture Size: 9.4" w x 7.3" h x 3" d (240mm w x 186mm h x 76 mm d)
Weight: 4.9 lbs. (2.2 kg.)
CCT: 2700K, 3200K, 4300K, 5600K, 6500K, Green, Blue
Local and DMX dimming, 0-100%, calibrated in f-stops
Completely flicker-free operation
Silent, passive cooling



Standard 480 – Mid-power soft light

Input Power: 110-240VAC, 480 watts max.

Output: 30,000 lumens

Fixture Size: 12" x 24" x 4.5" (305mm h x 610 mm w x 115mm d)

Weight: 28 lbs. (12.7 kg.)

Touchscreen control

Variable white: 2700K-6500K

Variable saturated color

Local and Remote dimming, 0-100%, calibrated in f-stops

DMX/RDM, CRMX wireless control.

sACN/ArtNet capable; WiFi and bluetooth ready

8 or 16-bit DMX control

HSI+CCT or RGB+CCT color control

Record, recall and transfer unlimited Presets and Effects

Control of up to 6 independent zones

Flicker-free to 10,000 fps

Silent, passive cooling



HS² Wave – Mid-power Remote Phosphor fixture

Input Power: 110-240VAC, 500 watts max.

Output: 25,000 lumens

Fixture Size: 12"x 21"x 7.5" (305 mm h x 533 mm w x 191.5 mm d)

Weight: 33 lbs. (14.8 kg.)

CCT: 2700K, 3200K, 4300K, 5600K, 6500K, Green, Blue

Local and Remote dimming, 0-100%, calibrated in f-stops

Integrated LumenRadio™ wireless DMX

Flicker-free operation to 25,000 fps

Silent, passive cooling



MavX – Small, portable hybrid fixture

Input Power: 110/220VAC, 10.5 - 28 VDC, Battery

150 watts max

Output: 8,000 lumens

Fixture Size: 9.5"w x 8.5"h x 3.25"d" (241mm w x 216mm h x 83 mm d)

Weight: 5 lbs. (2.3 kg.)

Variable CCT: 2700K to 6500K

Local and DMX dimming, 0-100%

Integrated LumenRadio™ wireless DMX

Completely flicker-free operation

Silent, passive cooling

CINEO
LIGHTING™
A NBCUNIVERSAL COMPANY

cineolighting.com/reflex

the shot in which the female victim was killed by being painted in gold; in our case, she was covered in oil. We set up our shot exactly like the other one. That was our homage. It felt right for this — we were keeping it in the franchise.

Dennis is amazing. The offices looked very modern but fit in well with that aesthetic and those color palettes. *Goldfinger* and *Dr. No* were our touchstones, but Marc and I went more for our type of framing and camera moves. We used Steadicam — and remote cranes that allow you to move the camera in ways it couldn't have done back then. Marc and I both tend to like a stylized framing that's very graphic and compositional. For me, that's as important as lighting. We were framing like a Bauhaus art film but still making it a Bond adventure.

Special-effects coordinator Chris Corbould did an amazing job. Viewers assume the fire in the hotel must be all [digital effects], but about 80 percent was real fire, and visual effects just augmented it. We overcranked the camera for a motorized wire move across the lobby with glass partitions and furniture exploding — that was all real fire and an explosion done on the 007 Stage. The physical effects were incredible.

Hoyte van Hoytema, ASC, FSF, NSC (*Spectre*, 2015)

By taking part in such an established and widely liked franchise as Bond, you submit yourself to a very dense register of rules and expectations. On one hand, you can thrive on the fame and successful formula, but on the other, there is the challenge to bring something fresh and [new] to the table.

And on your journey, you will meet a lot of experts who claim to know what it is that historically has made Bond so great — and each one has their own wildly variable interpretation. In the end, you are playing a schizophrenic role: copycat and creator. It's a role that provided me with great pleasure, I must say. It's about obeying the good rules and trying to dodge the bad ones, and with that, implementing a bit of yourself in the

bigger-than-life machinery so you can become a tiny chromosome in this massive DNA structure.

Words From Past AC Issues

Alan Hume, BSC, on the special photography used on *For Your Eyes Only* (AC Aug. '81):

"Quite a lot of front projection was involved in the filming, mainly to shoot close shots of Roger Moore and Carole Bouquet for the action sequences. These included a hectic car chase, highly dangerous ski and bobsled-run material, as well as shots of Roger hanging onto the outside of the helicopter and eventually climbing into the cockpit to take control. All of the front projection was shot using Roy Moore's setup, it being particularly small and maneuverable, with sophisticated light intensity and color control, yet capable of producing a picture 30 feet wide to a light level of T/4."

Adrian Biddle, BSC, on blending drama and comedy in *The World Is Not Enough* (AC Dec. '99):

"The trick was creating the right balance between being comedic and not getting too much of a laugh, because the scene is supposed to be exciting as well. There's a line between making it sort of look stupid but not, you know? It's also an editing issue."

Roger Deakins, ASC, BSC, on shooting handheld for *Skyfall* (AC Dec. '12):

"On *Jarhead*, Sam [Mendes] said to me one day, 'Here we are, doing a \$70 million picture with all these stunts and explosions, and you're shooting with a handheld Arri 3C!' It was the same on *Skyfall*. Some days, [B-camera operator] Peter Cavaciuti and I would both have handheld cameras on these big stunts. That's the way Sam and I like to work; we both enjoy being quite instinctive on the day."

"The story required us to use Imax cameras in very challenging conditions," he adds, "including temperatures below zero, in air, on cables, underwater, and in heavy-action vehicle stunts, and the cameras really performed [beyond] our expectations."

Sandgren worked with Tildesley and Sinfield to integrate practical lights representative of the respective locales. "Linus and Dave would 'audition' different color-temperature combinations and show them to me," Fukunaga says. "From there, we started to find a palette we consistently gravitated toward. It was as if the film itself was dictating the color, and Linus and I were just homing in on it as we went forward."

Having scenes in Jamaica and Cuba, where Bond crosses paths with Nomi, required visually differentiating the neighboring islands. Sandgren explains, "Jamaica is romantic in the film — Bond's retirement home is on the water, situated next to an exotic, rural city. Santiago de Cuba, meanwhile, is an old city full of history that hasn't changed much in 50 years."

The production shot scenes set in both locales in Jamaica, with Port Antonio in Portland Parish standing in for parts of Cuba. In addition, Tildesley, who scouted the latter, spearheaded the building of a Santiago de Cuba street on the Pinewood Studios backlot for the Imax night sequence in which Nomi, on a mission, causes an explosion that lights up the neoclassical buildings.

"In Cuba, you often see neon and harsh fluorescent lighting in some of the bars," Tildesley notes. Sandgren worked closely with Tildesley's art department and set decorator Véronique Melery to figure out appropriate practical sources with interesting color combinations for each scene. The cinematographer recalls, "We actually manufactured many practical lights ourselves that were creatively integrated into sets — for example, a shimmering wall, and



▲ A spotlight shines on Bond at a SPECTRE party held in a dark ballroom. ◀ CIA agent Paloma (Ana de Armas) chases the action out of the ballroom and onto the street.

TECH SPECS

2.39:1 and 1.90:1/1.43:1

4-perf 35mm; 5- and 15-perf 65mm

Panavision Panaflex Millennium XL2, System 65 65SPFX; Imax MSM 9802 and Mark IV; Arriflex 765

Panavision G Series, Sphero 65, custom close-focus and zoom (for Imax); Hasselblad (for Imax); Arri/Hasselblad 765

Kodak Vision3 500T 5219, 250D 5207, 50D 5203

fluorescent-looking fixtures that could work underwater.”

The Cuba sequence required A-camera/Steadicam operator Jason Ewart and B-camera/Steadicam operator Ossie McLean to handhold the Imax cameras. “Those cameras are a lot heavier and quite awkward to operate,” Ewart says. “They weren’t designed for action sequences. We did quite a lot of handheld with them, which was challenging, to say the least. Their size and weight took a lot of getting used to, and it was physically demanding to follow these fast-paced fight and action scenes.”

Camera moves called for varying degrees of planning, Fukunaga says. “Some moves were thought about ahead of time,” he adds, “certainly for action scenes and scenes that needed previs, but for the most part, the actors, Linus and I would [map] out the camera positions once the blocking had been set.”

“Sometimes a simple, intimate, handheld shot was much better than a dramatic crane shot,” Sandgren adds. “The range in this film is as wide as it can be!”

One notable crane shot featured in a scene where Bond, showing up at a SPECTRE party in a dark ballroom, is revealed by a spotlight to be surrounded by unfriendly figures. The first portion of the scene was covered on Steadicam and dolly as Bond moves about, and then a high-angle setup revealed the sea of opposition he faces. →



VERSATILITY without COMPROMISE

Full-featured. Lightweight. Solid.

FH-7240 Fluid Head & **TMC** Tripod



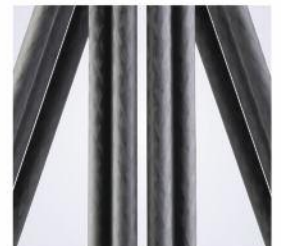
Class-leading performance, precision, and smoothness



Quick-release spreader with mid and ground-level positions



Platform and spike feet for any environment



Unparalleled strength-to-weight ratio

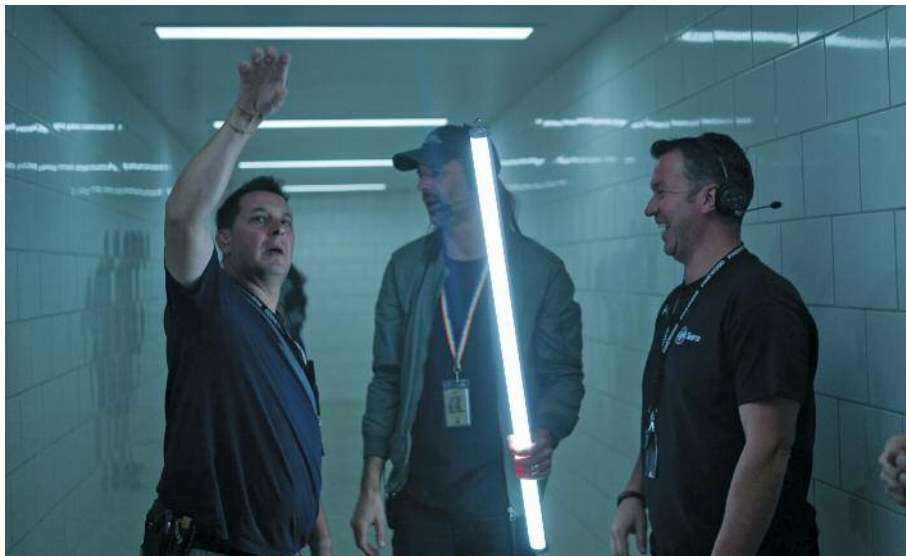
Scan to discover:



**MADE
IN THE USA**

www.cinema.reallyrightstuff.com

1-385-248-0777



▲▲ Sandgren (center), on-set art director Arwel Evans (left) and gaffer David Sinfield discuss a setup.
▲ Sandgren checks his meter.

Sandgren describes the desired tone of this sequence as “sinister menace and claustrophobic paranoia, a bit in the spirit of Hitchcock.” The lighting reflects that mood with 2.5K HMI Ivanhoe spotlights washing across the faces of Bond and CIA agent Paloma (Ana de Armas), adding to the drama. The crew used 5K Fresnels dimmed to 40 percent, motivated by the room’s tungsten practicals, along with an array of Arri SkyPanels — S60s in light boxes rigged on electric motors from the roof, S360s with Chimeras, and S60s bouncing off bleached muslin on the floor to provide fill.

“My lighting crew was dressed by [Suttirat Anne Larlarb’s] costume department to operate the spotlights on camera,” Sinfield recalls. “We had many cues for interactive lighting from our various sources built by desk operator Adam Baker with the GrandMA2 console, and I controlled them via iPad or iPod Touch.” This manual operation allowed him to organically respond to the action as opposed to relying on pre-set timings.

The special-effects team added an atmospheric effect that figures into the story. “It worked great with our lighting concept,” the gaffer says. “Linus and I worked together and added new ideas to every scene. Collaborating with him is a never-ending journey; his ideas make you think on your feet, but they are fantastic, and he is open to your input.” →

The majority of *No Time to Die* was captured in anamorphic 35mm — which Sandgren regards as “the classic Bond format” — with Panavision’s Panaflex Millennium XL2.

Scenic action sequences, though, were captured in large format. “Five-perf and 15-perf 65mm look spectacular projected,” says Fukunaga, recalling the filmmakers’ initial large-format tests. “Some of the images just leapt off the screen.” The filmmakers used Imax MSM 9802 and Mark IV cameras for these scenes, with System 65 units employed for intimate dialogue because, says Sandgren, “Imax cameras are just a bit too loud.” When the System 65 units were unavailable toward the end of production, the filmmakers turned to the 65mm Arriflex 765 — which was more often used by the production’s 2nd unit for dialogue within Imax sequences.

When shooting Imax, the camera team framed for both 1.43:1 and 1.9:1 — owing to differences in Imax venues’ projection systems. Five-perf was usually tiled for 1.43:1, according to Sandgren.

The production was shot mainly on Kodak Vision3 500T 5219, though Vision3 250D 5207 and 50D 5203 were employed as well, the latter specifically for 35mm-captured day exteriors. The crew shot 1,007 rolls of 35mm — and more than 1.7 million feet of 35mm and 65mm total.



2403 High Bright

Class-leading brilliance. Rugged good looks.

The SmallHD 2403 High Bright clocks in at an incredible 1600 nits brightness. Its aluminum chassis provides professional-grade protection without adding bulk. Weighing just 13.9 pounds, this daylight viewable 24-inch monitor is made for productions on the go.

Learn more at: smallhd.com/2403HB

SMALLHD

Rehired Gun

“David Sinfield is a brilliant gaffer — full of creative ideas, always positive, and exceptionally prepared and competent,” says Sandgren. “He runs an amazing crew — [and] at one point during production he had more than 1,000 SkyPanels rigged in overhead light boxes, eight 100K SoftSuns, and a 200K SoftSun rigged on different soundstages at Pinewood.”

The main unit usually ran one camera, but seated-dialogue scenes were covered by two. (The B camera was initially operated by Oliver Loncraine, but when he left to serve as cinematographer on another project, Ossie McLean stepped in.) “Cary likes to tell the story efficiently, with as few cuts as possible,” Sandgren notes. “Also, we both love a curious camera. We often worked out blockings where the camera is almost its own character, observing the intimacy of the characters as it explores the scope of



A-camera operator Jason Ewart frames up as Sandgren eyes the scene.

the sets. That could include a 360-degree turn, so mostly we shot in single-camera style, having the second camera leapfrog to the next

setup.” On heavy action sequences, however, the crew ran up to five cameras.

The production’s 2nd unit —

Optics Spotlight

For the production of *No Time To Die*, Imax supplied the Hasselblad lenses for its cameras, and Dan Sasaki, Panavision’s senior vice president of optical engineering and an ASC associate member, developed custom high-speed close-focus Panavision lenses with an Imax mount for 15-perf in 40mm (T2.6), 50mm (T2), 80mm (T1.9) and 300mm (T4) focal lengths, as well as a 460-1,430mm (T8) zoom. The Imax Hasselblad lenses were 40mm (T4), 50mm (T2.8), 60mm (T3.5), 80mm (T2), 110mm (T2), 150mm (T2.8) and 350mm (T4). Panavision Sphero 65 lenses were paired with the Panaflex System 65.

After much testing, cinematographer Linus Sandgren, ASC, FSF chose Panavision G Series Anamorphic Primes for the Panaflex Millennium XL2 — a strategy inspired by *E.T. the Extra-Terrestrial* (shot by Allen Daviau, ASC). “I was looking to re-create the red-circle lens flares Allen got on those beautiful old spherical lenses,” says Sandgren. “I wanted a lens that would be a workhorse but also have beautiful flares that weren’t overly dramatic. I have mostly used the C Series, which I love and which have a lot of attitude, and the Primo Anamorphic Primes, which were nearly perfect for us but too heavy. I wanted lenses with a sharp look that are lightweight and fast, with interesting impressionistic characteristics.

Dan Sasaki helped us experiment to find the *E.T.* look by modifying the T Series with built-in IR filters and various coatings, which looked quite interesting but still wasn’t exactly what I was looking for.”

Sandgren even reached out to Steven Shaw, ASC, *E.T.*’s 1st

AC, who recalled shooting with an uncoated Panavision spherical lens.

It was 1st AC Jorge Sánchez who suggested using the G Series. “We shot some tests, and wow, how they performed!” says Sandgren. “They’re fast and sharp, and I learned to love them more than the Cs. They’re beautiful and gentle but with lively, soft flares.”

For his part, Fukunaga says, “I love Panavision anamorphics. I’d had more experience with the C and E series, so I was interested to see how the G Series performed in the variety of dark and light sets we had.”

Go to focal lengths were 80mm for the Imax cameras, 50mm for the System 65, and 40mm for the XL2. Referring to the latter, Sandgren notes, “A 40mm lens is probably most true to reality when it comes to how the depth in the space falls off. When shooting spherical 35mm, I often find a 40mm too tight to see the width of a set, but with anamorphic, it accommodates for that and also enables you to move in for a close-up.”

He also shot interiors at T2.8 on both camera formats, stopping down to T5.6 or T8 for day exteriors. “The G Series performs so well at T2.8, whereas other anamorphic lenses might not,” Sandgren observes. “I like it when practical lights such as neon signs, car headlights and fluorescent tubes expose naturally, and I find T2.8 provides the most appropriate exposure on 5219.”

— Mark Dillon



Orbiter[®]

Illumination | Reshaped

The ultra-bright LED point source
with a variety of optics.

Orbiter is an ultra-bright, tunable, and directional LED fixture from ARRI. All systems in Orbiter are completely new and designed with versatility in mind. Orbiter's new six-color light engine delivers a wide-color gamut and outstanding color rendition across all color temperatures along with industry-leading, smooth dimming from 100 to 0%. With its changeable optics, Orbiter can transform into many different types of lampheads including projection (profile), open face, soft light, and other future possibilities. Orbiter is the most advanced luminaire ever created with exciting new technology packed into every fixture.



Open Face



Projection



Light Bank



Dome

Learn more about
Orbiter's extensive features:
www.arri.com/orbiter

Orbiter[®] is a registered trademark of
Arnold & Richter Cine Technik GmbH & Co. Betriebs KG.

