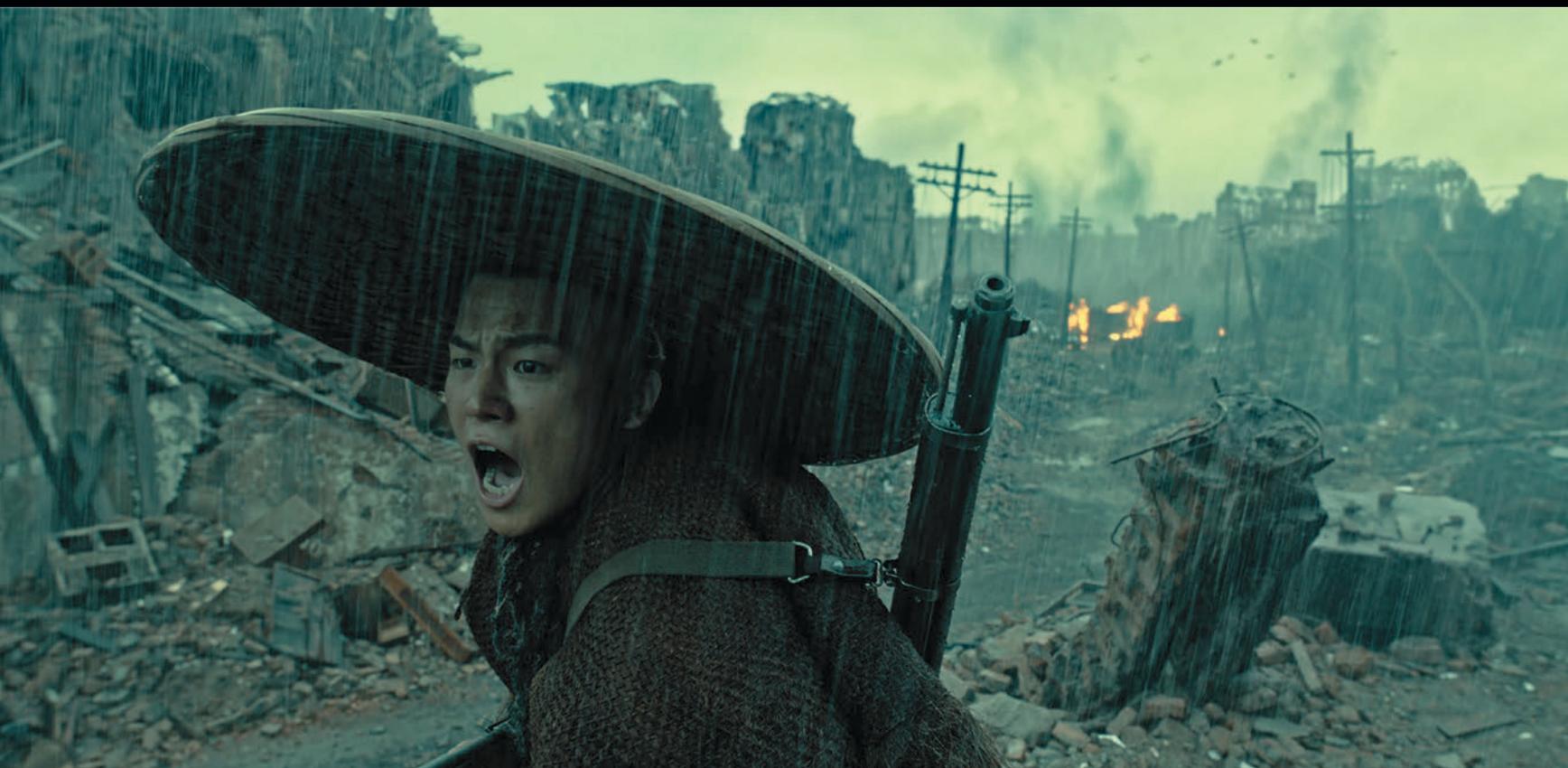


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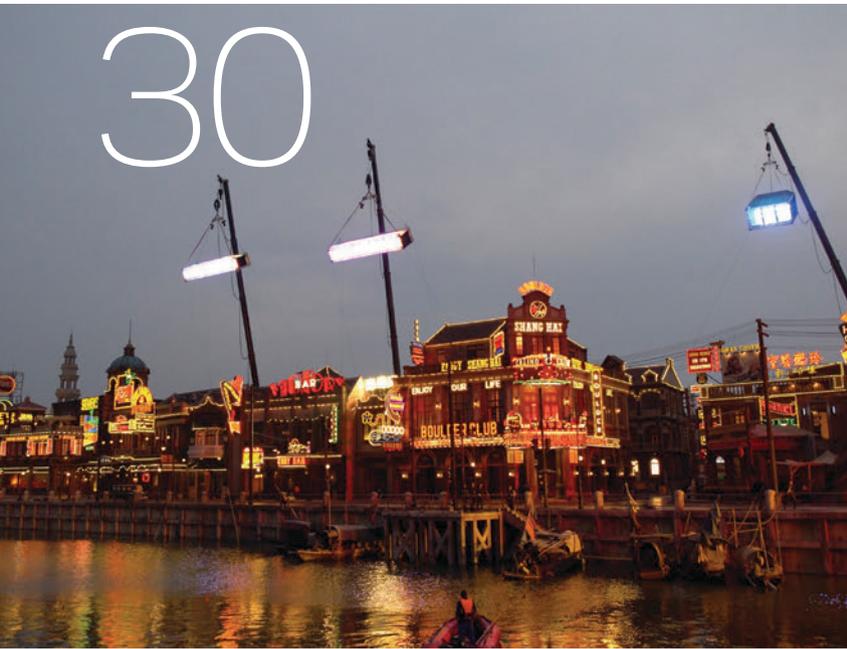


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American Cinematographer

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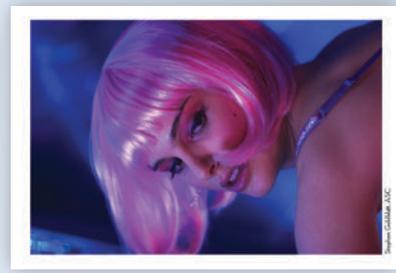


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Letter From the President



PORTRAIT BY
MICHAEL M. PESSAH, ASC.



PHOTO BY ROBERT FRANK.

IF ONE WAS CRISSCROSSING THE UNITED STATES TODAY, as Swiss photographer Robert Frank did in the 1950s — resulting in his seminal book *The Americans* (1958) — what would be the biggest visual takeaway?