ARRI 



The lighting setup for the Cuba set, constructed on a blacklot at Pinewood Studios.



Regarding the material set in Cuba — which was shot in Jamaica and on a backlot at Pinewood Studios — gaffer David Sinfield notes, “Linus wanted it to feel as much like Cuba as possible, so we used lots of color. There’s a large centerpiece bar in which we used Cool White fluorescent tubes, Bi-Color [LiteGear] LiteRibbon and 100-watt ES Pearl practical tungsten bulbs in chandeliers and wall fixtures for a mix of warm and cool light. We lit the whole thing so we could shoot as close to 360 degrees as possible.”

Outside, looking to create soft ambience and a natural feel, the crew had Lee Lifting cranes holding six 12'x12'x8' light boxes, each containing eight Arri SkyPanel S60s projecting through Full Silent Grid Cloth and blacked on the sides with deep skirts. Beneath each box hung two BMFL Blades to bring up the level in spots or provide an edge light. Another light box held four SkyPanel S360-Cs with Chimeras to enhance the neon from building signs.

“Many of the practicals on the exterior Cuba set were a mixture of the Cool White fluorescent tubes, old-school tungsten bulbs, and streetlights that were a mixture of 150-watt 6,500K LED bulbs or 2K Blondes dimmed down to around 30 percent,” says Sinfield.

led by director-cinematographer Alexander Witt, ASC, ACC — was just as big as the main unit, and logistics prevented them from occupying the same location at the same time. In the case of the Matera car chase, Witt’s team traveled to Italy first to shoot the wider vehicle stunts, including helicopter footage, before the 1st unit came in to shoot the majority of the scenes, including vehicle stunts with Craig and Léa Seydoux (playing Madeleine Swann).

The stunt cars in the film were all built or modified by special-effects and action-vehicle supervisor Chris Corbould and his team. “They built eight stunt DB5s with roll cages,” says Sandgren. “The bodies were custom-built by Aston Martin in carbon fiber, and the chassis had been fitted with fixed pick points to hold camera rigs. Thanks to Corbould’s team and to the innovative mind of my key grip, David Appleby, we were able to quickly mount the heavy Imax cameras anywhere on the car. We also had custom rigs on motorcycles that could handle Imax cameras affixed to their front and rear.”

In the sequence, Bond drives the armed Aston Martin DB5 introduced in the 1964 installment, *Goldfinger*. As Bond and Swann are pursued through the narrow streets by an enemy motorcycle and sedan, 007 accuses Swann of betraying him. Craig did as much of his own driving as was determined to be safe; otherwise, the stunt team had a driver in a pod atop the car steering the vehicle.

“Daniel is a very good driver and could do stunts on his own,” says Olivier Schneider, supervising stunt coordinator. “He spent time with [stunt coordinator] Lee Morrison rehearsing parts of the chase. He had to manage the presence of the camera while focusing on his lines and his acting, as well as safety. It was a lot of pressure.”



Bond takes the wheel of the infamous Aston Martin DB5.

A few tighter car interiors throughout the film were shot at Pinewood on an LED stage provided by Creative Technology Group. "We set up a virtual world at Pinewood," Sandgren says, "where we built a ¾ fixed cylinder of LED Black Pearl screens from CT Group, with a pixel pitch of 2.8mm. The cylinder diameter was 30 feet, and there was a movable screen covering the top. This was the same type of concept we used on *First Man*."

The car was surrounded by screens projecting moving-background footage that had been taken on location by a vehicle rigged with eight digital cameras capturing various angles from Bond's point of view. "That way the car was covered with realistic lighting and reflections, and we would just add some ambience with SkyPanels and sunlight from a Mole Richardson 5K PAR on a [Chapman/Leonard] Hydrascope crane," Sandgren says.

A climactic moment in *Matera* has Bond grabbing a motorcycle, riding up a steep facade protruding

from an ancient wall, and launching himself onto a street level above, where he drops 12' and lands as a procession leaves a nearby church. Morrison oversaw the carefully rehearsed stunt, which was performed by Paul Edmondson and shot by the 2nd unit in four takes.

Such scenes were designed during prep, which stretched from November 2018 until the 122 days of principal photography began the following March. "Linus would always share ideas with you to see what you could bring," Schneider says. Throughout the shoot, Sandgren and Sinfield communicated daily with Witt and 2nd-unit gaffer Toby Tyler Jr. to ensure consistency in all footage.

Perhaps the biggest-scale nod to the franchise's storied past is a gigantic underground set. The set might bring to mind production designer Ken Adam's creation of Blofeld's base inside a volcano in *You Only Live Twice* (shot by Freddie Young, BSC) and *SPECTRE*'s colorful garb in that film. Tildesley and his

Ewart estimates that half the film was shot on dollies, with most of the rest on Steadicam and handheld. What crane work they did, the camera operator says, "was mainly to add scope on larger sets. For the most part, we used those other platforms, which allowed us to be with the characters."



See us at the NAB Show, April 19 - 22, 2020 • Las Vegas Convention Center, Booth C10245

Backstage Equipment, Inc.
8052 Lankershim Bl. • North Hollywood, CA 91605
(818) 504-6026 • Fax (818) 504-6180
info@backstageweb.com • www.backstageweb.com



For the underground set, Sandgren employed dozens of 6-foot-tall, free-standing light sticks in the water.

team built the set in the massive tank at Pinewood’s 007 Stage.

“We had Ken Adam’s book [*Ken Adam: The Art of Production Design*] firmly opened on our desk throughout the whole process,” Tildesley says.

“As this is Daniel’s last film in the franchise and the 25th Bond film, we thought hard about how to evoke some of the best bits and pieces from the previous films.”

Dozens of tall light sticks stand-

ing in the water both serve the plot and provide ambience in the cavernous set. “I asked my practical team to find some 4-inch-diameter tubes between 6 and 8 feet tall that we could use as light sticks in the water to replicate Mark Tildesley’s design,” Sinfield explains. “After lots of R&D, I decided on a design, and Cary, Linus and Mark all liked it. We ended up making about 50 6-foot-tall, free-standing light sticks filled with 5 meters of LiteGear LiteRibbon that we controlled from the lighting desk via wireless DMX. They gave an amazing amount of soft light that we could easily control.”

Sandgren adds, “I thought the concept art of this set was really exciting and I was intrigued to try to light the entire massive set with these 50-something light sticks. At the end of the set there was also an elevated lab, which was a bright source of light, featuring a transparent wall illumi-

CMB
FILM SERVICES, INC.
PHILIPPINES
CMBFILMS.COM

CAMERA **LIGHTS** **GRIPS** **SHOOTING GALLERY**
 S T U D I O S

nated by 40 8-foot-by-2-foot LiteGear LiteTiles [placed behind it]. In the ceiling of the set, we had made a 20-foot circle with functioning doors that would [ostensibly open to the above-ground surface], and it had to be lit to produce daylight washing down as the doors opened. Tildesley had designed the set to its maximum, and it barely fit into the 007 Stage at Pinewood – giving us about 5 feet of space to fit lights above the circle. We arranged four 100,000-watt SoftSuns above the circle that we shot inward to bounce off an Ultrabounce. The SoftSuns are fully dimmable, so we brought the 400,000 watts worth of light up as the doors opened, creating the effect that bright daylight was spilling down into the set. We shot this at T2.8 on 500T.”

Working on a Bond film, and in particular this landmark entry, inspired the entire crew to give their best. That sense of teamwork suffused



Another source of "underground" light was a transparent wall — located in the lab — which was illuminated by 40 LiteGear LiteTile units.

the production, and Fukunaga certainly felt it with Sandgren. “Linus is one of the most supportive collaborators you could find,” the director says. “Inevitably, time and budget constraints weigh down on creative choices, and when I was at the point

of bending to compromise, Linus would stand up with his persuasive smile and his laser focus on the end result, and say, ‘Well, you could do it the right way or you could do it the wrong way.’” ◆



K 5600[®]
L I G H T I N G

HMI | LED
JOKER | ALPHA | SLICE

Quest for Magic



Onward directors of photography Sharon Calahan, ASC and Adam Habib frame a fantastical adventure in the virtual world

By Jay Holben

The latest adventure from the creative minds at Pixar Animation Studios is *Onward*, the tale of two teenage elf brothers, Ian and Barley, who embark on an adventure in an attempt to reconnect with their late father. The brothers' suburban world is a fantastic one, populated by sprites, satyrs, cyclopes, centaurs, gnomes and trolls, but the magic of the realm has slowly faded away over many years. On his 16th birthday, Ian's mother gives him a gift his father intended him to have: a letter detailing a spell that will enable his sons to see him one last time after they've grown up, along with a magical staff and gem. The brothers perform the magic, but the spell goes awry, enabling them to conjure only their father's legs and feet. In the process, the gem is destroyed. Now the brothers have just 24 hours to find another magical gem and conjure the rest of their father.

"*Onward* was inspired by my relationship with my

brother and our connection to our dad, who passed away when I was about a year old," says director Dan Scanlon in a press statement. "My dad has always been a mystery to us. A family member once sent us a tape recording of him saying just two words: 'hello' and 'goodbye.' Two words, but to my brother and me, it was magic. That was the jumping-off point for this story. We've all lost someone, and if we could spend one more day with them, what an exciting opportunity that would be."

Helping Scanlon bring *Onward* to the screen were Sharon Calahan, ASC, director of photography: lighting, and Adam Habib, director of photography: camera.

Calahan, the first animation cinematographer to become an ASC member, has been with Pixar since 1994. She was a lighting supervisor on the company's first feature, *Toy Story*, and the director of photography on *A Bug's Life*, *Toy Story 2*, *The Good Dinosaur* (AC Dec. '15), *Cars 2*, and on the Academy Award-winning features *Ratatouille* and *Finding Nemo*. She originally studied graphic design, illustration and photography and began her career in the industry as an art director for broadcast television and video production. Following those jobs, she was a lighting director at Pacific Data Images for commercials and television. Calahan is currently a member of the cinematography branch of the Academy of Motion Picture Arts and Sciences.



Behind-the-scenes photos by Deborah Coleman, Adam Habib, Patrick Lin and Gairo Cuevas. All images courtesy of Disney/Pixar.

Habib, who received an M.F.A. in film from the University of Southern California, started with Pixar as a camera and staging artist in 2010 and became the lead artist on *Inside Out*. He was the director of photography: camera on the short *Lou*. *Onward* is his first feature as a director of photography at Pixar.

Calahan and Habib spoke with AC about their work on their latest collaboration.

American Cinematographer: I'm curious about your working relationship and how the director-of-photography responsibilities are divvied up.

Sharon Calahan, ASC: Having separate cinematography departments, which are known as layout and lighting, is a historical structure originally adopted from the cell-animation world. Many people on *Toy Story* came from cell animation at Disney, so we adopted how they approached

◀ & ▲▲▲ In *Onward*, brothers Ian and Barley Lightfoot (voiced by Tom Holland and Chris Pratt) receive a magical gift on Ian's 16th birthday, but when the accompanying spell meant to conjure their late father goes awry and only his legs appear, they embark on a quest to spend one last day with their dad. ▲▲ Director Dan Scanlon and Cinematographer Sharon Calahan, ASC review lighting shots at Pixar Animation Studios in Emeryville, Calif. ▲ Cinematographer Adam Habib works on a scene.



INTRODUCING ROTOLIGHT TITAN X2
A NEW ERA OF CINEMATIC LIGHTING

"A quantum leap ahead of anything else I've seen"
 — Tom Townend, DOP —



BARBIZON
 LIGHTING COMPANY

212-586-1620
 barbizon.com

Sim

604-434-4008
 siminternational.com



416-239-5050
 whites.com

SEE US AT
NABSHOW
 BOOTH **C7412**

Ardent Supporters

In 2013, Sharon Calahan became the first cinematographer to be inducted into the ASC for work in animation. *AC* recently spoke with some of the ASC cinematographers who championed her for membership.

Dennis Muren, ASC: I was really pleased that the Society chose to bring her in. I saw a real parallel between the work she was doing in animation and the work I was doing in miniatures, stop-motion and full-size effects. Looking at her work, it's clear she's dealing with the same problems we deal with in real-world photography; we're both trying to tell stories in visual media.

One of the things I find interesting is that Sharon is dealing with synthetic lighting and creating looks not exclusively [based] on where lighting would be in the photographic world. She starts off with a black-and-white image of a frame that represents the look she's going to light, and then she colors it in to what looks right to her sensibility, and within certain ranges there's a lot of cheating she can do that would be impossible in actual photography. Adding her sensibility to it, she's looking for the emotional impact, just like traditional cinematographers. And what she ends up doing is just so darn beautiful!

I wanted to get her into the ASC because the work she's doing is at the forefront of where a lot of our techniques are going, and we need artists with her skills to make digital characters indistinguishable from real ones. I stopped giving predictions on the future because it's always the public that decides — not us — but what Sharon is doing is certainly in the category of the future of cinematography.

Steven Poster, ASC: I was introduced to Sharon on a kind of field trip to the Pixar campus, and as I sat with her, I realized that what she does is every bit as photographic as what we do. She also has a deep knowledge of color and of the mechanics of workflow; at the time, she was working on designing [how to] transfer color from linear to log in the digital-

animation system so it would look much more like motion-picture film.

It dawned on me that this was what's next — this was what we're going to be calling cinematography and the director of photography. I just thought this was a great opportunity for [the ASC] to move into a new phase and recognize the expanding realm of the cinematographer. Her work is not too far from the kind of work Chivo [Lubezki, ASC, AMC] did on *Gravity*.

Sharon is a painter; she's got a fabulous eye and an amazing eye for composition, light and texture.

Stephen Goldblatt, ASC, BSC: One fall I was going to Pixar for screenings, and at one of them, I was asked to meet Sharon, look at the work and go through her workflow. Pixar was of the opinion that she should be credited as a director of photography, and I agreed. She was the cinematographer on *Ratatouille* in every way. The work I saw her doing was in essence the same kind of work I had been doing all my career. She's responsible for the look of a film from beginning to end, and it absolutely makes sense to me that she be recognized as a cinematographer.

It really comes down to how you define cinematography. If you don't confine it to the traditional crew and traditional photography, then the definition becomes a lot looser to cover those individuals who combine artistry and mechanics to create images, and animation therefore is definitely included. The cinematographer could be broadly defined as a visualizer. That's what Sharon does, and that's good enough for me!

In the end, the job of filmmaking is a puzzle, and cinematography is central to the look of the film. Her films all have very specific looks to them. That's her job; that's what she does. I was very impressed by her talent and subsequently found that there was definite support for her to become an ASC member.

Daryn Okada, ASC: I met Sharon in the mid-2000s, and spent time learning and recognizing that her creative

approaches and responsibilities were similar to the challenges and artistic partnerships of live-action cinematographers. Many times in animation, a person may have screen credit as "director of photography," but their duties may not be [those of] a cinematographer. Sharon approaches every project from a truly creative place that arrives from visual storytelling. She takes a story, researches it, and scouts locations to get their essence, colors and textures in [service of creating] the movie's image.

During production, Sharon supervises her crew like a live-action cinematographer. She works closely with the director to visually interpret the story. She does everything a cinematographer does, only it takes longer! In some cases, what she does is harder because she's literally starting from a blank page, whereas we might have sets or locations to begin from. Sharon also has to consider the different characters, their skin tones and facial features, and figure out the best way to light and photograph them in every scene — exactly the way we do with real-world actors.

From doing visual-effects movies as a cinematographer, I never took it for granted that images added later would just fit in with what I shot on set, so I stayed involved in postproduction to work with the digital lighting process. When Sharon was proposed for ASC membership, I was able to communicate with other ASC members the parallels between what she does and what we do. She was also able to transfer from the animation branch to the cinematography branch of the Academy.

The cinematographer's job is to interpret the story visually, and that's exactly what she does, with similar tools, approaches and concepts. She's a perfect match for the ASC.

— Jay Holben

Beautiful Look. Full Control.



ZEISS Supreme Prime Radiance Lenses

ZEISS Supreme Prime Radiance lenses enable cinematographers to create beautiful, consistent and controlled flares within their frame, while maintaining contrast and avoiding transmission loss. The Radiance family offers all the attributes of a modern cinema lens: large-format coverage, a fast T1.5 aperture, robustness and smooth, reliable focus – all in a small, light-weight package. From the inventors of anti-reflective lens coatings. Made in Germany.



zeiss.com/cine/radiance

 ZEISSCinematographyAmericas



Seeing beyond

Quest for Magic



▲▲ This storyboard by Le Tang was one of approximately 488 boards for the “Conjuring Dad” sequence.

▲ This concept-art piece by Matt Nolte, Bert Berry and Carlos Leon Ortiz showcases the exploration of color and design, including character scale. ► The Camera and Staging team uses the principles of cinematography to translate each moment from the storyboards into the shots that comprise the finished film.



[Early in prep] we do what I call weird science experiments, for lack of a better term. We might have a live-action shoot where we’d have an actor stage some action as a way of throwing out some ideas. Or we might try to demonstrate photographically what we mean when we say ‘anamorphic look’ — ‘Do you like this or not?’ To try to get an idea of what it might look like when the boys attempt to conjure their dad and only succeed in bringing back his legs, we put an actor in a greenscreen suit, put pants and shoes on him and shot him running around as live action. And sometimes our experiments weren’t literally about a look or feel; sometimes it was just about getting the crew inspired. Since *Onward*, we’ve started a classroom-based internship to teach students our Camera and Staging process. We had a rep from Zeiss up here to show [us] some new lenses, and we had a [Sony] Venice set up with a fluid head. I invited the interns to give it a try — to just pan and tilt the camera to get a feel for it. Most of them came from a pure art-school or animation-school background. I wanted them to get a sense of the resistance of the head and the weight of the camera, and to look through the viewfinder. It’s enormously helpful for CG artists to get that real-world experience.

— Adam Habib

something completely fabricated still requires a color-grading session. I mean, you’re not dealing with mismatched lighting fixtures, changing times of day, or differences in lens color bias.

Calahan: Yeah, but it’s tricky when you have 30 to 60 artists lighting a film and it has to look like a unified vision. It can be hard to keep the continuity tight enough throughout. So in the color-grading session, where I work with our amazing colorist, Mark Dinicola, I’m there to even things out. In *Onward*, the main characters have blue skin, and it was really difficult to keep it from going too green, gray or purple in colored-light situations. The director was particularly sensitive to that, so I spent a fair bit of time in the grade using masks for the skin, trying to even that out. And even for us, there are times when light fixtures are the wrong color!

Couldn’t you just alter the skin tone for those shots so that it stayed blue in the lighting?

Calahan: Sometimes we could do more of that, but when you have 30 artists who are all lighting different sequences, that can cause more problems than it solves. If one person were executing all the lighting, we could probably be more consistent, but under the circumstances, that would have caused a lot more inconsistencies than solutions.

Adam Habib: In terms of my collaboration with Sharon, one thing we did early on was to meet a lot, share references and talk. More than coming to any one vision of the film, I think it was just a great way of learning each other’s visual taste and what sorts of stuff we respond to. Once the movie got into full swing, we’d just see each other in the halls, running from one meeting to the next, but we had that common framework to go on.

Calahan: I think another reason [the job responsibilities] have tended to stay separate over the years is that

ROKINON XEEN CF



Smaller - Lighter - Stealthy - 8K - 3 Year Warranty

The addition of the 16mm T2.6 and 35mm T1.5 models grows the CF's to a core set of five primes. ROKINON XEEN™ CF cinema lenses utilize carbon fiber for an incredibly light, durable, and compact future oriented design. In addition to luminous markings, 8K support and Full Frame Plus coverage, they feature exceptional compatibility with gimbals, drones, and the trend toward compact and lightweight high-definition equipment.



Left and Right Side
Luminous Markings



PL, EF, Sony E Mounts
and 11 Blade Apertures



Lightweight
Carbon Fiber



X-Coating
Technology



...I recommend these XEEN CF lenses to anyone looking for a lightweight, very fast, and very small profile motion picture lens that covers wide frame...

Steve Gainer Cinematographer, ASC ASK



...they actually have a variable look... shoot them at a 2.8 they look like very sharp contrasty lenses.... shoot them wide open they're absolutely gorgeous and creamy...

Bill Bennett Cinematographer, ASC



Visit Us at **BOOTH # C4414** to View
All 3 ROKINON® Cine Lens Systems

Quest for Magic



▲ The animation team works with the suggested layout and recorded dialogue to create the character performances. This moment shows the chaos while Ian struggles to complete the spell.
◀ The lighting department helps to integrate all of the elements into a fully realized image, placing virtual sources into the scene to illuminate the characters and set, draw viewers' eyes to key areas of the frame, and create mood.

camera plan and a lighting plan, but those continue to evolve as the show goes on.

We don't do it very often because it's hard to schedule and can be expensive, but every now and then I'll set up a lighting workshop where we bring in somebody to do a hands-on, real-world lighting demo. Bill Bennett [ASC] did a car-lighting workshop for us just before *Cars 3* started up, and then we discussed what we could learn from that. It's both educational and inspirational to see that.

Onward was inspired by the look of Cooke /i anamorphic lenses. How did you come to that decision?

Habib: Early on, we were talking about fantasy as a genre, and we noted that all the movies we were referencing, all these great films from the '80s like *Labyrinth*, *The Goonies* and *The Dark Crystal*, were all anamorphic movies. Dan Scanlon was a little skeptical about the idea, so we brought in an [Arri] Alexa Mini and Cooke anamorphic lenses and shot a

besides the tools, we each have pretty big crews we're supervising, and everything's happening at once. We are probably lighting 10 different sets and about 150 shots in any given week. There's a lot of content to look at and a lot of iterations that have to happen. It would be overwhelming to try to figure out how to do all of that *and* the layout/camera work at the same time. So it's nice to have a partner; we can share and collaborate and

divide and conquer.

In those early meetings and discussions, how did you both work with Dan Scanlon to establish the look of the movie?

Calahan: Typically, we spend a lot of time gathering film references, still-photo references, illustrations and paintings; we create a lot of concept art, and we watch films together and are constantly pitching ideas to see what sticks. We develop a

There's a scene in *The Good Dinosaur* where the characters are running through this field — of course, they do that a lot in that movie! — and it's early morning, and I originally wanted the hills around them to be covered in snow, but we couldn't afford to do it. Snow is expensive because of the shading and rendering. But one morning, the renders came back all broken because something had happened in the shader, and it looked like the hills were covered in snow! I said, 'It's perfect! Can we keep that?' So I ended up getting exactly what I wanted, but it was a total accident!

— Sharon Calahan, ASC

CREATING MOMENTS THROUGH MOVEMENT



52' HYDRASCOPE ON ECS BASE
LAND-AIR-WATER



SUPER PEEWEE IV



COBRA



M7 EVO



HYBRID V



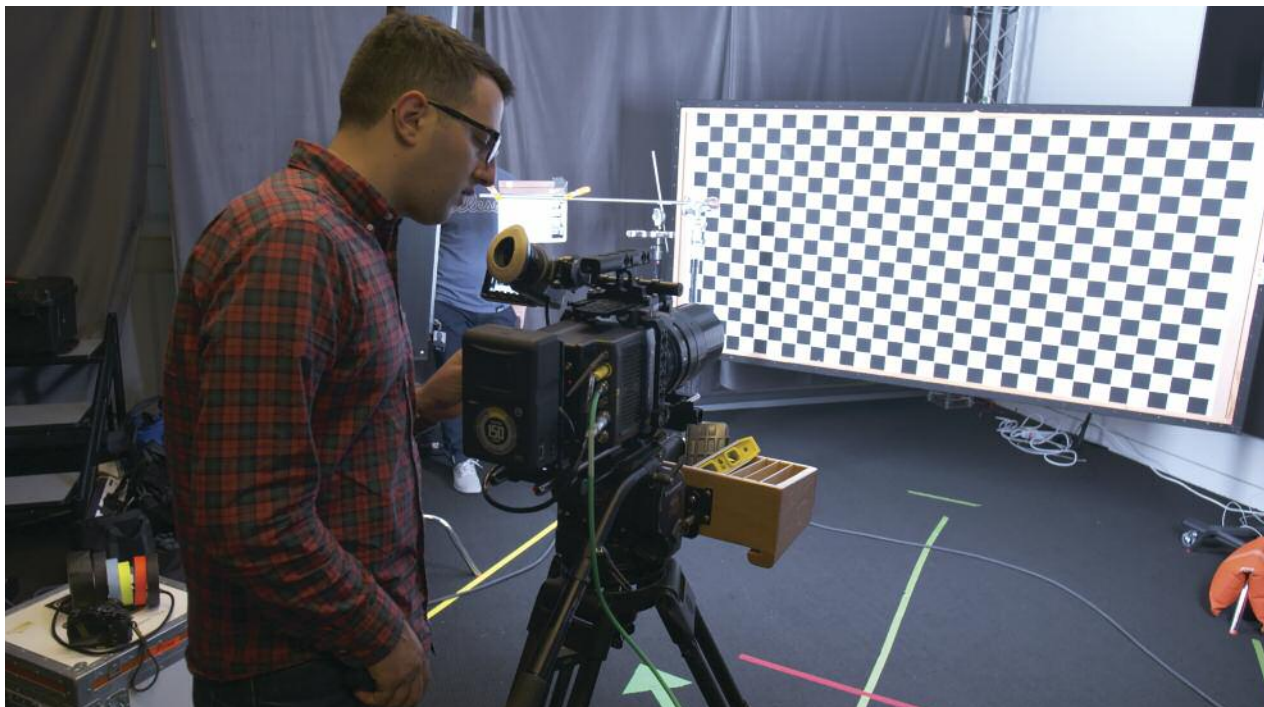
CHAPMAN/LEONARD
— STUDIO EQUIPMENT INC. —

www.chapman-leonard.com | [@chapman_leonard](https://www.instagram.com/chapman_leonard)    

HOLLYWOOD, CALIFORNIA (888) 883-6559 | UNITED KINGDOM & EUROPE +44 1 727 838424
LOUISIANA, NEW MEXICO, TEXAS, & GEORGIA (888) 758-4826 | FLORIDA (888) 337-8243

TRY OUR SOUND STAGE AND PRODUCTION CENTER IN ORLANDO!

Quest for Magic



▲▲ Habib maps lenses. ▲◀ Steadicam operator Nick Schwyter records motions. ▲▶ Scanlon and story supervisor Kelsey Mann work in VR gear.

test for him. He kind of perked up and said, ‘Oh, I like it. I like the texture this adds to the background.’ And of course, Sharon and her team came in and helped to make that look possible. But the way the anamorphic lens renders the world was something we all liked; we liked the way it called back to those earlier fantasy films, and how the unique texture gives permission for magical things to happen. In Camera and Staging, we determined the degree and character of distortion for each lens in the anamorphic set. So, for example, the look of the 50mm is unique from that of the 35mm. We decided to create a contrasting look for scenes of the boys

in their ordinary, everyday world; those have the look of Arri/Zeiss Ultra Primes — spherical and flatter. When the boys set out on the quest and the adventure really kicks in, we switch to the more ‘characterful’ anamorphic-lens distortion. For the third act, we were inspired by Cooke S4s, somewhere between the clean Ultra Primes and the characterful anamorphics.

Do you incorporate imperfections into your work in order to emulate reality?

Habib: [We do,] but sometimes they’re very hard to keep in! On *Inside Out*, we tried to have a moment where we missed focus, like the focus

was too slow coming onto the character, and we had to have that argument — that *discussion* — no less than 20 times as that shot went down the pipeline. The artists would think it was a mistake and fix it, and then we’d have to put it back in! So some imperfections are easier to build in than others. For *Onward*, we used motion capture on some of the cameras to capture the feeling of an actual operator responding to the performance of the characters. And we had a Steadicam operator, Nick Schwyter, come in and create a library of various common motions such as walks, runs and creeps. Our lead artist, Jan Pfenninger, ran those



AKASO V50 PRO SE TECH SPECS

With an **adjustable angle of view**, native **4K video capture at 30fps** and the ability to take **stills up to 20MP**, the AKASO V50 Pro SE is a lot of action camera at an affordable price.

And thanks to **image stabilization** and being **waterproof up to 98ft**, the AKASO V50 Pro SE is ideal for a wide range of out door activities.

Its handy **2-inch touchscreen** makes the AKASO V50 Pro SE is easy to use. It saves images and footage to a **Micro SDHC** card, and has a **Mini USB** port and built in **Wi-Fi**. Plus, **remote control** capabilities from a distance of 32ft. **Mounts and accessories are included.**

Find out more about the AKASO V50 Pro SE action camera at:
www.akasotech.com



“A portion of every V50 Pro SE sale will go to support the Leave No Trace Access Fund”

World-famous rock climber Tommy Caldwell is an AKASO action camera ambassador.

Connect with AKASO at:

- www.facebook.com/akaso.official
- www.youtube.com/akaso_official
- www.instagram.com/akaso_official
- www.twitter.com/akaso_official



AKASO

Go Beyond



Quest for Magic



An example of using deeper depth of field on a wider shot to create a realistic-looking landscape.

mocap sessions. Finally, because a good part of the movie is traveling in vehicles, we shot live-action footage from various car mounts and our other lead artist, Leo Santos, tracked the camera vibration using [Foundry's] Nuke. We layered all these imperfections into the shots to create that physical believability.

In most of the sequences of *Onward* that I saw, I noticed there's

a fair amount of depth of field.

Calahan: [Laughs.] Yeah, we talked about that a lot, especially early on, to decide what the general feel of the whole show would be, including the depth-of-field guidelines, light levels and how they might change for time of day, desired apertures, shutter speed, ISO, et cetera. And then we'd get in there, take a pass at it, look at it and decide what

we liked. And we'd come to some sort of consensus that made both of us and the director happy.

Habib: Sometimes Sharon would say, 'Can we open up one more stop?' and I was usually like, 'Yeah! Let's do it!' We developed some tools on this film to be able to track focus more closely. The tool was a bit like 'false color' exposure mode, but for focus — whatever was in front of the depth of the field would go yellow, whatever was behind it would go red, and whatever was in focus would be green. With shallower *f*-stops, we had to keep a closer eye on what was sharp and what wasn't [so we used this false-color system for our reference]. You wouldn't think you could end up with an accidentally out-of-focus character in animation, but you can!

What software are you using?

Calahan: Our camera-layout software is the same one our anima-



The ultra-bright LED point source with a variety of optics.

Orbiter is an ultra-bright, tunable, and directional LED fixture from ARRI. All systems in Orbiter are completely new and designed with versatility in mind. Orbiter's new six-color light engine delivers a wide-color gamut and outstanding color rendition across all color temperatures along with industry-leading, smooth dimming from 100 to 0%. With its changeable optics, Orbiter can transform into many different types of lampheads including projection (profile), open face, soft light, and other future possibilities. Orbiter is the most advanced luminaire ever created with exciting new technology packed into every fixture.



Open Face Projection Light Bank Dome

Learn more about
Orbiter's extensive features:
www.arri.com/orbiter

Distributed by:



Maccam Inc.
7011 Hayvenhurst Ave.
Van Nuys, CA 91406

Tel. 818-780-5600
sales@maccam.tv
www.maccam.tv

Orbiter® is a registered trademark of Arnold & Richter Cine Technik GmbH & Co. Betriebs KG.



tors use, proprietary software called Presto. Our lighting software is a heavily customized version of [Foundry's] Katana. We use RenderMan as our renderer.

It's wonderful and fascinating that Pixar places so much importance on the art of cinematography. We're seeing that art expand far beyond traditional photography, and you both represent that new path beautifully.

Calahan: Thank you! It is also very inspiring for us to see the kind of work Chivo Lubezki [ASC, AMC] did on *Gravity* [AC Nov. '13] and Caleb Deschanel [ASC] brought to *The Lion King* [AC Aug. '19 and page 72 of this issue]. Seeing that crossover is really exciting. In animation there are very few rules. You can do a film like *Spider-Man: Into the Spider-Verse*, which has a very 2D, hand-painted look, or you can do something like *The Lion King*, which is trying to be



This shot, another example of deeper depth of field, simulates rays of sunlight passing through the breaks in the clouds.

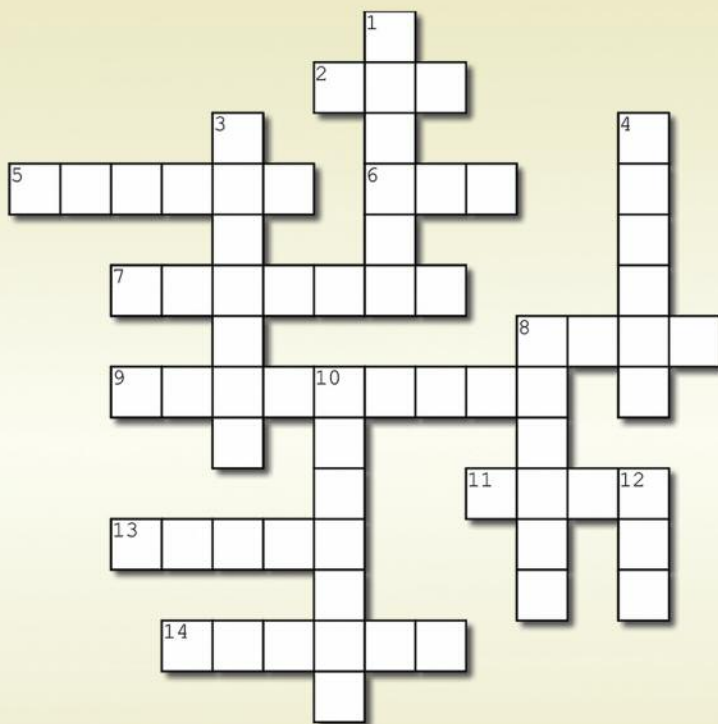
much more photo-real. It's really a very wide palette to play with.

Habib: It's wonderful to see traditional cinematographers become more involved in the animation world, because it's all cinematography. It's all about the lighting and the camera; those are the common links between the virtual and physical worlds. When there is a lens and there

is light, there is cinematography, even if those lenses and lights are virtual! And in the end, an animation director of photography and a live-action director of photography are concerned with the same thing: How are we telling this story with the visuals?

Calahan: It's all about making images. ♦

QUASAR SCIENCE



Across

- 2. Incandescent Soft Light
- 5. _____ Science
- 6. Cross _____
- 7. 'C' in C-Stand
- 8. Opposite of Flood
- 9. Quasar Light with 2K to 6K Kelvin
- 11. Soft Frontal Source
- 13. Used to Contain the Beam
- 14. Quasar Light Clip

Down

- 1. A Hard Edge Light
- 3. Quasar Light with RGBX
- 4. A 2K Fresnel Light
- 8. A 5K Fresnel Light
- 10. Overhead Light Source
- 12. Light Emitting Diode

Rather than another boring gear advertisement...
Please enjoy this nifty crossword puzzle!



Strange Machines



Jeff Cronenweth, ASC and Mark Romanek bring an artist's surreal sci-fi digital paintings to life for Amazon's *Tales From the Loop*

By Jamie Stuart

***Tales From the Loop* is a true product of modern media.**

The process began without fanfare in 2013, when Swedish artist Simon Stålenhag posted his first paintings to the internet: digital illustrations based on original reference photos that combined mundane, naturalistic settings with bizarre, science-fiction elements. Following the viral success of those images, a Kickstarter campaign was launched to fund a book collection of the artwork, and it ultimately raised \$321,680, even though the goal was only \$10,000.

The book was designed as an alternate-reality take on childhood nostalgia. Its protagonist reflects on growing up during the 1980s in the small, country town of Mäläröarna, where work on a gigantic, underground particle accelerator nicknamed “the Loop” is responsible for littering the landscape with giant robots and rusted, decaying industrial machinery. Two subsequent books, *Things From the Flood* and *The Electric State*, followed.

Eventually, the world created by Stålenhag caught Hollywood's eye. Moving the story's setting to Mercer, Ohio, showrunner Nathaniel Halpern developed an eight-part television series with producer Matt Reeves — which explores the strange, surreal, sci-fi-infused tales of the town's denizens, who are all “connected” to the Loop — and the project was greenlit by Amazon Studios. To helm the pilot of *Tales From the Loop*, which premieres April 3, they turned to legendary music-video director Mark Romanek, who also directed the features *Never Let Me Go* and *One Hour Photo* (AC Aug. '02).

Romanek, an art connoisseur who had previously

found inspiration in the work of Marina Abramović, Edward Gorey, Joel-Peter Witkin and Erwin Wurm, among others, was already well aware of Stålenhag's illustrations. "What I liked about the paintings was how little you knew about them, and how there was a big narrative going on that you could fill in for yourself," says Romanek. "It became my job to fill it in, but we wanted to keep that enigmatic quality."