An underlying theme might be that just when we thought it was safe to go back in the water, it isn't. Of course, many filmmakers are capitalizing on our anxiety now with films of ordinary people in jeopardy. Scary as our real world is these days, it's a very, very scary world on the big international screen, as we report on in this issue. We now realize all the clichés we heard about a New Normal were not clichés, but really sensible cautions. Of course, our lives are not as peeing-in-our-pants crazy as the life of the poor British film censor portrayed in *Censor*, reported on in these pages. Our lives are also far removed from the threats facing the soldiers in the Chinese film *The Eight Hundred*, shot by Society member Cao Yu, ASC, CNSC. A striking still from that picture graces this issue's cover and reflects the turmoil experienced by the movie's combatants.

Cao Yu's membership is a reminder that the ASC has members from all over the globe. The ASC is the only accomplishment-based cinematography organization in the world with members from every inhabited continent. We bring them together to join our mission of honoring cinematographers' accomplishments AND educating others, nourishing the quest for knowledge through this magazine, our website and the Society's Master Classes.

This summer we wrapped an amazing online ASC

Master Class with Russell Carpenter, ASC, and Emmy and ASC Award-winning cinematographer Baz Idoine (*The Mandalorian*). The subject they explored was virtual production and how to shoot in an LED volume — a skillset that is becoming increasingly important to both aspiring and established cinematographers wherever they live and work. One third of the Master Class attendees were from outside the U.S. — another example of the Society's international reach that continues to make us proud.

Among the other clichés popular over the last year or so was, "... we're all in this together..." This is surely what Frank was thinking in 1955 when he shot the photograph shown on this page — which became the cover of *The Americans*. Segregation was still enforced in many states, but Frank dispassionately focused on the bigger picture of the U.S. and the direction it had to go, which his photo so starkly illuminates. What Frank saw then, others can see today: Despite strife over the pandemic and continuing racial inequities, we are all still on the same bus ... together.

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

Stephen Lighthill
President, ASC

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The New York Times

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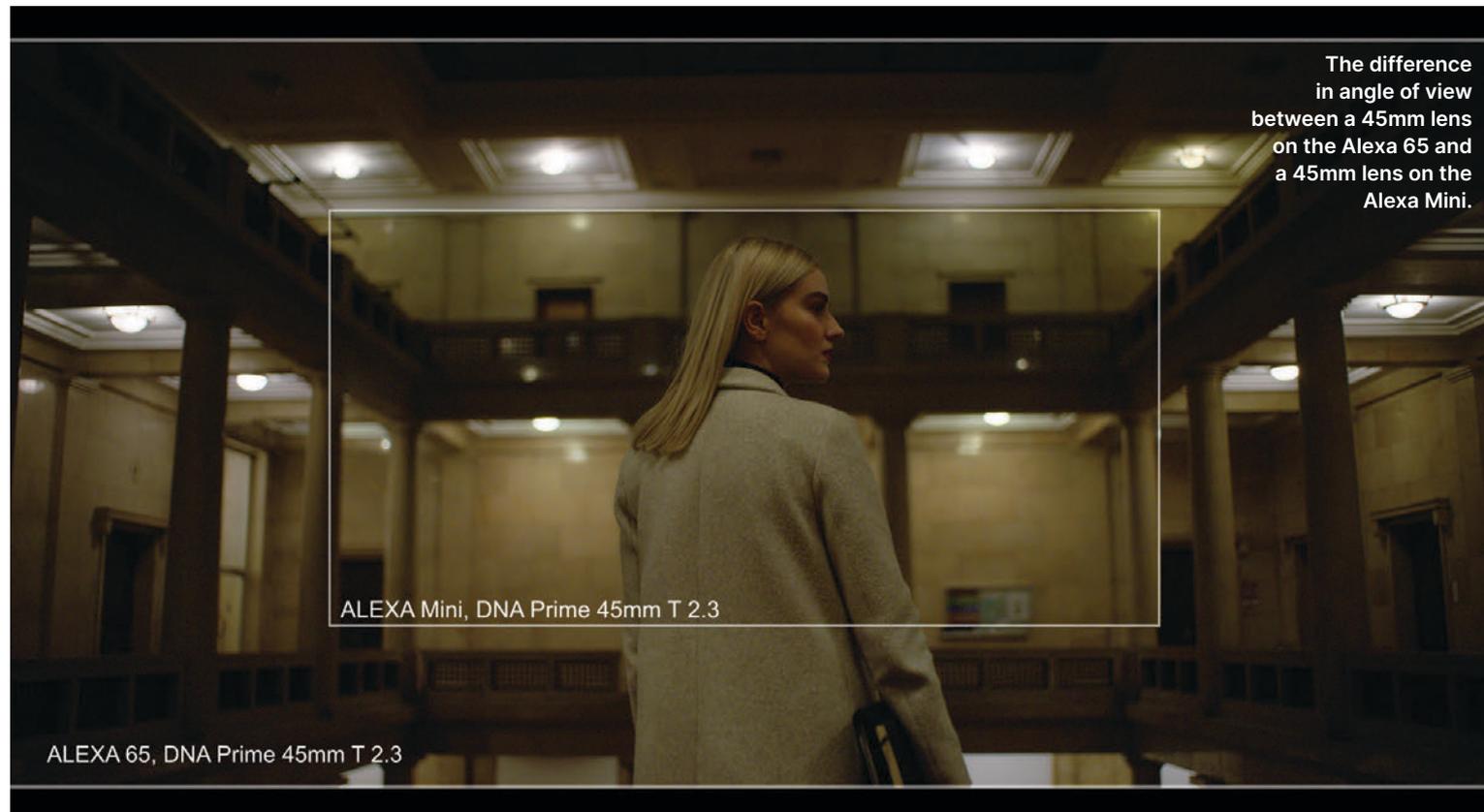
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Large-Format Cinematography: A Close-Up



CAMERA-TEST IMAGES COURTESY OF MANUEL LÜBBERS.

Large format is one of the most popular current trends in cinematography. It's a hot option for filmmakers, but there are quite a few misconceptions about the format and its usage. While the aim of this installment is to clear up as many of these as we can, nothing beats understanding a concept better than seeing the results.

Demonstrating the misconceptions about larger formats is a complex and expensive exercise to set up — but fortunately, Munich-based cinematographer Manuel Lübbers has already done it for us. I initially learned of Lübbers' test via a Facebook post by M. David Mullen, ASC — who praised Lübbers' work — and I was extremely happy to find the examples that we've referenced on the following pages.