Building on Stålenhag's artwork, Halpern constructed the series' narrative tone by referencing the films of Ingmar Bergman, Andrei Tarkovsky and Krzysztof Kieslowski — hardly typical choices for an American sci-fi TV show. But they were ideal points for Romanek, who says of his initial meeting with Halpern, "I liked him immensely. He's in his thirties, but he's got a deep knowledge of cinema. I was like, 'Okay, I'm down with that stuff.'" Other references Romanek ultimately brought to the show's aesthetic were Ang Lee's *The Ice Storm* (shot by Frederick Elmes, ASC) and the photography of Cristina Coral.

Once onboard, Romanek wasted no time in approaching two-time Oscar-nominated cinematographer Jeff Cronenweth, ASC, with whom he has collaborated for 25 years. "Jeff always comes to mind immediately," says the director. "I've had the greatest experiences with him. He's the chilliest, most poetic guy. He comes across as a patient suburban dad, but he's an artist — a



◀◀ An underground machine brings about anomalous occurrences for the citizens of Mercer, Ohio in the Amazon Prime series *Tales From the Loop*. ▲ A girl (Abby Ryder Fortson) and boy (Duncan Joiner) happen upon a mysterious cabin in the woods. ◀ Cinematographer Jeff Cronenweth, ASC (left) and director Mark Romanek have collaborated on projects for 25 years.

sculptor of light. We vibe together really great."

Romanek and Cronenweth first worked together on Michael and Janet Jackson's 1995 *Scream* video, photographed by Harris Savides, ASC. Cronenweth was the B-camera operator on that project, and he went on to shoot many music videos for

Romanek, as well as *One Hour Photo*, Romanek's first feature. "I've known Mark a very long time," says Cronenweth. "We've done a lot of music videos, and those videos were always pushing the boundaries. We were always doing something unique, trying to create something new."

Romanek had previously

Cronenweth grew up in the industry learning from not only his father, Jordan Cronenweth, ASC, but also such cinematographers as John Alcott, BSC; Conrad Hall, ASC; and Sven Nykvist, ASC. His experiences with Nykvist, with whom he worked as 1st AC or camera operator on seven features, came in particularly handy on *Tales From the Loop* because Winnipeg's light is so similar to Sweden's. "I channeled Sven a lot on this," says Cronenweth.

Cronenweth first met Nykvist as a child, and recalls him talking about wanting to bring his version of soft light to the United States. "Sven used to joke that he didn't [light] anything — he would just adapt to what the Swedish weather was doing. It was always overcast. There was always a window with soft light coming through."

Nykvist's mastery of natural light served as a primary model for the exteriors on *Tales From the Loop*. According to Cronenweth, "We were very careful about where we were at what time of the day. We were trying to always get the long shadows, to create drama photographically as much as we could to add weight to the story."

Strange Machines



◀ The robot's support equipment is marked to be removed in post. ▼▼ Cronenweth, Romanek and crew have a look at the large automaton. ▼▼▼ Boom operator Sacha Rosen, key grip Jim Sweet and A-camera dolly grip Rob Thomson track Fortson and Joiner along a snow-covered path.



directed an episode of *Vinyl* (AC March '16) and an unaired pilot for *Locke & Key*, but Cronenweth was new to the TV-series world. Neither was interested in creating something that looked like a typical TV show, however. "My mantra was, 'I'm not making a TV pilot, I'm making a film that I would want to see on a big screen,'" says Romanek.

Production on the pilot began in early 2019 in Winnipeg. The location, chosen for its pristine winters, presented a host of logistical problems, including subzero temperatures, which were as low as -30°F when shooting commenced, as well as short daylight hours and the challenge of replacing snow (both practically and digitally) that was destroyed during the construction of sets. Camera equipment was often transported across the snow using toboggans.

Another concern was the dynamic range of the digital cameras, given that so much material would be shot outside during the day, with sun reflecting off the snow. Romanek says, "Two or three years ago, we probably couldn't have shot this digitally. [Digital] has arrived only just now, thanks to large-format cameras and the quality of the sensors. I am overjoyed with the way this pilot looks. Might it have looked somehow more tactile or more emotional or richer on film? Maybe a little, but I'm happy because the advantages of [digital] are now outweighing the disadvantages. I do feel somewhat converted."

Whereas Romanek is a slow convert to digital, Cronenweth is an exclusive practitioner. "It's been 15 years, and it's been a learning curve — a trusting curve, following it all the

Full Frame

Enjoy the full experience.



U35 =
IC 34,6 mm

FF/VV =
IC 46,3 mm

IRO Interchangeable
Rear
Optics
Technology™



S35 =
Image Circle Diagonal
31,1 mm

1.85 :1

Optimo Ultra 12X Multiple Format Design : the 24-290 reference redefined

The new Optimo Ultra Zoom covers the familiar 24-290 12X range in S35 (T2.8). Thanks to the IRO Technology (Interchangeable Rear Optics), the lens covers multiple imaging formats up to Full Frame/Vista Vision, with optimized performances. The industry reference lens is now redefined with a completely new design, providing an even higher optical quality, stronger mechanics and easier maintainability. The perfect companion to Full Frame cameras.

To discover our collection, visit www.angenieux.com

Follow us **#angenieux**

On display at NAB : Band Pro stand C7920



Romanek checks the rig for a scene with the girl in her bedroom.

way through," says the cinematographer.

"*The Social Network* [AC Oct. '10] was the first [digital] movie I dove into," Cronenweth continues. "Before that, I'd been going back and forth [between film and digital] with commercials and music videos. It was a novelty back then. People would say, 'Let's do something different — let's shoot Red One or the [Arriflex] D-21

or the [Sony] F900.' New technologies were being introduced, but [shooting digitally] was in its infancy. The [Arri] Alexa hadn't come out yet; it was before the Mysterium-X chip on the Red. I had the benefit of testing everything with [director David] Fincher for *Social Network*; we tested different cameras all the way to the end, which you don't always get to do.

"We adapt," Cronenweth adds.

Optics Spotlight

Jeff Cronenweth, ASC initially chose the Primo 70 (T2.0) series of lenses for *Tales From the Loop*, but early on in production, ASC associate member and Panavision senior vice-president of optical engineering Dan Sasaki offered him the very first Panaspeed lenses retrofitted for digital large-format cameras: Panaspeed 70s. These allowed him to shoot at T1.4. "Dan initially made three lenses for me — a 24mm, a 50mm and an 80mm — and sent them up for us to test," recalls Cronenweth. "They were kind of bastardized and had a weird 54mm iris. We needed a complete set because it was a two-camera show, and Panavision made sure we had one by the time we started shooting."

"That's another advantage of working with Jeff Cronenweth: they treat him like a prince!" director Mark Romanek says. "You get access to things other people might not have access to."

"I've never received a lens from anyone with serial No. 00001 before," adds Winnipeg-based A-camera 1st AC Jeffrey Hammerback.

Throughout the 21-day shoot, the Primo 70s came into play mainly for plate work and 2nd-unit work, but Cronenweth also used them when a specific focal length was not available in the Panaspeed 70s. Hammerback recalls, "The 65mm, 125mm and 200mm Primo 70s were used often."

TECH SPECS

1.78:1

Digital Capture

Panavision Millennium DXL2

Panavision Panaspeed, Primo 70

"If you're intuitive and you keep pushing as far as you can with whatever technology you happen to have in your hand at the time, you'll push that technology as far as it will go and see where you end up."

Where he ended up on *Tales From the Loop* was with Panavision's Millennium DXL2, recording in raw at 6K. "6K was both an aesthetic and an economic consideration," says Cronenweth. "We wanted to exploit the depth of field — or lack thereof — and also stay within our means."

The cinematographer has shot almost exclusively with Red cameras since *The Social Network* and was keen to employ Red's 8K Monstro sensor, around which the DXL2 is built, but he notes that the decision to use Panavision's new large-format camera was motivated mainly by the lens options it afforded him. He explains, "Mark and I wanted to shoot 70mm glass, and the lens choices Panavision had were considerably more grand than what anybody else had." (See sidebar, this page.)

On *Tales From the Loop*, two specific aesthetic decisions were made that put Panavision's lenses and the DXL2's sensor to the test: Cronenweth almost always shot wide open or close to wide, creating an extremely shallow depth of field, and, upon witnessing Winnipeg's gorgeous extended magic hour — "manna from heaven," says Romanek — the filmmakers decided to convert all of the script's night exteriors to late day, taking advantage of the Monstro's full dynamic range.

Regarding the shallow depth of

Filmtools[®]

YOUR STORY CAPTURED



C100 MKII



C200



C300 MKII



C500 MKII



C700 FULL FRAME

YOUR PREMIERE CANON CINEMA HOUSE

Order online at www.filmtools.com or visit us in-store for customer service provided by passionate industry professionals



4.9 OVERALL SATISFACTION RATING

CINEMA EOS

Canon

Available Now

Filmtools[®]

Call your representative TODAY!
(818) 980-9916

Burbank: 1400 W. Burbank Blvd.
Burbank, CA 91506

Chicago: 845 N. Church Ct.
Elmhurst, IL 60126

Strange Machines



▲▲▲ From right: A-camera 1st AC Jeff Hammerback and 2nd AC Aaron Mallin, camera trainee Juan Panelli, Romanek, and A-camera operator Len Peterson plan the next shot. ▲▲ Showrunner Nathaniel Halpern, Peterson, Romanek, Rosen and Thomson ready a scene featuring Fortson and actor Rebecca Hall. ▲ Romanek checks the angle for a scene outside the “Loop” facility.

field, Cronenweth explains, “Most of my career, I’ve subscribed to that. Depth of field is a creative storytelling tool [wherein] we get to decide where we want the focus to be. It helps you focus on the humanity of the story, which was especially important for this story.”

“It becomes incredibly complicated for the camera assistants, though,” the cinematographer adds. “I had two amazing focus pullers in Winnipeg, Jeff Hammerback and [B-camera 1st AC] Packal Boisvert. They did an outstanding job.”

Hammerback admits he was often worried he’d get it wrong and upset Romanek, a notorious perfectionist. “Mark is kind of intimidating — he’s had this famed career — and I’d see him coming over, and it was like, ‘Oh, God, is this the moment when I get fired?’ And then he’d say, ‘That was a really good shot. Thank you.’ He was quite appreciative.”

Romanek has nothing but praise for Hammerback’s work: “It was stunning. There’s a shot in the pilot that at one point was going to be a continuous shot of a little girl running through the woods at magic hour [which was ultimately edited to run as two separate shots]. We were wide open, and she was running from a good 50 yards away to a point past the camera, and the focus was razor for the entire take. That’s hard.”

Most of the interiors were sets, and Cronenweth designed his lighting strategies around practical sources, adding fill where needed. “I tried when possible to use tungsten-filament bulbs in all relevant practicals, as it’s a period piece, per se, and justified — but my fill sources varied,” he says. “The fill was always driven by practicals or ambient sources, and ranged from [Arri’s] LED SkyPanels, to fluorescent and LED tubes, to tungsten globes.”

Many images make full use of the Monstro sensor’s wide dynamic range, stretching from clean highlights to crisp blacks. Recalling one of

BOOST YOUR POSSIBILITIES

Active Head Milli MAX



Active Head Milli



OperTec

**MAX Stabilization
MAX Power
MAX for IMAX**

Give us a call

Europe OperTec Europe
+380 95 673 63 63
dir@opertec.tv

Canada William F. White International Inc.
+1 416 239 5050 - Toronto
wseeast@whites.com
+1 604 428 2144 - Vancouver
wsewest@whites.com


USA Elite Camera Support
+1 818 577 38 43 - Los Angeles
james@elitecamerasupport.com

Dynamic Remote Systems
+1 602 405 65 41 - Atlanta
craignix@icloud.com



**MEET THE NEWEST
GYRO-STABILIZED HEAD
ON CINE GEAR**

Booth #18

f OperTecWorld  oper_tec office@opertec.tv

www.opertec.tv

Strange Machines



The girl and her mother (Elektra Kilbey) have an intense conversation over chess.

his influences, Cronenweth says, "Conrad [Hall, ASC] used to say a funny thing: that there should always be something that's too hot, or over-exposed, and something that should

be underexposed, but nothing should be properly exposed.'

"The picture is a cerebral experience," he adds, "and the visuals give the audience a palette so they can

then fall into and be seduced by how clever the writing is and be led along this journey. To showboat and do overtly dramatic things [visually] would have taken away from the subtlety of the story."

Although the overall approach was minimalistic, one very specific choice stands out: the recurring use of slow motion. Sections of the pilot were shot at 48 fps so the filmmakers could adjust the timing in post. "There were dramatic moments where we wanted to elongate the experience or slow down reality a bit to either extend the motion or give it an awkwardness, an off-pace quality, some kind of visual tension," Cronenweth says. Romanek adds, "There are flashbacks, and I knew that some of it needed to be dreamy. I had this idea that because the Loop facility was exploring space and time, and Nathaniel was playing with that in the storytelling, the filmmaking



PERMISSION TO LAND

Total remote control
V5 full color light engine
Motorized ZOOM 13° to 60°
Fresnel + multiple lamphead system
Breakthrough output 400W - 48,000 lumens

velvetlight.tv

NABSHOW '20. Booth C8945

Cronenweth used the DXL2's built-in Light Iron Color Film LUT throughout the shoot. With a laugh, he recalls, "I really enjoy the way it falls off, and the texture, and when I called Michael Cioni [formerly of Light Iron and Panavision] to tell him how much I liked the color science, he said, 'Well, you created it — it's based off [the LUT developed for] *The Social Network*.' I had no idea. Maybe that's why I was so comfortable with it; it fit my sensibilities."

Light Iron colorist Ian Vertovec, one of Cronenweth's longtime collaborators, recalls that when Cioni was developing the DXL in his capacity as Panavision's senior vice president of innovation, Cioni "reached out to me and asked me to design a look that would be unique to Panavision, and I built two LUTs. One was just a good-looking digital look, and that became Light Iron Color, and the other was a more cinematic, vintage, filmic look, and that became Light Iron Color Film. And I built [the latter] off my experience working with Jeff."

grammar should perhaps play with space and time, too."

Back in Hollywood, Light Iron colorist Ian Vertovec spent three days grading the pilot, working with FilmLight's Baselight. The camera files were recorded in raw, which allowed the completion of an HDR finish, as mandated by Amazon.

"I tried to incorporate a rich, soft quality," says Vertovec. "[We wanted] these contradictory concepts of having contrast, but also an overall

soft feel. Normally, contrast makes everything seem harsher and sharper. We were trying to ride that line where there's a lot of contrast, but then there's also this soft, painterly quality that we were trying to preserve."

Other episodes of *Tales From the Loop* were shot by cinematographers Ole Bratt Birkeland, Craig Wroblewski, CSC and Luc Montpellier, CSC. The show's directors include Jodie Foster and Charlie McDowell.

Reflecting on the experience,

Cronenweth notes that *Tales From the Loop* is "something different — something people have to think about when they watch it." ♦

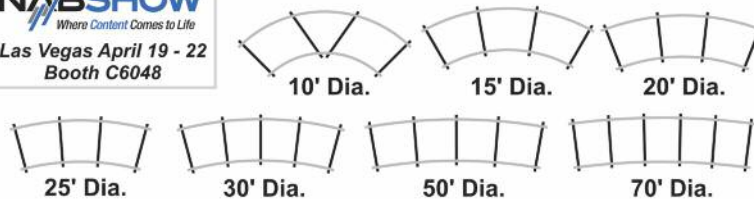
CAMERA DOLLIES, JIB ARMS & MORE



Accessory Carts for Model 10 & 11 Dollies

See us at NAB 2020
NABSHOW
Where Content Comes to Life
 Las Vegas April 19 - 22
 Booth C6048

ROUND TUBE TRACK



J.L. Fisher

Motion Picture & Television Equipment

"J.L. Fisher® products are proudly made in the U.S.A."

NEW DOLLY ACCESSORIES

Scooter Board

- Fully Articulating Wheels
- Mitchell Mount
- 4 Tie downs
- 4 Speed rail receivers
- 4 Carrying handles
- 44 3/8" pre drilled holes for high hats and other accessories
- 3 Tripod foot locators
- 34 1/2" W x 53" L

Order Code: **SCOA**

Note: Red tiedowns, speedrail, and tripod not included



Short Front Board

is a shorter version of the standard front board (F).

For Model 10 & 11 Dollies.

Order Code: **SFB**



Short Narrow Front Board

is narrower for tight quarters and doorways.

For Model 10 & 11 Dollies.

Order Code: **SNFB**

AVAILABLE FOR RENTAL WORLDWIDE

J.L. Fisher, Inc. 1000 W. Isabel Street, Burbank, CA 91506 U.S.A.

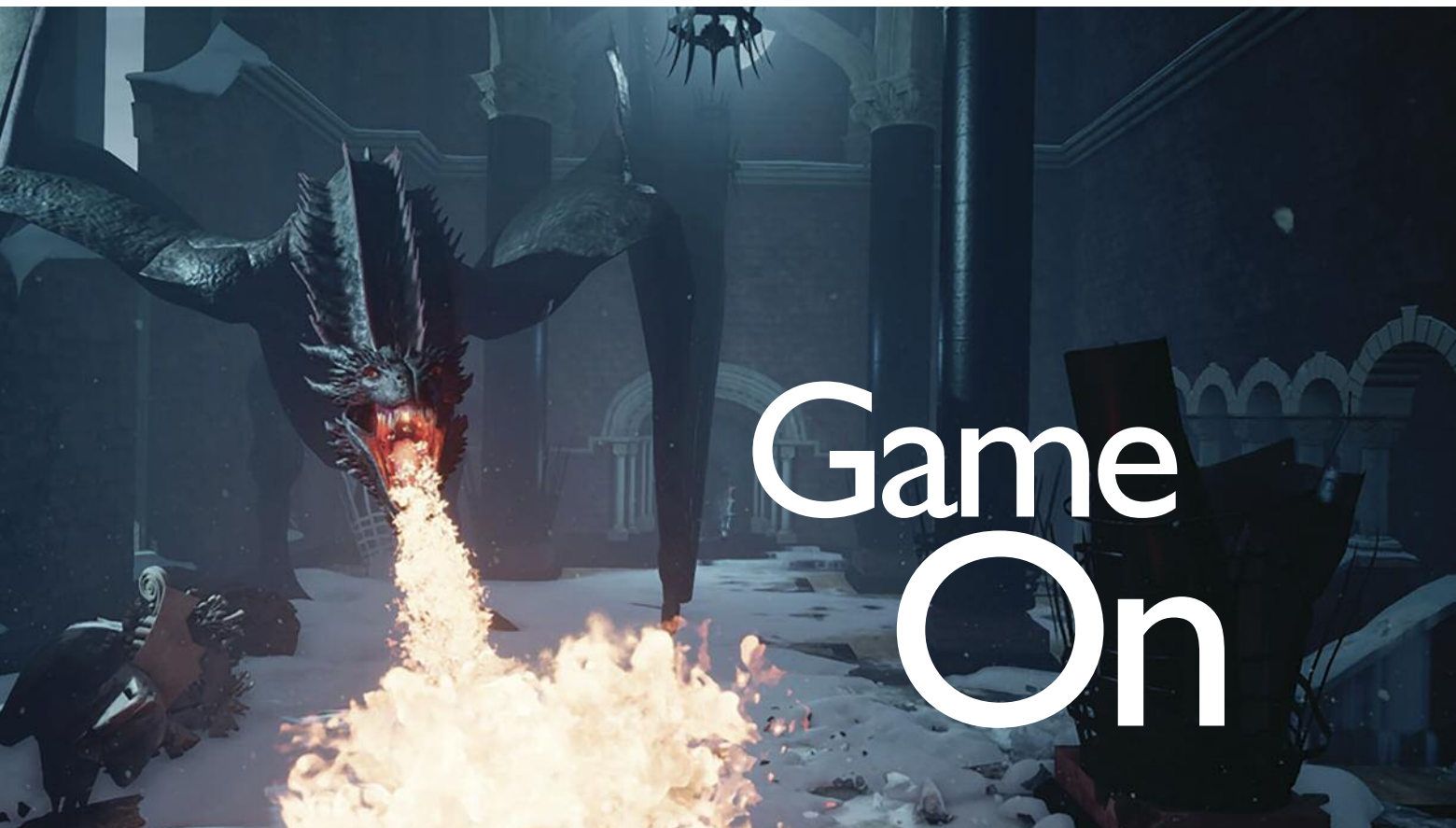
Tel: (818) 846-8366 Fax: (818) 846-8699

Web: www.jlfisher.com e-mail: info@jlfisher.com

J.L. Fisher, GmbH Emil-Hoffmann-Str. 55-59 50996 Köln, Germany

Tel: +49 2236 3922 0 Fax: +49 2236 3922 12

Web: www.jlfisher.de e-mail: info@jlfisher.de



Game-engine technology expands filmmaking horizons

By Noah Kadner

Game engines such as Unreal Engine and Unity were, as their umbrella term implies, originally designed for the development of real-time applications, aka video games. In recent years, advances in both hardware and software have ushered these engines into the purview of cinematographers. Game engines are now used to create many forms of visualization for filmmakers, including previs, techvis

“Most cinematographers who are on the technical side pick up [game-engine-powered previsualization] very quickly. If you want to add light coming through the window, the steps to get there are very quick. It’s the same way you do it in the real world.”

— Matt Workman,
cinematographer and software designer

and postvis — and even final in-camera movement and imagery for such productions as *The Lion King* (AC Nov. '19; see sidebar, page 72) and *The Mandalorian* (AC Feb. '20).

Traditional 3D animation applications such as Autodesk’s Maya and 3ds Max have long played a significant role in visual effects. Their comparatively slower performance, however, has seen their benefit focused more on pre- and postproduction, where time is somewhat less critical than in live-action production. These 3D apps prioritize final image quality over performance; as a result, image render times can easily stretch into hours or even days per frame, depending on the complexity of the shot and the computational power of the hardware.

By contrast, game engines were initially optimized for speed first and image quality second, in order to support gameplay in real-time, often at frame rates of 60 frames per second or more. And in the past few years, major technical advancements in the graphics-processing unit (GPU) of computers have enabled such engines to render production-quality imagery while maintaining their real-time speed.

Commensurate with these hardware improvements, developers like Epic Games (creators of Unreal Engine)



◀ For Season 8 of HBO's *Game of Thrones*, The Third Floor offered real-time rendering during production — which, for example, helped represent a dragon (pictured here) as shots were composed, framed and performed. The company also provided virtual versions of story locations for preproduction "scouting." ▲ For *The Mandalorian*, an LED-wall system known as "the Volume" allowed the filmmakers to capture actors in a photo-real (or nearly so) environment, in-camera and in real time, with the aid of Epic Games' Unreal Engine.

and Unity Technologies (creators of Unity) have optimized their software for direct inclusion into the production pipelines of features and television. These changes are intended to support the crossover between traditional cinematography and computer-generated imagery — a dynamic that can serve filmmakers in a whole host of ways.

Matt Workman, a cinematographer and software developer, is working to erode even further the boundaries between filmmaking and CG with his creation of Cine Tracer, a real-time cinematography simulator built with Unreal Engine. The application — offered directly to filmmakers — enables the viewing of real-world camera and lighting equivalents in simulated, user-designed movie sets to produce highly accurate shot visualization.

"My background includes about 10 years of traditional cine-

matography, mostly in commercials around New York City," Workman says. "During that time, I worked with a lot of visual-effects companies on effects-heavy commercials — so I started creating previs tools to communicate in 3D and plan with the teams. A couple of years ago, I started developing Cine Tracer to handle that workflow more efficiently. I [designed] it as a video game [that's controlled similarly to playing a third-person shooter game], but it's

intended to help filmmakers quickly visualize their shots.

"I went to school for computer science, but I've always been tinkering with 3D," he says. "Luckily, it's 2020 and there's YouTube, so the amount of available free education is incredible, as long as you have the time and the patience to learn."

Regarding the primary advantage that real-time engines have over the more traditional computer-animation software, Workman notes, "The

In addition to the obvious benefits of real-time rendering, Casey Schatz, The Third Floor's head of virtual production, sees these software and hardware innovations as facilitating greater direct collaboration between studios like The Third Floor and cinematographers. "Historically, as previs creators, we were brought in very early, often before the DP was even hired," he says. "So a certain amount of work had already been done, and when the cinematographer finally came on, they often felt like they were just painting by numbers. No one in visual effects wants that approach. We're all trying to blend in with the wheel of filmmaking that's existed since the Lumière brothers."

Game On



◀ Director of photography and previs artist Matt Workman's real-time "cinematography simulator" Cine Tracer is powered by Unreal Engine. ◀▼ Workman at a demo of an LED Volume. The realistic background is actually an image that appears on the LED wall.

iteration time is much faster. If you want to see a camera move [for a specific shot] in order to determine, for example, what it would look like if you start close and then pull out wide — to see that change with Maya, you're taking up to a couple of hours to render maybe 120 frames at high quality. In Unreal, that change happens instantly."

Visualization studios like The Third Floor have leveraged Unreal and other real-time engines on projects for the past several years to design previs, techvis and postvis services, and other forms of animation used in various phases of the production chain. The Third Floor's credits span multiple Marvel movies, *The Rise of Skywalker*, (AC Feb. '20) and other recent *Star Wars* films, as well as popular episodic series such as *The Mandalorian* and *Game of Thrones* (AC May '12 and July '19).

Casey Schatz, The Third Floor's head of virtual production, has worked on such projects as *Thor: Ragnarok* (AC Dec. '17), *Gemini Man* (AC Nov. '19) and *The Mandalorian*, and has helped innovate everything from flame-throwing motion-control robots to real-time virtual eyelines. "Just a few years ago, game engines weren't as conducive to moviemaking," he says. "Unreal's virtual camera didn't have a focal length or a film back [aka aperture gate] — it just had a field of view. Now there's focal length, film backs, depth of field, *f*-stops, ISO and shutter speed. Epic even added the ACES color workflow into the rendering pipeline.

"A respect for and acknowledgment of traditional filmmaking has made its way into the software," Schatz adds. "So you can say, 'I'm shooting anamorphic with Panavision Primos,' and we'll have a menu of



As the world of gaming has provided tools for the advancement of filmmaking, the cinematography community has begun to assist the game creators in kind. As reported in the February 2020 issue of *AC*, Society member Dan Mindel and Society President Kees van Oostrum visited the Vancouver campus of game-development company Electronic Arts to discuss techniques in cinematography and how they may be applied to the design of EA's projects.

"To me, bringing traditional cinematography into gaming seems totally logical," Mindel said. "The more we — the [traditional] filmmakers, who use cameras and lights and people — cross into the gaming world and share our knowledge, the better the games are going to look. And the more we, as cinematographers, learn from the game artists, the better the CG in movies will be."

NEW Sony PXW-FX9K XDCAM 6K Full-Frame Camera System w/ 28-135mm f/4 G OSS Lens

Whether you're shooting documentaries, events, reality TV, education, or corporate productions, the PXW-FX9K XDCAM 6K Full-Frame Camera System from Sony has you covered with its powerful and flexible 4K interchangeable lens camera system. The PXW-FX9K features a full-frame, oversampled 6K Exmor R CMOS sensor that allows you to capture 4K images with cinematic depth of field. The camera's E-mount is machined from stainless steel and allows you to use E-mount lenses.

SOPXWFX9K | \$13,498.00

Visit BandH.com for the most current pricing



Canon EOS C200 EF Cinema Camera and 24-105mm Lens Kit
CAC20024105



ARRI ALEXA SXT Plus Camera Body (LDS PL)
ARK1.0006383



Panasonic Cinema VariCam LT 4K S35 Digital Cinema Camera (EF Mount)
PAAUV35LT1G



Sony E PZ 18-110mm f/4 G OSS Lens
SOSELP18110G



Canon 14mm Sumire Prime T3.1 (PL Mount, Feet)
CASE14PL



Leitz Cine 28mm M 0.8 f/1.4 Full Frame M-Mount Lens (Feet)
LE28M08F14L



Litepanels Gemini 1 x 1 Bi-Color LED Soft Panel (Standard Yoke, US Power Cord)
LI9451301



ARRI cforce Set for ALEXA Mini (Meters)
ARCFSAMMS



CINEGEARS Rattlesnake Complete Kit with Standard Motor
CI2807



ARRI SkyPanel S30-C LED Softlight (Blue/Silver, Edison)
ARS30CM3MBS

Learn, Explore and Buy at the Largest Photo Retailer

Free Expedited Shipping on orders over \$49*



Call an Expert Today
877-657-9686



www.BandH.com
Where you will find information on over 400,000 items



Visit Our SuperStore
420 Ninth Avenue
New York, NY 10001



Cash in or Trade up
Used Equipment
We Buy, Sell, and Trade

*Applies to In-Stock Items. Some restrictions may apply. See website for details. NYC DCA Electronics Store Lic. #0906712; NYC DCA Electronics & Home Appliance Service Dealer Lic. #0907905; NYC DCA Secondhand Dealer - General Lic. #0907906 © 2020 B & H Photo & Electronics Corp.



Society members Caleb Deschanel (wearing goggles) and Robert Legato (right), alongside Magnopus virtual-production producer A.J. Sciotto, at work on the photo-real animated feature *The Lion King*, which was produced with the aid of the Unity game engine.

Game-engine technology can provide cinematographers with ways to previsualize in a simulated filmmaking environment — but it can also serve as a filmmaking medium in itself. With the aid of game-engine tech, veteran cinematographer Caleb Deschanel, ASC leveraged his extensive traditional cinematography experience to capture *The Lion King* with entirely virtual characters, and settings as well (save for a single shot). Making this possible was visual-effects supervisor Robert Legato, ASC and a team of technicians and artists at Magnopus, who coupled the Unity game engine with various traditional dollies, cranes, tripods and other camera-movement tools to enable Deschanel to manually operate virtual cameras while directly interacting with live animation.

“The essential thing for me in filming this way is having enough visual detail so I can make the same kind of decisions I always make on a set,” Deschanel tells *AC*. “That informs how you compose the shot and how you light it.” Though not yet photo-real — as the process to make them so would unfold later at MPC in London — the filmmakers’ subjects were imbued with enough detail by the real-time interactive system “that you can read their emotions and understand how close or how wide you need to be,” Deschanel says.

Legato — who was a key member

of the virtual-camera crew in addition to his role in developing the technology — adds, “We’re essentially motion-capturing the Steadicam operator attached to the Steadicam or a dolly grip attached to the dolly. With the game engine, everything is live and under your control. You just walk over to the place that seems the most appropriate for you to film it. And because it’s live, you can say, ‘Let me get a little lower or a little higher, or let me try this same position with a 20mm instead of a 24.’ You’re tapping into your on-set intuition, which is ultimately years and years of experience, instead of overintellectualizing it.”

With these tools at their disposal, Deschanel and crew could not only capture the motion and composition of their virtual cinematography, but make visual design choices as well. “I would sit with [lighting director] Sam Maniscalco, who was my gaffer, with the files of all the sets,” Deschanel recalls. “We had a choice of 350 different skies to give us the right mood for every scene. It was just like being a cinematographer [in a traditional environment], but having far more control than you normally would. On a [traditional set], you don’t have control over the clouds and sky, so you have to follow the sun throughout the day. It was exciting and a lot of fun — I was really surprised.”

— Noah Kadner

those exact focal lengths so that you can’t previsualize a focal length that doesn’t exist in your real lens kit.

“I’m working on the *Avatar* sequels now using Gazebo, Weta’s proprietary real-time engine,” he says. “Russell Carpenter [ASC], the movies’ cinematographer, sat down with the lighters before we did any of our live action in New Zealand. Together they set the tone, the mood, the general key-light direction, the key-to-fill ratio, et cetera; all of this was done using [cinema terminology] Russell is accustomed to. Thus, the line in the sand between traditional cinematography and computer graphics is disappearing more and more every day.”

Indeed, the rendering time of high-resolution interactive imagery has advanced to the point that it can actually appear onscreen as-is or with minimal adjustments in post — as employed, for example, on *The Mandalorian*. “That was our goal,” said Greig Fraser, ASC, ACS (who shot the Disney Plus *Star Wars* series along with Barry “Baz” Idoine), as reported in *AC*’s February 2020 issue. “We wanted to create an environment that was conducive not just to giving a composition line-up to the effects, but to actually capturing them in real time, photo-real and in-camera, so that the actors were in that environment in the right lighting — all at the moment of photography.”

When asked which specific advancements in real-time engines have pushed forward their synergy with traditional cinematography, Schatz explains that the ability to simulate bounce light, something so fundamental to traditional cinematography, is a game changer because only recently could this happen in real time or even close to it. “[During a previs session] a traditional cinematographer could be looking at a shot and say, ‘If we put a Kino Flo 6 feet away and add a bounce card, what would be the result?’ We can now show that result very quickly and accurately. Prior to these advancements, computer lighting



"With the new built-in looks created by the ASC and the stunning black-and-gold design, this camera is as good-looking as the images it takes."

— Mandy Walker, ASC, ACS

LEICA M 10-P "ASC 100 EDITION" The M for cinematographers.

The Leica M 10-P "ASC 100 Edition" continues Oskar Barnack's ingenious idea and translates it into a fitting tribute to the world of cinema on the occasion of the 100th anniversary of the founding of the American Society of Cinematographers.

The M 10-P "ASC 100 Edition" is an exclusive professional tool for aiding cinematographers and filmmakers in their search for the truly exceptional visual experience.



Please contact the ASC to order this unique Leica M10-P "ASC 100 Edition" at www.theasc.com/leica





Game On



From left: *The Lion King* director Jon Favreau, Deschanel and production designer James Chinlund explore the previsualized world.

“For directors who are not veterans of giant visual-effects tentpole films, it’s a new experience when they first get to the set. But [prepping] in a low-pressure, small-audience situation, and exploring and practicing via [real-time interactive previs], prepares them for the set like nothing else could.”

— Johnson Thomasson, The Third Floor real-time developer

was more analogous to theatrical lighting; you could aim a light and cast a shadow, but then you would have to cheat a bounce light by adding other lights to the sides at lower intensities.”

One of Schatz’s Third Floor colleagues, real-time developer Johnson Thomasson (*The Mandalorian*, *Venom*, *Godzilla: King of the Monsters* [AC June ‘19]), is quite directly involved with the intersection of live-action cinematography and real-time animation — specifically via motion capture and “virtual-camera sessions.”

“One of the major benefits to real-time animation is ‘practice time’ for the filmmakers,” Thomasson says. “We worked on *Christopher Robin*, and director of photography Matthias Koenigswieser was able to use a virtual camera rig, playing back animation from the film and recording his camera motion so he could practice operating. He was able to directly

35MM & 16MM FILM CAMERAS • DIGITAL CINEMA CAMERAS • VIDEO FULL HD CAMERAS • CAMERA ACCESSORIES • LENSES
 LIGHTING • DOLLIES • CRANES • FULLY EQUIPPED TRUCKS • GRIP • GENERATORS • SOUND STAGE • EXPENDABLES

FILM EQUIPMENT RENTALS
 MEXICO CITY T. +5255 5676 1113 / +5255 5676 1483

WWW.CTTRENTALS.COM
 CONTACTO@CTTRENTALS.COM

experience the size difference between 12-inch tall Piglet and [for scenes set in the title character's early years] 4-foot-tall Christopher Robin.

"It was a real challenge framing both of them, and something he hadn't considered before coming to our virtual-camera sessions," Thomasson continues. "It allowed Matthias to design his compositions ahead of the actual production. He was shooting with an empty frame [aka, a clean plate] on the day, but having rehearsed virtually, he already knew what the right framing felt like. When directors and DPs go through a virtual-camera session, they discover new ideas, and they're exploring, expanding and coalescing their creativity.

"Another benefit is the physical representation of depth of field, which has never been rendered well in previs in the past," Thomasson adds. "Unreal's depth-of-field camera

Schatz says, "The goal has always been that even someone that has never touched a computer before, but is a remarkable cinematographer, can sit down next to a computer artist and talk in the language that they're comfortable with — *f*-stops, T-stops, shutter speeds, film ISOs, grain, bounce light, diffuse light — the traditional cinematography terms that have existed for more than 100 years."

model is based on real-world cameras. So a cinematographer can ask which stop we're at in a virtual-camera session and get an answer that reflects a physically accurate visual model. In my experience, when DPs learn about that capability, they want to take advantage of it, because depth of field is one of the strongest tools in their toolset for communicating their choices in cinematic language early on in preproduction."