Lübbers conducted this test as his thesis work at University of Film and Television (HFF) Munich, using a stereoscopic beamsplitter rig with an Alexa Mini and an Alexa 65.

These tests prove, beyond a doubt, the true facts surrounding "large format." Lübbers was generous enough to share his results with *AC* to clearly illustrate the misconceptions and benefits of larger-format cinematography, and the results speak for themselves. You can see his full test at manuel-luebbers.com/large-format-look-alex-65-vs-alex-mini/.

The following is a breakdown of the issues.

1. "Large Format"

Let's start with a biggie: "Large format" *isn't* large format.

In photographic terms, "large format" is actually a retronym that dates back to the very origins of photography. Early photography was captured on photosensitive metal plates, paper and negatives in very large sizes of 6"-8" on average.

The Kodak Brownie still camera, introduced in 1901, featured 120 film (allegedly so named because it was the 20th attempt to make roll film), which we now refer to as "medium format." This format ranges from 56mm x 41.5mm to 56mm x 224mm!

In the early 1920s, Leica's Oskar Barnack invented the 135 still-camera format, taking 35mm cine film and turning it 90 degrees to run horizontally through the camera at 8 perforations per image and creating the 24mm x 36mm frame. This became the standard "full format"

option (also a retronym coined after economical crop-format cameras were introduced), which still exists as a standard today. Larger photographic plates beyond this sizing became known as medium or large format.

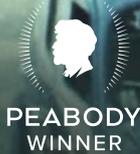
This means that we have cinema Super 35mm at 18mm x 24mm, roughly; "full format" at 24mm x 36mm; 70mm at 52.5mm x 23mm; and the largest cinema format ever commercially produced, Imax, at 51.638mm x 70.739mm — none of which even come close to the largest *medium format* still film, let alone large format.

"Large format" cinematography refers to anything larger than Super 35mm, including the "giant" formats of 70mm and Imax, but it is an unfortunate misnomer — and, quite

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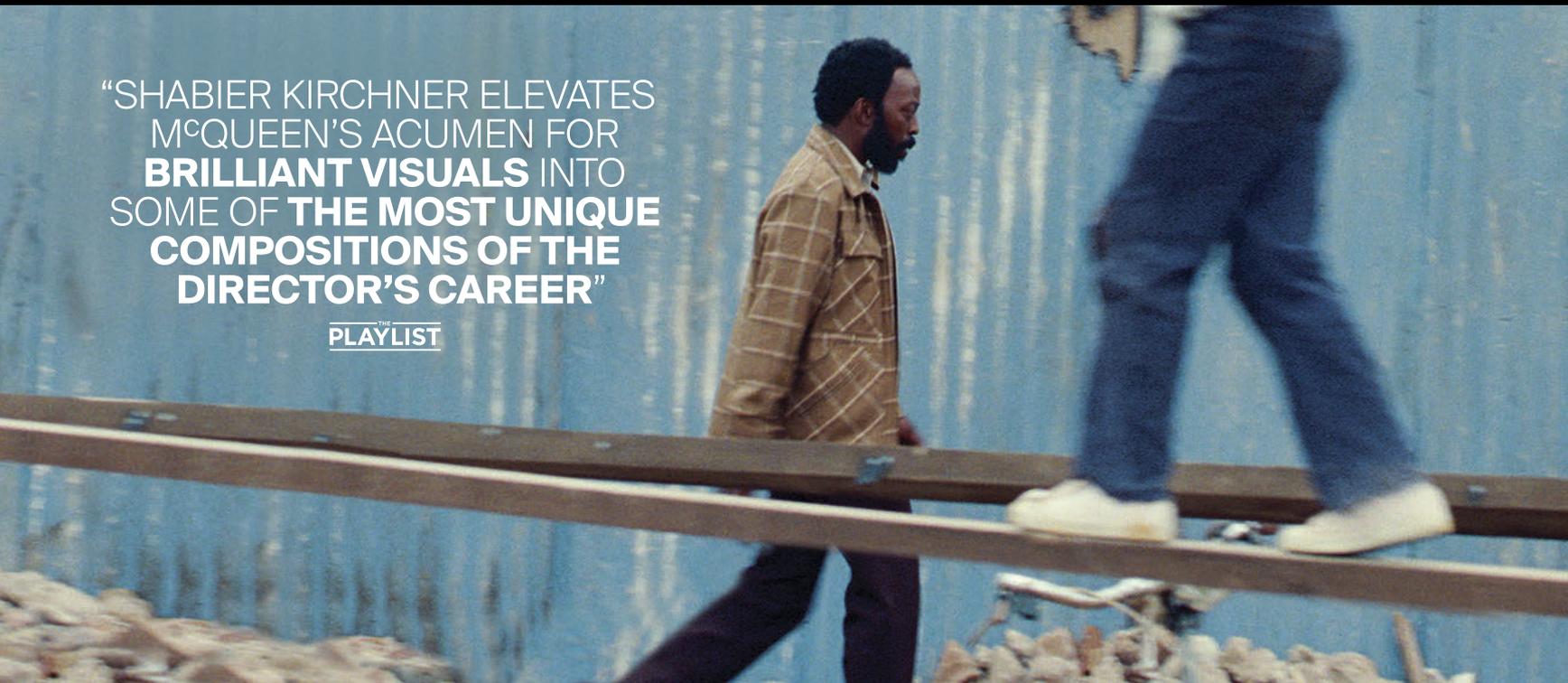
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Experimentation with larger-format cinema negative is as old as the motion-picture industry itself.

The difference in depth of field when matching field of view with two different lenses: a 35mm on the Mini and a 70mm on the 65, both at a T2.8.



simply, incorrect.

Nonetheless, “large format” has become a popular term for digital motion-picture cameras featuring an imager larger than Super 35mm.

2. New Again

The notion that imagers larger than Super 35mm are new to cinematography is empirically wrong. Experimentation with larger-format cinema negative is as old as the motion-picture industry itself. As early as 1897, Enoch J. Rector exhibited Veriscope, a 63mm-wide film stock that captured a famous boxing match. We’ve had several waves of experimentation with larger film sizes, including more than a dozen formats that debuted during the 1920s and ’30s, and, of course,

those that appeared during the widescreen wars of the 1950s. What we now call “full format” (based on the 24mm x 36mm 135 still-camera format) was called VistaVision when it was introduced in 1954 as Paramount’s widescreen answer to Fox’s CinemaScope format (based on a 1921 patent and a conversion of a 1926 “Natural Color” camera).