Looking toward the future, Schatz sees game engines becoming further entwined with live-action cinematography. "The hardware and software are going to [continue to advance], and it might almost become

indistinguishable in terms of which imagery is real-time and which isn't," he says. "This is in service of the story and not to show off the technology. The motto of the Previsualization Society is 'fix it in pre.' The more creative decisions you can interactively figure out before you get on set, the better."

Workman adds, "What directors want are iterations. They want to find all the possible challenges early, so the faster you can see a result, understand the issues and create another iteration, the better. Real-time engines make that process happen instantly. It's just like playing a video game." ♦

NEW FreeStyle T44 LED System



Exclusive

Camera profile matching
Gamut selection, 709, P3, 2020
Gels on any Kelvin setting
CIE XY and RGB color selection



Kinoflo.com
Shop.Kinoflo.com

Film Class



Society members offer their perspectives on instructing a film-focused ASC Master Class

By Samantha Dillard

“Following the introduction and popularity of digital capture, motion-picture film has steadily come back into cinematographers’ use,” says ASC President Kees van Oostrum. “We felt that it was our responsibility to teach the use of motion-picture film and expose our students to the convictions of Society members who attribute their artistic expression to it.”

The topic at hand is the November 2019 ASC Master Class, whose exclusive focus was shooting on film. Through the five-day seminar, ASC members Dan Mindel (*Star Wars: The Rise of Skywalker*, *Star Trek*), M. David Mullen (*The Marvelous Mrs. Maisel*, *The Love Witch*), Mikael Salomon (*The Abyss*, *Far and Away*) and Linus Sandgren (*La La Land*, *First Man*) each took the lead, offering their photo-

chemical expertise on such topics as exposure, cinematography techniques through history, the particulars of a practical shoot, and creating experimental art — all with the goal of preserving this specialized skill set for future generations of filmmakers.

AC spoke with the instructors of this special edition of the ASC Master Class.

American Cinematographer: How did you develop the lesson you taught at this film-focused ASC Master Class?

M. David Mullen, ASC: My lecture using video clips was centered on getting a historical overview of cinematography techniques as shown in some classic movies — movies I had seen over the years and was personally inspired by. Since the movies selected were more than 20 years old, they all naturally used film technology. My lecture on the principles of film technology started with Ansel Adams’ book *The Negative* and Adams’ use of the Zone System.

Cinematography always begins with an artistic concept before technical decisions can be made, and this

With a film camera, you have a camera operator who's looking through it, and that relationship between the camera operator and the actor is very close — not only in proximity, but in the choreography of the scene or the story. The actor relates to the operator, who is right by the camera. In the digital-camera world, the cameras don't have viewing systems; they have screens, and generally the camera operator is removed from the actor by the screen.

— Dan Mindel, ASC, BSC, SASC

fits well with Ansel Adams' concept of previsualization of the tonal values of the image.

Linus Sandgren, ASC, FSF: I wanted the lesson to encourage the students to use their [imagination] and not think too technically when creating a film. I decided we could make a little piece of experimental art on one roll of 35mm film by shooting with all kinds of effects, like speed ramps, multi-exposures, offset shutters and offset speeds — things that are only possible on film cameras. We shot all day on this poor roll of [Kodak Vision3 500T] 5219 — double-exposed forward and backward — and finally viewed it as a print at FotoKem.

I think a film should be an impression of the reality, and sometimes you need to be bold with your expressions. The beauty of celluloid is that you can do plenty of painterly effects in-camera, and I wanted the class to see the entire day's work as a finished film that we cut right in the camera.

Dan Mindel ASC, BSC, SASC: It occurred to me that one of the most useful things I could do would be to show people how to experiment and not be afraid — and therefore increase their creativity and perhaps bring a more interesting-looking image into their resume. I wanted to show the class what I could get away with in terms of over- and underexposure on



◀ Instructor Dan Mindel, ASC, BSC, SASC (center, white shirt) and students gather for a session of the November 2019 film-focused ASC Master class. ▲▲▲ M. David Mullen, ASC confers with students. ▲▲ Mikael Salomon, ASC offers practical instruction on filming a scene. ▲ Linus Sandgren, ASC, FSF helps students prep for a shoot.

Photos by Alessandro Pietri and Willie T.



I feel that a cinematographer should know and appreciate the history of their chosen art form.

— M. David Mullen, ASC

film. I made the lighting setup all about flashing lights that were incredibly bright. When they weren't flashing, the scene was completely dark. I wanted to allow the class to physically make these 'mistakes' of exposure so they could see the results the next day in the DI suite at the lab.

These students don't [generally] get the chance to experiment, and I wanted to give them a chance to realize that through experimentation you increase your creativity. If you're not trying stuff out because you're a professional filmmaker and you can't experiment on someone else's dime, then you can't really get out of the repetitious cycle that you're in when you're just playing the exposure safely.

Mikael Salomon, ASC: Rather than getting into a lot of theory, I just wanted to do a practical shot. I tried to develop a shot of medium difficulty. We concentrated most of the day on doing that shot, and how we could do it in different ways so we could compare the pros and cons of using Steadicam versus the dolly. We did it with some artificial lighting inside and outside [with some] pretty severe focus pulling and stop pulling at the same time.

Why is it important to you to pass this information on to future generations of cinematographers?

Mindel: As storytellers, it's very important that we have as many tools as possible that we can use to tell the story. I think the pervasiveness of digital acquisition has taken away a lot of the technical knowhow of filmmaking. And it's important to me to teach the next generation how to use this equipment so that it's not forgotten. If we don't forget how to use it, and we keep nurturing it, it gives us a broad brush that we can use to tell stories.



▲▲▲ Mindel observes the students at work. ▲▲ Students gather to check a monitor with Sandgren.
▲ For Salomon's tutorial, Master Class staffer Raphael van Oostrum shoots Steadicam footage of Brittany Belt at the ASC Arri Education Center.



In my class, we actually shot in ways you cannot shoot digitally — and for the art of cinema, all forms of visual expression should be available to filmmakers. Therefore, it's important to encourage and inspire each other to shoot in many different ways.

— Linus Sandgren, ASC, FSF

Salomon: I think the students may one day run into a director who says, "Why don't we shoot on film?" And then it's nice for them to say, "I have a little experience with that, and I'd love to do that."

What vital knowledge is in danger of being lost?

Mullen: [The more you shoot on film, the more you learn about how] the stock responds to different exposure techniques, lighting-contrast ratios [and other factors] — so it's difficult to build up enough experience to learn the limits of film if one doesn't shoot often enough. I also worry about a loss of knowledgeable people in the manufacturing and processing of film, which is a technology that requires a high level of quality control.

Sandgren: A well-known composer told me that when you

write [music] with strings on a computer, there are certain sounds [produced by] analog string instruments that you cannot reproduce on a computer. Therefore, we have to leave these sounds out and actually dilute the song. Without analog film, we dilute the movies, and cinematographers lose the possibility to fully express themselves.

Mindel: The idea that two people can use the same camera, with the same film, and make two radically different pictures by using different approaches is something that I think is very important. There's a degree of personalization that comes with being highly skilled in how you expose film and what you do with it. I think that skill set is in danger of disappearing because digital filmmaking is so much more about technical know-how and high technology. And really, those parameters have nothing to do with storytelling.

Salomon: Film is always going to have a place in the toolbox. It's like musicians — you can have synthesized digital music, but actually picking up a violin and playing it is something that will never get lost. In that way, I think it's important that you at least dust off your knowledge

INVIZITRAK

Makes green screen tracking markers ...

Invisible.



- Invisible markers for 2D/3D tracking
- Non-distracting to actors/crew
- Eliminates marker paint-out in post
- Accelerates & improves matchmoving
- Motion-blur free markers
- Green/blue screen, arbitrary surface
- ALEXA, RED, Sony, Phantom sync
- Wireless, dimmable, multi-framerate

For more information & rental/lease:
www.InviziTrak.com

MBF 
 FILMTECHNIK

GERMANY'S LEADING CAMERA & LIGHTING RENTAL IS SELLING PREOWNED AND TESTED EQUIPMENT



MBF Filmtechnik GmbH
 Westerbachstraße 164
 65936 Frankfurt am Main
 GERMANY
 +49 69 340004 0
sales@mbf-sales.de



Hands-on [experience] is really important. Theory is one thing, but when it comes down to actually getting the camera out there and rolling the film, I think that's very valuable.

— Mikael Salomon, ASC

about film once in a while.

What did this experience teach you about the current interest in shooting on film among emerging directors of photography?

Mullen: I think there is a huge interest among them to shoot film as a way of breaking away from the common looks of digital images.

Sandgren: I think the students really loved to craft this little short piece of art, and I hope it inspired them to go home and experiment more themselves.

Mindel: It's absolutely huge. The demand for Kodak film stock this last year is incrementally bigger than it was the year before. I think the reason that the demand in Europe is so much bigger than in the U.S. is because the cinematographers have a lot more access to the creative part of the equation and therefore are able to persuade the directors that it's a viable proposition, and that it's cost-

ASC Photo Gallery



Prints and box sets available
www.theasc.com

effective and gives them another creative element in their films. And what I learned from the students is that they want that element too — they want that creativity.

Salomon: The people who were there were obviously all interested; they sought out this particular class because it was about film. And they may only be a small percentage of the people out there seeking more knowledge about the whole process.

For an extended version of this article, visit ascmag.com/articles/asc-film-class.

The ASC Master Class is an intensive five-day seminar designed for cinematography students with an intermediate to advanced skill set. To learn more, visit theasc.com/asc/education/master-class. ◆



Sandgren, David Darby, ASC (back row, fourth from right), filmmaking colleagues and students assemble at the Clubhouse.



LITEGEAR™
UPGRADE YOUR EXPERIENCE
LiteMat Spectrum: The First LiteMat with Software Updates

LiteGear's LiteMat Spectrum offers users the ability to easily upgrade software of existing Spectrum fixtures with new features and enhanced functionality. Spectrum's new software platform provides improved stability resulting in an increase in productivity and efficiency. To discover the new technology and advancements the LiteMat Spectrum has to offer, visit litegear.com/spectrum or scan the QR code below.

LiteGear Burbank
4406 Vanowen Street
Burbank, California 91505
Tel: +1 (818) 358-8542
Email: info@litegear.com

LiteGear New York
68 35th Street, 5th Floor, Suite 549
Brooklyn, New York 11232
Tel: +1 (917) 423-6997
Web: litegear.com



Scale and Spectacle



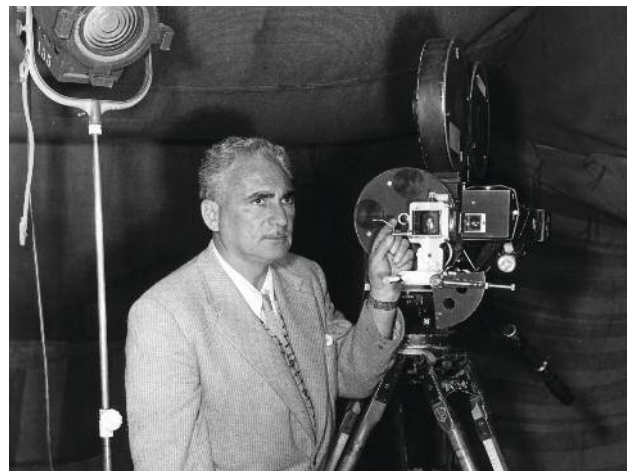
As theatrical motion pictures faced off with broadcast TV in the 1950s, *American Cinematographer* covered the surge in new formats

By Dawn Fratini

The 1950s was an era of profound insecurity and restructuring in the American film industry. Beginning in the post-war years, plummeting box-office revenue, labor conflicts, a federal antitrust suit, House Un-American Activities Committee investigations, and the rise of television combined to force the industry into a defensive position that played out via dramatic changes over the next decade.

The most exciting of these changes involved experimentation with new technologies. Widescreen, large formats, stereophonic sound, 3D and drive-ins all promised audiences a bigger and more immersive moviegoing experience. The 1950s were stressful times for Hollywood executives, but, as captured in the pages of *American Cinematographer*, the decade presented new opportunities, both creatively and financially, for the industry's cinematographers.

Most of the challenges and changes to the industry



actually began in the late 1930s but were placed on hold during the war years. No sooner had the war ended than the U.S. Justice Department resumed an anti-trust case against the major studios (*U.S. v. Paramount Pictures, et al.*), and in March of 1948, the Supreme Court decreed that the studios would have to sell off their theater chains. The intention was to create more favorable conditions for independent exhibitors, but in effect, exhibition became a buyers' market in which each film posed a greater financial risk to the producing company.

Meanwhile, the spread of TV broadcasting



◀ Photographed by Leon Shamroy, ASC (bottom) in CinemaScope, the smash biblical epic *The Robe* (1953) accelerated the trend toward widescreen pictures. ▲ Directed by Jack Arnold, *The Creature From the Black Lagoon* (1954) was shot in monochrome 3D by William E. Snyder, ASC and stereo specialist Clifford Stine, ASC.

commenced in earnest. The major Hollywood studios were poised to enter into this new medium, but the Federal Communications Commission, noting that these companies were already being sued by the U.S. government for monopolistic business practices, declined their applications for broadcasting licenses. The timing could not have been worse. Although 1946 was a peak year for domestic box office, a precipitous decline began the following year as more and more Americans decamped from urban centers to suburban homes in which TV was the more convenient form of entertainment.

As the 1950s began, studios were making fewer but more-expensive films, and innovative technology became a core strategy to get audiences back into theaters. Spectacular imagery and sound, it was believed, would dramatically differentiate the cinema experience from the black-and-white boxed image in the living room. To coordinate and facilitate technological development for the industry as a whole, the Association of Motion Picture Producers launched a pan-studio, noncommercial research laboratory, the Motion Picture Research Council, in 1948. ASC cinematographers served key roles in MPRC activities, and MPRC articles appeared in AC.¹ This centralization of the industry's technical program empowered

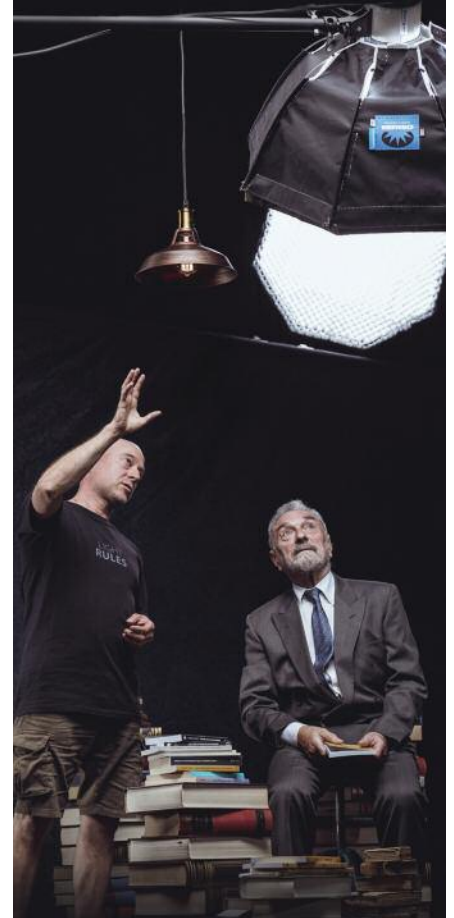
Hollywood's technical workforce to rapidly adopt and adapt numerous technologies throughout the 1950s.

One of the most radical technologies to come to the fore was 3D cinema. In 1951, the Telecinema exhibit at the Festival of Britain brought stereoscopic motion pictures to widespread attention and prompted a flurry of articles in trade journals. Stereoscopy pioneer John Norling described the situation in AC in early 1952:

"That the motion-picture industry could use something to combat television's capture of more and more of the theater audience is undeniable. Stereo movies might well induce people to return to their former favorite amusement. But the return is likely to come about in mass [sic] only if the film theater gives them something they can't get on a 17-inch TV tube, namely the ultimate in photographic realism, the stereoscopic movie in full color, with all dramatic possibilities that are only waiting to be appreciated."²

The format did experience some initial success,³ but by the time *Hondo*, *Dial M for Murder* (both shot by Robert Burks, ASC) and *Kiss Me Kate* (shot by Charles Rosher, ASC) — which showed remarkably expressive and inventive uses of space — were released in late 1953 and early 1954, most exhibitors had soured on the expense and hassle →

So well crafted, the details have details.



Just as you are passionate about creating inspiring images, we put the same heart into handcrafting our lighting solutions for you. It's the same care and passion we've put into our products throughout our 40-year legacy.



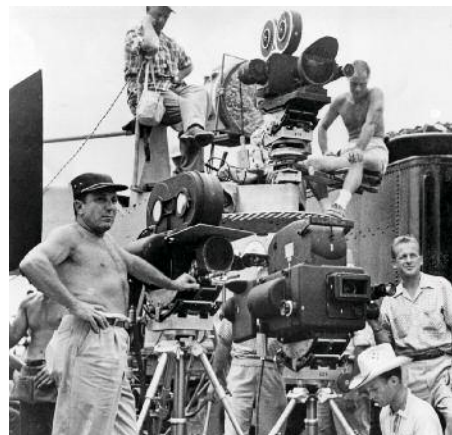
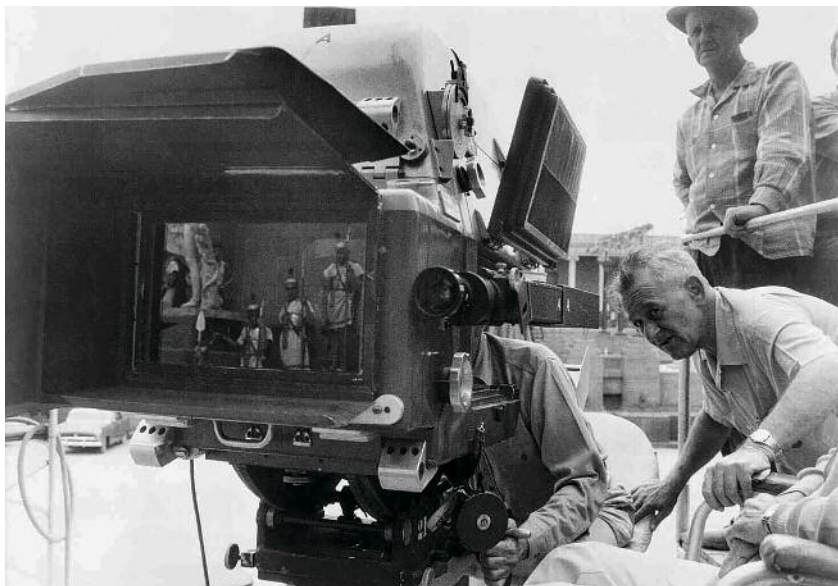
#CraftedWithChimera

Share how you craft your scene with Chimera

Photo by Matteo Mescalchin



Scale and Spectacle

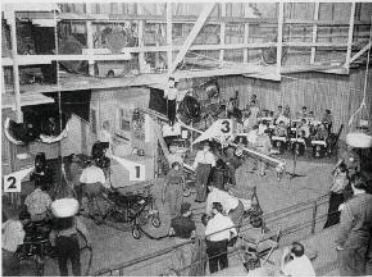


▲ Robert L. Surtees, ASC (top of frame) observes a multi-camera, multi-format setup while filming *Oklahoma!* (1955), directed by Fred Zinnemann. In front of him is the bug-eyed 12.7mm lens of his 65mm Todd-AO camera. ◀▲ Director William Wyler checks the finder of an MGM Camera 65 while shooting *Ben-Hur* (1959), under the watchful eye of Surtees. ◀ Sol Halprin, ASC — 20th Century Fox's executive director of photography — and his crew test a widescreen CinemaScope 55 camera system. ◀▼ James Mason and Eva Marie Saint pose with a VistaVision unit on the set of *North by Northwest* (1959), photographed by Robert Burks, ASC.