VistaVision was first used on the 1954 holiday movie *White Christmas* (photographed by Loyal Griggs, ASC) and was then famously adopted by Alfred Hitchcock on five films: *To Catch a Thief*, *The Trouble With Harry*, *The Man Who Knew Too Much*, *Vertigo* and *North by Northwest* (all photographed by Robert Burks, ASC).

Camera and Sensor Choices

The category of large(r) format in professional cinematography covers anything larger than the Super 35mm class of imagers. The commonly used cameras today include the Arri Alexa 65, Alexa LF and Alexa LF Mini; Canon C500 MKII and C700 FF; Panavision DLX2; Sony Venice; and Red Monstro VV.

3. Reverse Crop Factor

Another misconception is that formats larger than Super 35mm change the focal length of all your lenses to wider focal lengths. This is, emphatically, untrue. The focal length of a given lens *never* changes, regardless of what format it’s used on. There’s an oft-repeated phrase in optics: “A 50 is a 50 is a 50.”

Now it *is* true that the angle of view of a given focal-length lens

changes depending on what format it is used with. A 50mm lens on a 65mm camera is a wide lens. A 50mm lens on a Super 8mm camera is a very long lens. This means that for a given field of view, or a given composition and subject size, you’re likely using a longer focal-length lens on a larger-format camera than you would on a Super 35mm camera, because the focal-length lenses you’re used to in Super 35mm will have a wider angle of

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A comparison of sensor sizes.

view on the larger-format imager. The focal length of the lens remains the same, however. Focal length is the measurement of the optical center of the lens to the imaging plane when the lens is focused at infinity — and it never changes, unless you're using a zoom lens.

This holds true no matter what format the lens was designed for. So, regardless of whether you take a 50mm lens designed for a 65mm camera and put it on a Super 8mm camera (if you could), or take a 50mm lens actually designed for that Super 8mm camera, their angles of view will still be identical.

4. Image Compression

As is written in many textbooks and widely believed, longer lenses lead to more subject-to-background compression in the image, and wider lenses lead to less compression and more exaggeration of the separation between subject and background. And since larger-format sensors require longer focal-length lenses, larger-format capture gives better separation of

your subject and the background, because you're using longer lenses and introducing more compression. Again, this is incorrect. Image compression is *not* the result of the focal length of the lens; it is the result of the relative distance of the camera to the subject and the subject to the background. That's it.

Let's say you have a Super 35mm camera with a 50mm lens, set 10' away from a subject who is 20' away from the background, and you put a full-format camera right next to the first one, at the same distance from the subject and background. To match the angle of view, you'll use a 100mm lens on the full-format camera. Both shots will have *exactly the same image compression* because the distance to the subject and the distance to the background is exactly the same. Merely changing to a longer focal length lens *does not induce more image compression*.

However, if you wanted to match the angle of view while using the *same focal-length lens* as the Super 35mm camera, then you would have

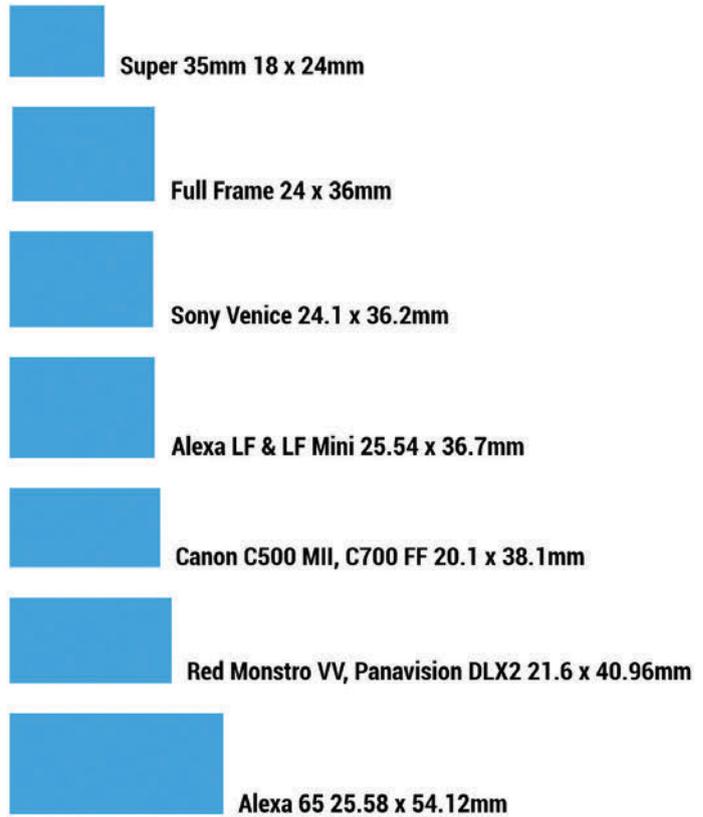


IMAGE COURTESY OF JAY HOLBEN.

to move the full-format camera closer to the subject. *This change in the camera's physical position* would cause a change in image compression — and in this case, it would exaggerate the distance rather than compress it.

is *considerably* reduced in larger formats than Super 35mm.

6. Geometric Lens Distortion

This is *somewhat* true — because larger-format cameras use longer focal-length lenses for a given angle of view, and longer focal lengths *generally* have less geometric distortion (i.e., barrel or pincushion distortion) than shorter focal-length lenses. However, remember that the optical design of the lens must feature a larger image circle to cover the larger-format imager, so creating a larger image circle can induce some geometric distortion — especially for cameras with the limitation of a PL lens mount. The LPL mount, which has a larger throat diameter, can allow for wider angles of view, larger image circles and less distortion. So while this belief *may* be true, it is highly dependent on the lens itself, and not a steadfast rule.

5. Depth of Field

It's actually *accurate* to say that "large format" has less depth of field than Super 35mm. As discussed, when you're shooting formats larger than Super 35mm, you'll need longer focal-length lenses to achieve the same angles of view at the same distance to your subject. As you're using longer lenses from the same distance and, ostensibly, at the same aperture, your depth of field is ¼ the distance that it is in Super 35mm. This happens with a doubling of focal length: your depth of field actually becomes 25% of what it was, as opposed to just half. So, yes, depth of field

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Left: A look at noise from the Mini and the 65, both at 3,200 ISO. The 65 has less discernible noise. Right: Cinematographer Manuel Lübbers employs a beamsplitter 3D rig for the camera test.



7. Noise

The signal-to-noise ratio of larger imagers is often better than that of smaller imagers. This is a matter

of physics, in that larger imagers will either have more photosites to capture more samples, or larger photosites that capture more



photons of light. However, these variables are highly dependent on the manufacturer's design of their sensor technology, the base ISO,

and exposure methodology. But within a single manufacturer's line of cameras, all else being equal, the larger imager will often have less noise than a smaller one.

8. Cropability

Because you're working with a larger image area — and, generally, a higher photosite count — it's also possible you'll have greater image area for stabilization, reframing, "look around," or even cropping in on the sensor to get a different field of view from a given lens.

Lens Choices

As the sensor gets larger, so must the projected image circle from the lens in order for it to cover the larger image area. This places a limitation on the available lenses. Yet, as the focal length of a lens increases in a given series, the image circle also increases, so it is possible that

even lenses designed for Super 35mm or Academy 35mm will cover larger-format imagers with the longer focal lengths in the series, or the longer focal lengths on a zoom. Below, however, are some of the available lenses specifically designed for larger-format cameras.

Spherical Primes:

Angénieux Optimo Prime
Arri DNA LF
Arri Prime 65 S
Arri Prime DNA
Arri Prime 65
Arri Signature Prime
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Sigma Cine FF High Speed Prime
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Caldwell Photographic Chameleon
Cooke Anamorphic /i Full Frame Plus
Glaswerk One
JDC Xtal Xpress
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Eyes in the Sky

Experts weigh in on shooting with drones.

By Tara Jenkins

An aerial shot was on the call sheet and the lighting at the location was beautiful, but the helicopter was grounded at the airport 50 miles away due to bad weather. “If I’d had a drone in my truck, I could have gotten the shot so easily,” says ASC member Claudio Miranda. “It was frustrating, and that’s what started me on this track.”

Miranda, an Academy Award-winning cinematographer, began learning to pilot drones in 2016, “mostly because it eased communication for me,” he says. “Once I had developed piloting skills, when I wanted a specific aerial shot, I knew exactly how to get it, and I could either capture it myself or — if it was something more complex — I could communicate it to a seasoned drone pilot.”

Directors of photography must be ready for anything on set, and today that often means having a drone on hand. *AC* spoke with a number of experts in the field who weighed in on the choices, misconceptions and sometimes surprising capabilities that come along with this high-flying technology.

What’s Possible

“Some people think the drone is a toy helicopter, and it very much isn’t,” says Sarah Phillips, a cinematographer and drone pilot who frequently serves both roles in tandem — including for the features *IRL* and *Ingress*, the shorts *Beachworld* and *Supplements*, and the pilot for *Tavern Brawl*. “It can achieve similar things to a helicopter, but it can also achieve similar things to a crane or jib — though I feel that people who think about drones as replacing other technologies are limiting their potential. A drone can do some really incredible stuff.”

“Flying right next to something or somebody as you push in or pull out, dolly left or right, or boom up or down are things I practice every day,” says drone operator and ASC associate member Mark Bender — whose aerial work has included collaborations with cinematographer Chuck France

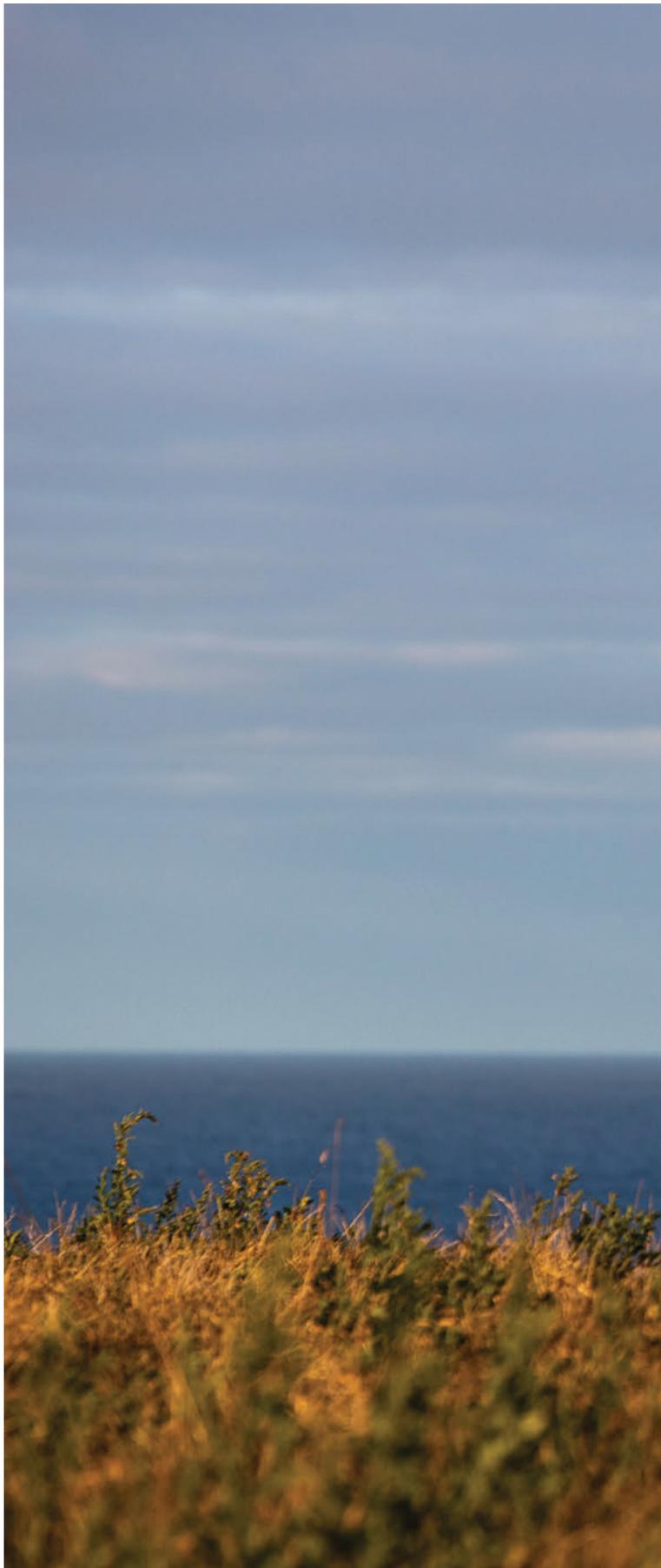


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EYES IN THE SKY

Previous pages: An XM2 Tango drone at work.
This page: A DJI Inspire 2 drone shot is transitioned from aerial to handheld for the short *The Circle*, photographed by Claudio Miranda, ASC.