A more lasting technological change came in the form of widescreen formats. By 1955, AC could report six “well-established methods” for achieving widescreen imagery. The first to debut was filmmaker/inventor Fred Waller’s three-camera panoramic system, Cinerama, which opened in New York in late 1952 and became a long-running success. It was the “outgrowth of the famous wartime Waller Gunnery Trainer, which utilized a five-lens camera of unique design and five projectors to show airplanes realistically on a large curved screen.”⁴ Because Cinerama required three tandem cameras, three tandem projectors and an enormous curved screen, it ultimately proved too unwieldy and expensive for widespread use. Nonetheless, its popularity — and indeed, that of 3D exhibition — indicated that the public would turn out for a more spectacular theatrical experience.

Earl Sponable, head of research at Fox, was tasked with coming up with a viable alternative. Assisted by Sol Halprin, ASC, Fox’s executive director



GENERAL VIEW of the set for the filming of the CBS-TV comedy show *I Love Lucy*. The set is a complete miniature of a living room, with the camera crew and equipment visible in the background. The set is a complete miniature of a living room, with the camera crew and equipment visible in the background.

Filming The 'I Love Lucy' Show

Weekly CBS-TV comedy show filmed in Hollywood sets pace for top-quality television.

By LEIGH ALLEN

GENERAL VIEW of the set for the filming of the CBS-TV comedy show *I Love Lucy*. The set is a complete miniature of a living room, with the camera crew and equipment visible in the background. The set is a complete miniature of a living room, with the camera crew and equipment visible in the background.



OPERATOR at camera, Karl Freund, is seen in the background of the set for the filming of the CBS-TV comedy show *I Love Lucy*. The set is a complete miniature of a living room, with the camera crew and equipment visible in the background.



With the studio set in complete of the show, the cinematographic details are... The set is a complete miniature of a living room, with the camera crew and equipment visible in the background.

While the decrease in Hollywood feature-film production led to a drop in studio employment, the rise in TV production was actually a boon for experienced Hollywood cinematographers. By the spring of 1953, *AC* was able to report that "an average of 35 cinematographers each week were shooting TV films in Hollywood" — adding, "It has been a long time since there have been that many cameramen working simultaneously in feature-film production."¹¹

The employment of ASC cinematographers dramatically improved televisual style as the new medium shifted from live broadcasts to filmed programming. In January 1952, Leigh Allen proclaimed, "Major film producers could take a lesson from" Desilu, in an article profiling the streamlined production process of *I Love Lucy* and the contributions of Karl Freund, ASC in innovating the method of filming with three cameras before a live studio audience.¹²

of photography, Sponable developed CinemaScope from a 1920s system by French inventor Professor Henri Chrétien. With elegant simplicity, Chrétien's anamorphic hypergonar lens "squeezed" a wide image (2.35-2.66:1) onto a regular 35mm (1.33:1) negative, which would then be expanded back out to its wider dimensions via a complementary anamorphic attachment affixed to the projector.⁵ Fox's CinemaScope debuted with *The Robe* in September of 1953. Heralded by Bob Mintz in the pages of *AC* as "a new horizon in motion-picture technique ... the greatest development since the introduction of sound,"⁶ the process was rapidly adopted across the industry thanks to its relative ease of use on both the production and exhibition sides.

The new wide horizontal frame called for new photographic techniques, e.g., fewer cuts and longer

takes.⁷ Close-ups were a particular challenge, as the first generation of CinemaScope lenses made actors in close-up appear to have "mumps." Even after this was corrected, there was the challenge of using all that horizontal space effectively. George Folsey, ASC described this challenge and the solution he devised on MGM's *Seven Brides for Seven Brothers*:

"... the CinemaScope area in the camera finder loomed as empty as the Rose Bowl on January 2nd when setting up for close-ups or medium shots of the individual couples. Here the compositional and lighting problems were to make unobtrusive, without being obvious about it, those parts of the wide CinemaScope picture area left open when action was concentrated in the middle of the screen. The solution was in strategic placement of kickers and sidelights..."⁸

Other popular widescreen

So well crafted, the details have details.

Just as you are passionate about creating inspiring images, we put the same heart into handcrafting our lighting solutions for you. It's the same care and passion we've put into our products throughout our 40-year legacy.

#CraftedWithChimera
Share how you craft your scene with Chimera

SUMMARY OF CURRENT WIDE-SCREEN SYSTEMS OF PHOTOGRAPHY

The development of wide-screen motion picture systems has resulted in an unbridled method now currently in use in Hollywood. A recent Panavision is about to go into use at Metro-Goldwyn-Mayer studios in Hollywood.

For the education of our readers, the editors have presented here both in picture and text, a summary of all six systems. With exception of the CinemaScope films, which had to be reduced slightly in order to fit the space, all film reproductions on these pages are full size and show the comparative negative contrast used by each of the systems, and also any special placement of the image, as in VistaVision, which has the picture in horizontal position instead of the vertical, which is standard with all the others.

This feature is continued on the next page.



CINARAMA

Cinarama. The distinctive feature of this system is that it photographs conventionally three strips of film together. The picture from each film is taken when projected from a miniature picture that covers a field of vision 180° with 25% depth.

The strips above show the camera from the rear and around the film the magazine. As with the other systems, cinematographers who photographed in the Cinarama process.

Changes in the equipment of the Cinarama camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The Cinarama 16mm camera is (Continued on Page 64)



CINEMASCOPE

CinemaScope. CinemaScope is essentially a modified modification for its screen of wide-screen film production developed by John D. Hayes. The photographic process of special cinema lens which depends upon the use of anamorphic lenses. In projection of the picture once which, when "transposed" during the projection process, produces a picture with an aspect ratio 2.35 to 1. The 16mm CinemaScope camera lenses may be used with almost any standard 16mm motion picture camera equipped with appropriate adapters and having the aperture changed to the CinemaScope f/11. The development of CinemaScope has continued in the various lenses. Following acquisition of the first (Continued on Page 65)

Changes in the equipment of the CinemaScope camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The CinemaScope 16mm camera is (Continued on Page 64)

Changes in the equipment of the CinemaScope camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The CinemaScope 16mm camera is (Continued on Page 64)



VISTAVISION

VistaVision. The outstanding feature of the VistaVision camera is the fact that its negative results give the film (especially in the case of the horizontal motion picture). The picture can be used in a picture area of 16mm (which is the length and provides high-resolution image which is not subject to any loss of resolution in printing the picture onto a large print. It also makes possible the more rapid rates of 144 to 144 which Panavision Picture City, Oakland, California, use as the most used screen size for the records of the world's theaters. VistaVision is Panavision's answer to the VistaVision. (Continued on Page 65)

Changes in the equipment of the VistaVision camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The VistaVision 16mm camera is (Continued on Page 64)

Changes in the equipment of the VistaVision camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The VistaVision 16mm camera is (Continued on Page 64)



TODD-AO

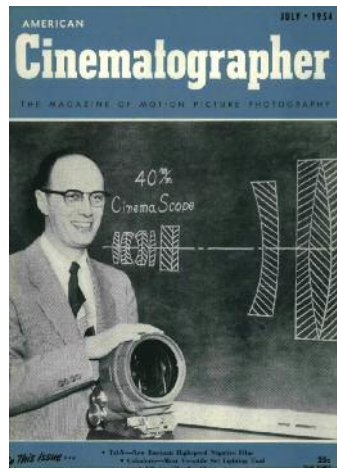
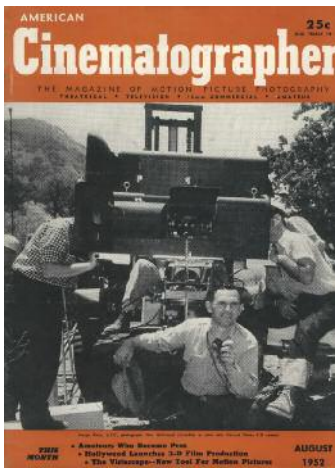
Todd-AO. The first Todd-AO camera was modified CinemaScope camera, designed for use with 35mm film. The modification was made by John D. Hayes. The camera is similar to the standard CinemaScope camera. Each frame is 5 frames high by 16mm. Another feature is the higher film speed—50 frames per second is compared to 24 for standard CinemaScope—which can be used to shoot on action on the larger screen. Film magazines, which are interchangeable, take 1000-1500 feet of film. This, which is larger than the standard 16mm camera, the Todd-AO camera. (Continued on Page 65)

Changes in the equipment of the Todd-AO camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The Todd-AO 16mm camera is (Continued on Page 64)

Changes in the equipment of the Todd-AO camera. When General Electric, which utilized a 16mm camera of make similar to the present one, first obtained permission to a large screen system. The Todd-AO 16mm camera is (Continued on Page 64)

AMERICAN CINEMATOGRAHER • NOVEMBER 1952

AC offered extensive reportage on the era's unique camera systems, including cover stories on Joseph Biroc, ASC shooting the Natural Vision 3D feature *Bwana Devil* (▶); AC Aug. '52), and CinemaScope, featuring John D. Hayes, head of the photographic department of Bausch & Lomb Optical Co. (▶▶); AC July '54).



systems of the early 1950s were Paramount's VistaVision, which achieved a larger image (1.66:1) by running 35mm film horizontally; Todd-AO, which utilized 65mm film running at 30 fps; Fox's T.F.C. 4X-55 MM, essentially a 55mm version of CinemaScope; and Superscope, an anamorphic process in which "the squeezing of the image is done in the laboratory, after the negative is shot."⁹

As the decade progressed, new systems involving combinations of matting, anamorphic lenses and large-format film expanded upon these systems, e.g., MGM Camera 65 and Super Panavision 70. Each of these systems had advantages and drawbacks, and cinematographers shared their experience and expertise in the pages of AC. For example, Lee Garmes,

ASC enthused over the Panavision 65 camera, which gave him "sharp, clear and incisive" photography for *The Big Fisherman* in 1959.¹⁰

The Screen Actors Guild and Writers Guild of America strikes of early 1960 led to the dismantling of the MPRC, and the momentum of Hollywood's technological advancement was no longer assured, and R&D was largely left to manufacturers. Nonetheless, the technologies of the 1950s continued to be refined well into the next decade, and cinematographers continued to explore the aesthetic possibilities they afforded. ◆

Articles Referenced

1. See for example: Dr. Armin J. Hill. "The Motion Picture Research Council 3-D Calculator." *American Cinematographer* 34, No. 8 (August, 1953): 373, 398.
2. John A. Norling. "Stereoscopic Motion Pictures Part 1." *American Cinematographer*, 33, No. 2 (February 1952): 66, 78-80.
3. See: Joseph Biroc. "Hollywood Launches 3-D Production." *American Cinematographer* 33, No. 8 (August 1952): 336-337, 350-352.
4. "Summary of Current Wide Screen Processes." *American Cinematographer* 36, No. 11 (November 1955): 654-56, 74-76.
5. "CinemaScope: What It Is; How It Works." *American Cinematographer* 34, No. 3 (March 1953): 112-13, 31-34
6. Bob Mintz. "The Big Changeover." *American Cinematographer* 34, No. 10 (October 1953): 480-81, 97-502.
7. See: Charles G. Clarke, A.S.C. "CinemaScope Photographic Techniques." *American Cinematographer* 36, No. 6 (June 1955): 336-337, 362-364.
8. Folsey, George. "Simultaneous Production Shooting in CinemaScope and Wide-Screen." *American Cinematographer* 35, No. 7 (July 1954): 338-39, 360-361, 363.
9. Ibid. "Summary of Current Wide Screen Processes."
10. Frederick Foster. "Photography Sharp, Clear, and Incisive." *American Cinematographer* 40, No. 8 (August 1959): 480-81, 504-06.
11. "TV Films Seek Hollywood's Top Cinematographers." *American Cinematographer* 34, No. 5 (May 1953): 220, 236-239.
12. Leigh Allen. "Filming the 'I Love Lucy' Show." *American Cinematographer* 33, No. 1 (January 1952): 22-23, 34-36.



Cine Gear Expo

Los Angeles 2020

THE STUDIOS AT PARAMOUNT, HOLLYWOOD, CA



FILM COMPETITION JUNE 4
EXHIBITS JUNE 5-6
MASTER CLASSES JUNE 7
FULL DETAILS: WWW.CINEGEAREXPO.COM

EXHIBITS
SEMINARS
DEMONSTRATIONS
NETWORKING
SPECIAL EVENTS

NEW PRODUCTS & SERVICES

• **SUBMISSION INFORMATION** - Please email New Products/Services releases to newproducts@ascmag.com and include full contact information and product images. Photos must be TIFF or JPEG files of at least 300dpi.



NanLight Unveils LEDs

NanLite USA/Mac Group will introduce two new LEDs at NAB 2020: the NanLite PavoTube II 6C and the NanLite Forza 60B LED. The PavoTube II 6C (pictured above) is a smaller version of the NanLite 15C and 30C PavoTubes. It comes with RGBWW and a built-in 3.7V/2200mA battery capable of running 70 minutes at full power on a single charge. It has a CRI/TLCI rating of over 95 and a color-temperature range of 2,700K-7,500K.

Featuring magnets on each end, the PavoTube II 6C can easily be placed anywhere or attached to other lights. It offers 17 practical effects, including Storm, Police Car, TV, Explosion and Bad Bulb.

The NanLite Forza 60B LED is a bicolor mono-light-style fixture. Weighing 1.8 pounds, the fixture measures 7.6"x4.1"x3.2" and features a 5/8" receiver with rotating yoke. It has a CRI/TLCI of 95/95 and is capable of continuous dimming from 0-100 percent. It offers 11 practical effects, including Pulse, Storm and Paparazzi.

The Forza 60B LED is powered through 110-240V AC via d-tap or v-mount (with adapter) or through a Sony L-style NP-F750 battery with the addition of a battery handle.

All NanLite lights come with a two-year warranty, and a third year is available with online registration.

For additional information, visit nanliteus.com.



Filmotechnic Offers New Car Platforms

Filmotechnic USA has introduced three new car platforms, and announced it will open a rental facility in Albuquerque, N.M., this year. The new car platforms are a Porsche Cayenne Turbo, a Toyota Tundra TRD Pro and a Toyota 4Runner TRD.

"The power and performance of the Toyota TRD models, even before fabrication, is quite impressive," notes Thom Tanton, head of sales for Filmotechnic USA. The Tundra comes with a 381 HP V8 AWD before Filmotechnic modifies it with oversized tires. A TRD Supercharger was already added to the 4Runner.

Filmotechnic's new Albuquerque location, which will open later this year, joins its rental facilities in Los Angeles, Detroit, Dallas, Atlanta, Orlando and Honolulu. "Filmmakers now can access Filmotechnic's advanced flight heads and arms anywhere in the U.S., even Hawaii," says Tanton.

For additional information, visit filmotechnicusa.com.

Rokinon Grows Xeen CF Line

Rokinon has added two wide-angle lenses to its Xeen CF Professional Cine Lens line for PL, Canon EF and Sony E mount: the 16mm (T2.6) and the 35mm (T1.5).

With these new additions, the Xeen CF lineup has grown to a set of five primes: 16mm (T2.6), 24mm (T1.5), 35mm (T1.5), 50mm (T1.5) and 85mm (T1.5).

The 16mm weighs 2 pounds and measures 3.24" in



length. The 35mm weighs 2.4 pounds and also measures 3.24" in length.

Like Rokinson's other CF lenses, the new models are compatible with gimbals, drones and compact cameras. This was accomplished by utilizing carbon-fiber construction rather than metal for a sturdier, lighter, more durable product.

The lenses are compatible with large image sensors (43.3mm image circle) and feature luminous markings, standard 95mm front diameters, Xeen X-coating to control internal reflection, and uniform focus- and aperture-ring locations to facilitate quick lens changes when using follow-focus devices.

All Rokinson Xeen CF lenses are covered by a three-year warranty.

"The new Xeen CF lenses show faces in a most beautiful way, with smooth and subtle transitions," says Bill Bennett, ASC.

For additional information, visit rokinon.com.



Akaso Adds Action Camera

Akaso has introduced the V50 Pro SE Action Camera, a special edition of the popular V50 model that promotes the Leave No Trace Center for Outdoor Ethics. A percentage of the sales will benefit the Leave No Trace Access Fund.

The V50 Pro SE offers an adjustable angle of view, native 4K video capture at 30 fps and the ability to take

stills of up to 20MP. Featuring image stabilization and waterproof up to 98', the camera is suitable for a wide range of outdoor activities. Accessories included with the camera include a waterproof case, a bicycle mount, two helmet mounts and five tethers.

The Akaso V50 Pro SE features a 2" touchscreen and has a Mini USB Port

and Wi-Fi built in. It can be remotely controlled from up to 32' away.

The Akaso V50 Pro SE lists for \$154.99. Three other V50 models are also available: the V50X (\$99.99), the V50 Pro (\$119.99) and the V50 Elite (\$139.99).