PHOTO COURTESY OF DJI.

“My personal challenge is to make the viewer feel it is natural to fly.”

on the short *Artemis*; with Sam Nicholson, ASC on a commercial spot for SDGE; and with this author on the short *Remains of a Nation*. “I can seamlessly be photographing low over the ground and then transition to aerial points of view without changing setups, thus avoiding cuts in the middle of those transitions.” He notes his appreciation for how far drone companies have come in improving issues with low latency “between camera movement input and the actual camera movement. It is not the perfection of a Steadicam in the arms of a master operator, but it does approach that capability.”

Stuart Cram, senior marketing manager at DJI, has noticed that compound shots — for instance, a move that starts in the air on a drone, moves down to become a handheld shot, and then takes to the sky again, all without cutting — are becoming increasingly popular. He notes the feature *Cherry* (AC March '21), the FX series *Snowfall* (AC Oct. '19) and the CBS series *SEAL Team* as productions that have featured such work. “New things are added to the language all the time,” he says. “Sometimes an aspect of the move can only be achieved with a drone, and sometimes it can only be achieved with that *specific* drone.”

It's equally important for filmmakers to understand the limitations of the technology, says Bender. “It's the right tool for some situations, but not every situation. People try to use drones for precise jib or crane moves, and although they are pretty good, you can't get that precise repeatability out of them all the time because they are literally part of the air they fly in. Drones offer another palette of perspectives — sometimes it's valuable and sometimes it isn't. You know, not every movie needs an ‘Eye of God’ shot to be force-fit into the storyline, or the camera to roll disturbingly from left to right.”

But for projects that are enhanced by a drone's perspective, he adds, “my personal challenge is to make the viewer feel it is natural to fly, and embrace the aerial perspective. The objective is to immerse them further



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into the story with these visuals. Working with directors and cinematographers who wish to explore this is very exciting and satisfying."

Exploring Options

Regarding the choice of drone size, Miranda notes that the camera's distance from the actor is key in this determination. "You have to know what it is you're trying to do and plan your shot," he says. "Obviously, a helicopter can't come very close to an actor. You can get a bit closer with a big drone, and you can get even closer with a small drone, which allows for a greater intimacy with the actor."

Phillips suggests that even if a production is employing a particular camera and lens combination, a smaller drone with a built-in camera can generally produce a comparable image on a budget — especially for establishing shots, because "you're usually at infinity focus either way. But if you want a specialty shot that starts close on an actor and pulls back to a point far away, you might use the A cam rigged on a larger drone for that depth-of-field change."

Stephen Oh, chief executive officer of aerial-cinematography company XM2 Pursuit, has designed large drones for numerous projects, including *Pirates of the Caribbean: Dead Men Tell No Tales*, shot by Paul Cameron, ASC. Oh notes that filmmakers on such large-scale movies generally prefer to achieve consistency between the drone work and the cameras on the ground by shooting with "the same sensor and same glass" at all times. He adds that "with a larger drone, we also can shoot on film and fly camera arrays." The company has provided drone services for film-captured productions *No Time to Die* (AC April '20) and the HBO series *Westworld*, and for camera arrays on *Star Wars: The Rise of Skywalker* (AC Feb. '20).

Oh and his team learn quite a bit by spending time on set. "We've collaborated with a lot of great DPs, and they've all contributed to our work in their own ways," he says. "When we're on set, we watch and listen, and even if a cinematographer might not make a specific request, I might hear them commenting about some aspect of the drone on set, and that helps me understand how we can improve it. Sometimes an idea will just pop, or something will emerge from a chat with someone — and we go with it."

Bender notes that even with larger drones, what can be achieved "still comes down to the skill of the operator. And with the biggest drones, there are multiple operators: someone flying and at least one camera operator. Being a camera-dolly grip is already an art, and being a drone pilot is like being a 3-dimensional dolly grip. Just because you are flying does not mean you leave your camera/dolly skills on the ground — you just take them to new heights."

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An Italian hillside captured by cinematographer and drone operator Sarah Phillips.



IMAGE COURTESY OF SARAH PHILLIPS.

More Than Flying

Among Miranda and DJI's numerous collaborations, which include the drone-heavy feature *Only the Brave*, various commercials ("especially car spots," he says), and the much-awaited upcoming feature *Top Gun: Maverick* — was *The Circle*, a 2016 short-form production that was shot by Miranda and designed to showcase DJI's Inspire 2 and its X5S camera. *The Circle* centers on a father and son's relationship, and was captured entirely with the Inspire 2 rig — not only the aerial shots, but all the conventional shots as well. "To get close-ups for driving shots, we rigged the drone-mounted] camera to a hostess tray strapped to the picture car," Miranda says. "For a shot where we wanted to lower the camera directly over a bed, we used a couple of pulleys and used the drone as a remote head. It was a cool way to use the drone — we might not have been able to get high enough at that location with a standard remote head and cine camera."

Miranda sees *The Circle* as a testament to everything drones can do. "For me, a lot of the appeal is having the ability to focus on what I want," he says. "Aerial cinematographers set a deep stop, and it covers everything. On *The Circle*, the stop was faster and my AC was able to pull focus from the monitors to selectively focus on subjects."

"The democratization of aerial movement has made life a lot easier for filmmakers, which I think is really important."

Miranda notes that he is part of DJI's Masters Program, and provides input on the development of their technologies. He also acknowledges the support of Kevin LaRosa II at Helinet Aviation Services, who has been especially helpful in Miranda's journey in the drone world, and with helping him navigate the rules and regulations involved with commercial drone shooting.

Accessible Opportunities

Miranda submits that though he used "everything" during production of *Top Gun: Maverick* ("drone, helicopters, jets") — and that drone photography may be typical of today's large-scale productions — the technology offers advantages to lower budgets as well. "I get excited about anything that makes a shot more interesting, and drones have made aerial shots possible for filmmakers who can't afford helicopters. This democratization of aerial movement has made life a lot easier



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Clockwise from top left: Claudio Miranda, ASC; ASC associate Mark Bender; Stephen Oh; and Sarah Phillips.



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for these filmmakers, which I think is really important. You can go out with an Inspire 2 and get amazing shots if you treat it right. The opportunity is there.”

Says Phillips, who is in the habit of always bringing a drone with her on projects, “Why shy away from having bigger shots in your film? You don’t need a massive crane to get a bird’s-eye shot anymore. Busby Berkeley cut a hole in the top of the soundstage to get the right view, but now you can just fly a drone in.”

Future Pathways

As the drone knowledge base expands, so, too, do the creative possibilities. Miranda, for example, has recently noticed some lighting experiments. “I saw someone use a drone for a poor-man’s helicopter light,

and it was pretty convincing,” he says. “I think that’s super-creative.”

Phillips is keeping an eye on FPV — first-person-view drones — which require VR goggles to immerse the pilot in the flying experience, as if they are sitting in the “cockpit.” She notes, “We’re just starting to see the dawn of an entire generation of FPV pilots. I’ve seen all these viral FPV videos with dive bombing, and they freak me out!”

Oh is interested in flying larger camera arrays and testing new digital cameras to use in them. “We’ve been looking at the Ahtel 9x7, a 65-megapixel camera developed in Australia last year for VFX [as well as for VR and larger-format work]. The camera was designed for Imax [presentation]. It is natively 9,344x7,000 with one-of-a-kind capabilities that we are excited to explore.”

MONEY HEIST



THE FINAL SEASON



A drone shot captured by Phillips for the short *Beachworld*.



IMAGE COURTESY OF SARAH PHILLIPS.

Clear Communication

With so much evolving so quickly, filmmakers need to be able to communicate their objectives clearly. Says Phillips, “If you want a drone shot, what’s most important is to have a very clear vision of that shot, because that will affect who shoots it and what they shoot on — and, in turn, what it costs. It also comes in handy to know what is possible, what is logistically realistic. And on the flip side, if I am just on a project for a day as a drone operator, I need to know how to speak with the DP about what they are envisioning.

“Collaborating with drone operators is the same as communicating with any other specialty on set,” she adds. “It’s just that drones are newer than, say, underwater or Steadicam. As with those specialties, descriptive words are key. Do you want to float up, truck left, get a bird’s eye,

“Sometimes an aspect of a move can only be achieved with a drone, and sometimes it can only be achieved with that specific drone.”

track an actor, lead an actor, and from what angle to what angle? Sometimes the director doesn’t know what they want except for ‘cool’ or ‘epic.’ That’s not really a problem, either, because most drone operators know how to do cool and epic!” ◊

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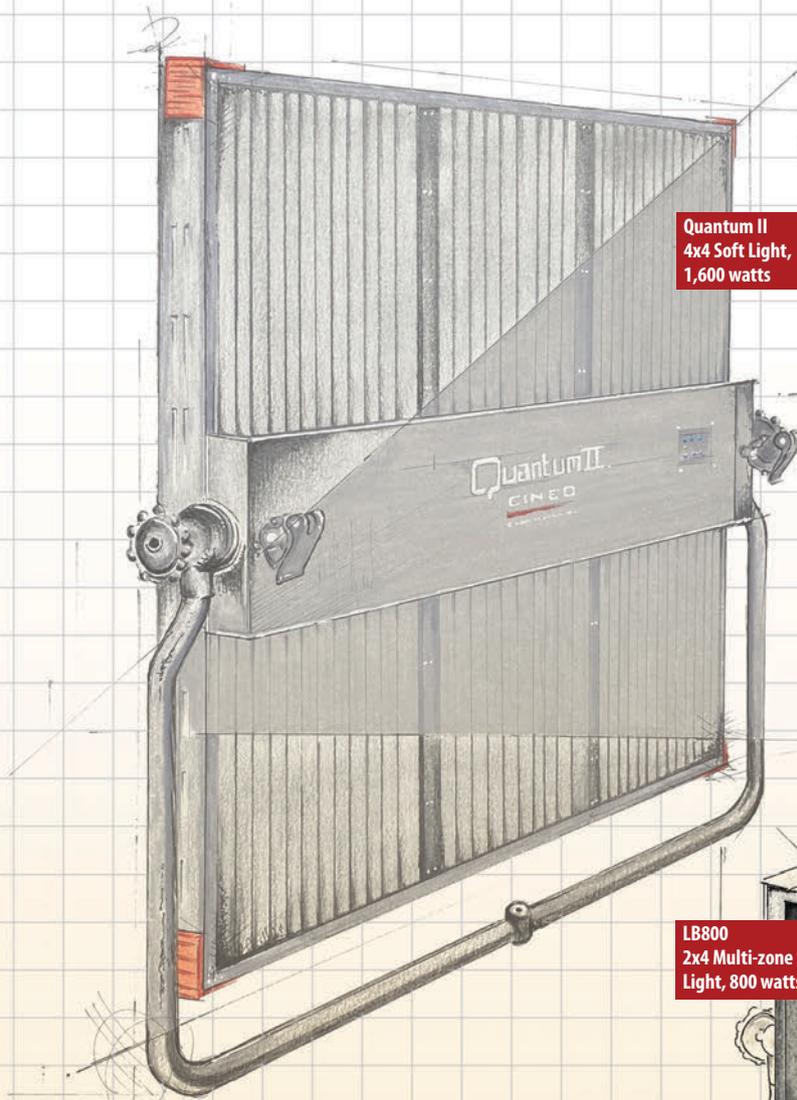
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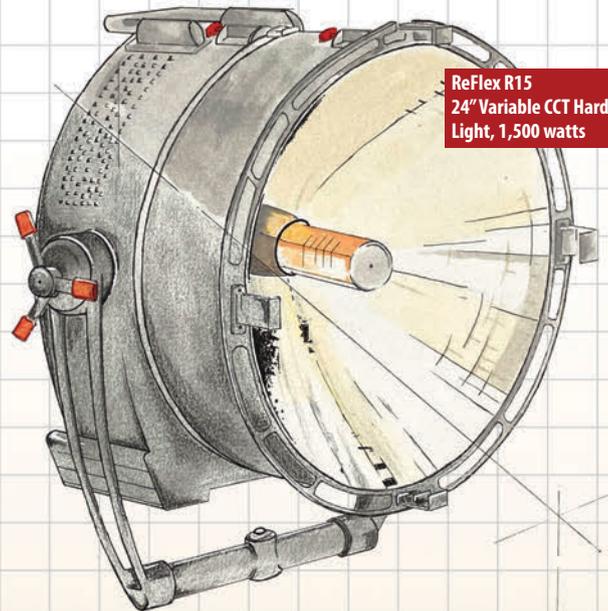
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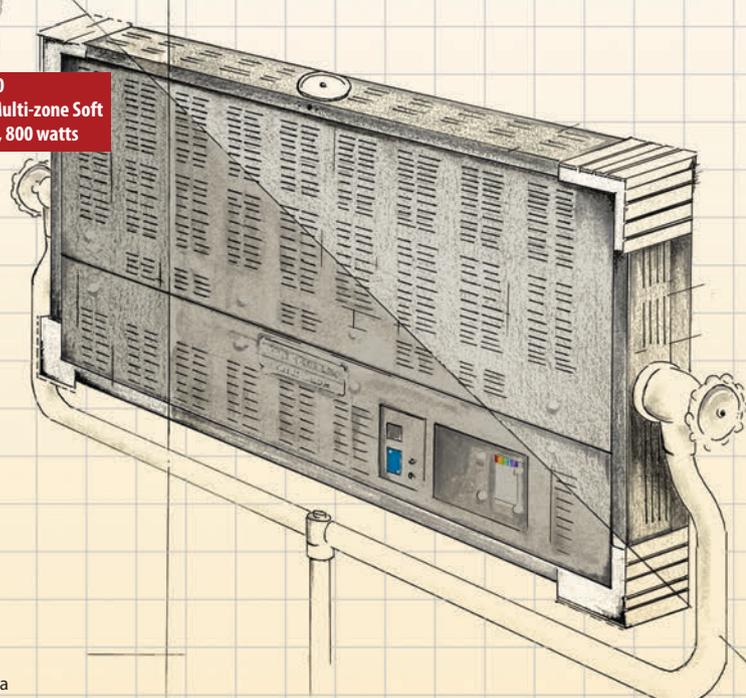
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National Defense