For additional information, visit www.akasotech.com. ◆

13th International Trade Fair
for Cine Equipment and Technology

19 - 21 September 2020
Munich | MOC

cinec

cineCongress
cinecAward

www.cinec.de

The poster features a central image of a camera lens with a rainbow light flare. The background is black with vertical lines of color. The text is white and black.

INTERNATIONAL MARKETPLACE

50 YEARS. STILL A CLASSIC.



Super 8 Cameras, Film, Processing & Scanning

Pro8mm
UP TO 5K

2805 West Magnolia Blvd., Burbank, CA 91505
Phone: 818-848-5522 • www.pro8mm.com



Blue Ring Gaffer's Glass

3.8 ND with UV inhibitor



alangordon.com/gaff



Mole LED

20k LED

NABSHOW BOOTH # C5044

Mole-Richardson Co. mole.com/20k-led



CAVISION

ONLINE STORE: WWW.CAVISION.BIZ

tel: 604-298-9053 email: info@cavision.com

USED FILMEQUIPMENT
from Germany

filmcameras, lenses, lighting & dollies



Please visit our website
www.used-filmequipment.com

American Cinematographer

visit us at:
ascmag.com



Large Format Directors Viewfinder

Lindsey Optics
For Brilliant Images

www.lindseyoptics.com • +1 661-522-7101

BACK-ISSUE SALE

Special ASC 100th Anniversary Issue



American Cinematographer
PRESENTS

100TH

ANNIVERSARY
AMERICAN SOCIETY OF CINEMATOGRAPHERS

1919  2019


Visit our website for details
ascmag.com

American Cinematographer
International Publications of the ASC

ONCE UPON A TIME... IN HOLLYWOOD
ROBERT RICHARDSON, ASC
REIMAGINES CINEMA HISTORY

THE LION KING
CALIB DESCHANEL, ASC
WITH VFX SUPERVISOR
ROBERT LEGATO, ASC

THE ASC'S 100TH ANNIVERSARY
• THE FOUNDERS • HISTORY OF THE ASC
• 100 MILESTONE FILMS OF THE 20TH CENTURY • THE FUTURE OF CINEMATOGRAPHY



ASC MASTER CLASS
LEARN FROM THE BEST

"Attending the ASC Master Class, and learning from the best, gave me the confidence and knowledge to work on big productions. Since then, I've shot two theatrical narrative features, mostly on sound stages, something I got comfortable with at the ASC Master Class. As a young cinematographer, the ASC Master Class helped me become a better cinematographer, and that has improved the quality of every project I've worked on since. As a result, I've gotten more work on better projects — and those projects have helped me to gain membership in the International Cinematographers Guild, IATSE Local 600, as a director of photography."

— Naeem Seirafi

Visit www.theasc.com for Master Class details, dates and registration.

CLASSIFIEDS

CLASSIFIED AD RATES

All classifications are **\$4.50 per word**. Words set in **bold face** or all capitals are **\$5.00 per word**. First word of ad and advertiser's name can be set in capitals without extra charge. No agency commission or discounts on classified advertising. **PAYMENT MUST ACCOMPANY ORDER.** VISA, Mastercard, AmEx and Discover card are accepted. Send ad to **Classified Advertising, American Cinematographer, P.O. Box 2230, Hollywood, CA 90078.** Or FAX (323) 876-4973. Deadline for payment and copy must be in the office by 15th of second month preceding publication. Subject matter is limited to items and services pertaining to filmmaking and video production. Words used are subject to magazine style abbreviation. **Minimum amount per ad: \$45**

EQUIPMENT FOR SALE

Technicolor 35mm 3 Strip Camera package (s/n: DF11)
Including Magazines, Lenses, Motor.
Used to film *Gone With The Wind*.
Museum display condition.
Minimum bid \$250,000
grantl@alangordon.com

EQUIPMENT FOR SALE

4X5 85 Glass Filters, Diffusion, Polas etc. A Good Box Rental
818-763-8547

World's SUPERMARKET of USED MOTION PICTURE EQUIPMENT!
Buy, Sell, Trade. **CAMERAS, LENSES, SUPPORT, AKS & MORE!**
Visual Products, Inc.
www.visualproducts.com
Call 440.647.4999

ADVERTISERS' INDEX

- | | | | |
|------------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------------|
| Abel Cine Tech 21 | Carl Zeiss 49 | J.L. Fisher 67 | Quasar Science, LLC 57 |
| A.C. Lighting 23 | Cavision Enterprises 90 | K5600 43 | Really Right Stuff 35 |
| Akaso 55 | Chapman/Leonard
Studio Equip. 53 | Kino Flo 75 | Revolution 435 D&C/Bolt
Stage Mexico 93 |
| Alan Gordon Enterprises
90 | Chimera Lighting 83, 85 | Koerner Camera Systems 8 | Rotolight Group Ltd. 47 |
| Arri 7, 39 | Cinec/Albrecht 89 | Lindsey Optics, LLC 90 | Selected Tables 92 |
| ASC/Leica Camera 73 | CineGear 87 | Lite Gear 81 | Sumolight 11 |
| ASC Master Class 91 | CityTheatrical 8 | Maccam 56 | Teradek, LLC C2-1, 37 |
| ASC Photo Gallery 80 | CMB Film Services, Inc. 42 | Matthews Studio
Equipment/MSE 22 | Thales Angenieux 61 |
| B&H Photo-Video-Pro
Audio 71 | Cooke Optics 9 | MBF Filmtechnik Gmbh 79 | Tiffen 15 |
| Backstage Equipment, Inc.
41 | CTT Exp & Rentals 74 | Mole-Richardson 90 | Tilta Inc. C3 |
| Bellomo Productions
LLC/Invizitrak 79 | Eastman Kodak C4 | NBC/Universal 32a-1
19 | TRP Worldwide/The Rag
Place 27 |
| | Ernst Leitz Wetzlar Gmbh
19 | Opertec UA 65 | Velvetlight/The Light
Luminary S.L. 66 |
| | Fiilex/Dicon Lighting 26 | Panavision 13 | www.ascmag.com 90 |
| | Filmtools 63 | Pille Filmgeraeteverleih
Gmbh 90 | Xeen by Rokinon 51 |
| | Formatt KT America Inc./
Tokina 5 | PRG/Production Resource
Group 3 | |
| | Fujifilm/Fujinon 17 | Pro8mm 90 | |

FOR FILM & DIGITAL

**SELECTED
TABLES, CHARTS
AND FORMULAS**
FOR THE
**STUDENT
CINEMATOGRAPHER**
FROM THE
**AMERICAN
CINEMATOGRAPHER
MANUAL**



FOURTH EDITION

EDITED BY
STEPHEN H. BURUM, ASC

EDITED BY
STEPHEN H. BURUM, ASC

**THIS POCKET-SIZED GUIDE OFFERS
KEY INFORMATION FROM THE
AMERICAN
CINEMATOGRAPHER
MANUAL**

— A 180-PAGE “JUMPSTART” RESOURCE FOR DATA ON
FORMATS, ASPECT RATIOS, DEPTH OF FIELD, FILTRATION,
EXPOSURE AND MUCH MORE.

TO ORDER VISIT: ASCMAG.COM

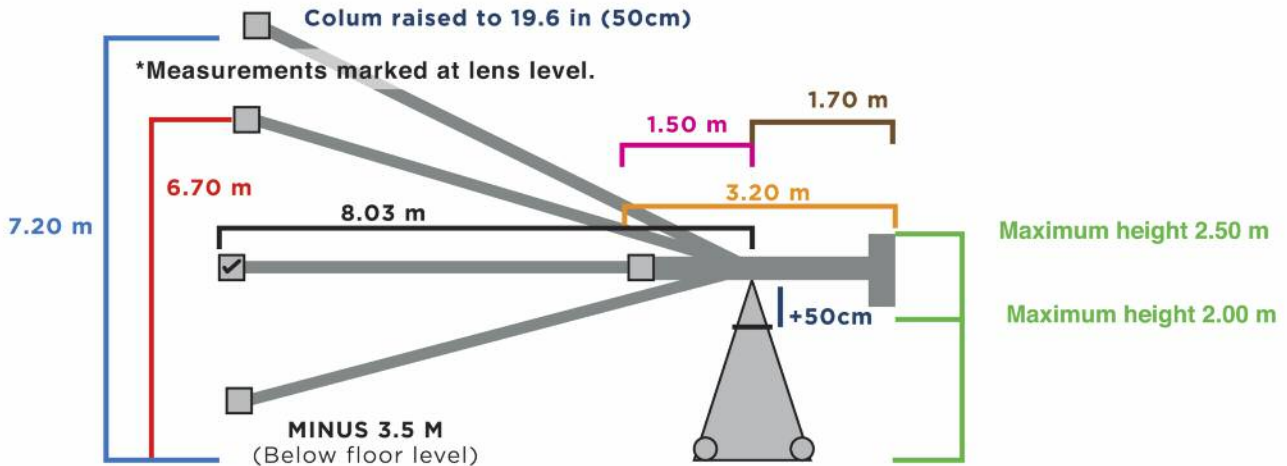


REVO TECHNOSCOPE 26.2 FT (8 M) (SUPER LIGHTWEIGHT).



- Carbon fiber arm, weight: 231.4 lb (105 kg).
- Completely dismantlable base (pedestal), weight: 286.6 lb (130 kg).
- Super compact and easy to work within small locations.
- Compensates for the horizontal and vertical arcs (silent movements).
- It only uses ***straight tracks***.
- 110 volts & 220 volts AC power.

- 36 volts DC power (approx. 8 hrs of autonomy).
- Manual programming of the initial and final movements only.
- Integrated power supply feeds most cameras, head and accessories.
- Maximum front payload, 50.7 lb (23 kg).
- Compatible with heads: Shotover G1, Ronin 2, Maxima 30, Mōvi Pro (FreeFly) & Arri SRH-3.
- The pedestal column lifts up an additional 19.6 in (50 cm).





CLUBHOUSE NEWS



Clockwise from top left: ASC associate Tim Smith of Canon with documentary and feature filmmaker Matthew Heineman (*Cartel Land*, *A Private War*, *The Trade*); a crowd gathers outside the Canon Creative Studio on Main Street; *American Cinematographer* editor-in-chief and publisher Stephen Pizzello introduces ASC CEO Terry McCarthy (inset), who welcomes guests at Canon's annual "Raise Your Glass" party.

AC and Canon Renew Sundance Partnership

At the 2020 Sundance Film Festival, *American Cinematographer* once again served as the media partner for Canon, the event's official camera sponsor. In addition to moderating a series of informative panels at the Canon Creative Studio on Park City's Main Street, AC co-hosted the company's annual "Raise Your Glass" party. The Canon Creative Studio also offered visitors the chance to get their hands on Canon gear and to

have portrait shots taken by photographer Michael Ori.

The five Canon/AC panel discussions, featuring filmmakers with projects at the festival, were guided by longtime AC contributors Iain Marcks and Patricia Thomson. Each panel was live-streamed on the magazine's Facebook page; complete details, videos of the panels, and additional coverage of select Sundance projects are posted on the magazine's website: ascmag.com/articles/join-ac-for-canon-creative-studio-2020-sundance.

On January 26, the popular "Raise Your Glass" cocktail reception drew a capacity crowd to the Canon space. AC editors and writers mingled with filmmakers, ASC associates and industry professionals, including Canon's Tim Smith, senior advisor for film and television production, and Len Musmeci, senior marketing manager. *American Cinematographer* editor-in-chief and publisher Stephen Pizzello greeted guests and introduced the ASC's new CEO, Terry McCarthy, who joined the Society this past fall.

Photo of Clubhouse by Isidore Mankofsky, ASC; lighting by Donald M. Morgan, ASC. Sundance photos by Anna Gudbrandsdottir, Stephen Pizzello and Nathalie Retana.



1.



2.



3.



4.

1. Pizzello with longtime AC contributor Patricia Thomson. 2. Cinematographer, filmmaker and photographer Rayana Chumthong poses with a framed poster for *La Leyenda Negra*, a 2020 Sundance feature on which she served as camera operator. 3. Partygoers chat on the interior balcony of the Canon space. 4. AC contributor Iain Marcks (left) with McCarthy and cinematographer Nic Sadler. 5. An overhead view of the Canon Creative Space. 6. WPA agents Kristen Billings, Brian Goldberg and Trevor Kossack. 7. Pizzello with Nathalie Retana of Impact24 Public Relations. 8. AC East Coast sales rep Sanja Pearce (far left) with ASC associate Snehal Patel and Katia Del Rosario of Zeiss, producer Carrie Radigan, and Richard Schleuning, senior director, Americas at Zeiss. 9. McCarthy with Len Musmeci, senior manager of Canon's product marketing division.



5.



6.



7.



8.



9.



CLOSE-UP

Gregg Heschong, ASC



When you were a child, what film made the strongest impression on you?

David Lean's *The Bridge on the River Kwai*, photographed by Jack Hildyard, BSC.

Which cinematographers, past or present, do you most admire?

Gregg Toland, ASC; James Wong Howe, ASC; Arthur Edeson, ASC; Sven Nykvist, ASC; and Haskell Wexler, ASC, in addition to many of my contemporaries.

What sparked your interest in photography?

Photography became a natural extension of my interest in painting and drawing as a child and teen. One of the fondest gifts I received as a child was a Kodak Brownie camera. I soon began experimenting with 35mm still photography — and at age 12, I purchased an 8mm camera.

Where did you train and/or study?

I helped my father build a darkroom and I experimented with black-and-white photography, and with whatever camera was available. My training was primarily learning by doing, though the UCLA film department certainly helped propel me into the professional world.

Who were your early teachers or mentors?

My junior-high English teacher, Wilbur Hanson. We had many talks about literature, music, art and history. As a teenager, I was mentored by director Lawrence Carra, a professor at Carnegie Mellon's drama department. In Los Angeles, I was both employed and encouraged by artists such as Ralph Bakshi; Robert Abel; Sven Nykvist, ASC; Joel Schumacher; Bruce Logan, ASC; and Dean Cundey, ASC. And I'd be remiss if I didn't acknowledge the support I received as a newly minted DP from James Burrows, Andy Ackerman and Bob Boyett — and most importantly, writer and producer Kari Lizer.

What are some of your key artistic influences?

Painters — from the Dutch masters to the Impressionists, along with Hopper, Andrew Wyeth, Georgia O'Keeffe, Klimt and even Frederic Remington. The photography of Adams, Weston, Cartier-Bresson, Dorothea Lange and W. Eugene Smith.

How did you get your first break in the business?

If I were to pick one, it would be when Joel Schumacher called to ask if I would step in as cinematographer to finish his film *D.C. Cab*. With that I was rerated from operator to director of photography.

What has been your most satisfying moment on a project?

I can be grateful that there have been many. I certainly would

count the experience of shooting 2nd unit on *Who Framed Roger Rabbit* and photographing my first multi-camera, *The Tracey Ullman Show*. Not only was every day a challenge but a world of fun as well.

Have you made any memorable blunders?

As a very inexperienced operator, I had the opportunity to take over the A camera on the television series *Trapper John, M.D.* I met Fred Gately, ASC the day I started work. One of my first setups was a very complicated crane move, which required rotating the turret in sync with the Pana-head. I became so involved with framing that I did not realize my left foot was slowly locking the turret, ruining the final composition. They printed the take. Fred was a true gentleman at dailies and I lived to see another day.

What is the best professional advice you've ever received?

Probably the most succinct advice I ever received was when I was first-time directing an episode of *NewsRadio*. James Burrows was kind enough to sit in on my producer run-through notes session. Afterwards he said, 'Heschong, you have to make some noise!' Another way to say, 'Believe in yourself and speak up.'

What recent books, films or artworks have inspired you?

Once Upon a Time ... in Hollywood, *Little Women, 1917* and *Joker*. I reread *Five Came Back* and felt the need to return to another inspiring book, *You Can't Go Home Again* by Thomas Wolfe. The recent Taper Forum production of Samuel Beckett's *Happy Days* was completely immersive. Attending the L.A. Phil's recent Copland performances has been very rewarding.

Do you have any favorite genres or genres you would like to try?

To this day I would love to shoot a Western. That and a true film noir — perhaps even in black-and-white!

If you weren't a cinematographer, what might you be doing instead?

I'd be a singer — if I had a real range. Though when I'm in the mood, I am more than happy to embarrass myself.

Which ASC cinematographers recommended you for membership?

James L. Carter, Dave Perkal and George Spiro Dibie.

How has ASC membership impacted your life and career?

The opportunity to share knowledge with students and working professionals, to teach and be taught, has made the ASC something of a second home for me. ◆



Suction Cup Payload: 50 Kg per cup
Total Weight: 18 Kg
Length: 1.3 Meters
Total Camera Travel: 1 Meter
Horizontal Payload: 3-15 Kg
Vertical Payload: 3-7.5 Kg



Fully modular design
High precision
Easy to break
down and store

Compatible with all
**LIGHTWEIGHT
GIMBALS**

- Includes
- Cell phone/monitor mounting bracket
- Ronin-S control handle from Tilta
- Tilta Nucleus Nano control handle (for simple lens focus control)



HYDRA

MOTORIZED SLIDER

2020 NABSHOW #C6938



TILTA



www.hydra-arm.com



[hydra_arm](https://www.instagram.com/hydra_arm)
[tiltamax](https://www.instagram.com/tiltamax)



[facebook.com/hydrarm](https://www.facebook.com/hydrarm)
[facebook.com/tiltausa](https://www.facebook.com/tiltausa)



Processed by KODAK
Film Lab, ATLANTA:

The Banker

The Devil All the Time

Boy Erased (film portion)

The Front Runner

Gifted

Hector Felix

Hidden Figures

I, Tonya

Killerman

Left Hand

The Florida Project

**The Walking Dead
(All Seasons)**

Bad Bunny

Adidas

Converse

Gucci

NASA

KODAK Film Lab in Atlanta

Offers comprehensive color negative processing services for motion picture film.

Our dedicated team of highly skilled film technicians have extensive experience working on major feature films, commercials, promos and archive projects so you can be assured of the very best service and support for your project.

35mm and 16mm color negative processing

Spirit 4k/2k film scans

Spirit HD telecine transfers

Cintel BMD scans

Dailies services

CONTACT:

Tel: 404-545-3172

Lab Services: Robert.wales@kodak.com

Post Services: jeremiah.drueke@kodak.com

Film Sales: michael.p.brown@kodak.com

Film

Get more from every frame.



#SHOOT FILM

© 2020 Kodak. Kodak and the Kodak logo are trademarks.