For *The Eight Hundred*, Cao Yu, ASC, CNSC takes a poetic approach to a historic wartime conflict. **By Alfonso Morgan-Terrero**



War erupted between China and Japan in 1937. The onset was marked by the Battle of Shanghai, which ended with the Chinese defense of the city's Sihang Warehouse against invading Japanese forces. It was a surreal scene, with harrowing bloodshed standing in stark contrast to the comforts and luxuries enjoyed by a thriving international community just across the Suzhou Creek. As Japan did not want to incite retaliation from Europe or the United States,

residents of the “foreign concession” settlement had no fear of attack, and thus were in the rare position to witness, in treaty-protected safety, China’s last stand in a historic clash.

The Eight Hundred’s striking visuals emphasize the deep incongruity between these two environments — with counterpoints in lighting and perspective achieved with the aid of cinematographer Cao Yu, ASC, CNSC, whose camerawork and creative decisions helped wrap a film about a pivotal moment in China’s history and culture within an immersive Imax experience.

Previous pages: Japanese forces prepare to move in on Shanghai's Sihang Warehouse. This page: The lights of the purpose-built "foreign concession" set were augmented by fixtures on cranes.



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Serving as an ode to heroism while expressing a pointed nationalistic perspective, the production was one of the first major releases since the start of the global pandemic when it premiered for Chinese audiences in August 2020. It went on to become the highest-grossing movie of the year, worldwide.

Cao describes the feature, which was directed by Guan Hu and shot in digital Imax format with Arri's Alexa 65, as "a visual poem — microscopic and grand, gentle and cruel — [about] a group of soldiers who, through self-sacrifice, were able to restore their nation's dignity over the course of just four days."

Poetic Approach

Cao sought to create a visual design that was unique to *The Eight Hundred*. Shanghai's foreign-concession neutral territory serves as a vantage point for what initially appears to be a useless effort by the Chinese Kuo-mintang soldiers against the Imperial Japanese army.

"In terms of military strategy, the battle meant nothing, and the warehouse wasn't strategically important," Cao says. "It made no sense to keep guarding that warehouse." However, he adds, it meant a great deal for Chinese people, as it gave them "strength and a new sense of hope."

Cao decided that the film's visual style should be characterized by "the subjective hidden in the objective," calling for "a more poetic feel" — a

visual palette that shifted away from the "grainy, desaturated ENR look" often found in war films. He therefore moved toward "a painterly style with relatively soft contrast and a very delicate layering of the image" that would accurately express what this battle meant in the hearts of the people.

Lighting for Contrasts

"I think as a DP, the most important thing to consider is light," says Cao, who expresses central themes in the story through different lighting schemes. "In terms of cinematography, the film is centered on the themes of darkness and light." He sought to strongly emphasize the shadows because he felt that without a consistent, pronounced look in the darker parts of the image, the soft, poetic visual scheme he was aiming for would not be achieved. "Darkness is the cornerstone of highlights," he says. "Oftentimes what we can't see is more powerful than what we can."

The audience experiences this visual dynamic during a haunting master shot — the camera pans from the brightly lit casinos and restaurants in the foreign concession to the unlit battleground of the warehouse, where the contours of demolished buildings are shrouded in the darkness of night — leaving us to only imagine the degree of destruction. Cao explains that he tried to light in a way that emphasized the

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“Whether you have 50 million dollars or five thousand dollars, time is still of the essence. Production always wants to know, can we do it - can it get done in the 12 hours. I can stay on that zoom all day, all week, all episode. Wherever I was on the lens, it felt like a prime. You can go all the way to the wide end of the lens and it holds true, as well as all of the focal lengths in between.”

JOE “JODY” WILLIAMS
CINEMATOGRAPHER



Top: The neon illumination from the concession across the creek is visible from the battlegrounds. Bottom: Cinematographer Cao Yu, ASC, CNCS captures a frenzied moment in the warehouse.



“It’s not about how unique or beautiful a shot looks — it’s about whether it evokes emotion.”

stark difference between the two sides.

For a scene in which the Japanese soldiers attack the warehouse at night, Cao lit the sprawling concession set — which was “built from scratch by the art department,” the cinematographer says — so that it could be “very bright. It has the neon lights from the casino and the billboard, and during that scene there is no actual light in the warehouse, just the flashlights the soldiers are using.” To simulate the lights from the concession that reached the warehouse, fixtures were mounted to towering cranes, the tallest of which were approximately 260’. “We used 70 Dino lights and more than 200 SkyPanels, and had them emit the multi-colored, bright lights into the warehouse.”

The difference between the bright and dark sides “has an exaggerated effect; it’s almost surreal,” says Cao, who notes that he wants the viewer to experience a kind of hyperrealism that makes the world in *The Eight Hundred* “look familiar and unfamiliar at the same time.”

Imax Experience

A key factor in creating this hyperrealism was shooting *The Eight Hundred* in the digital Imax format. “I think the reason that audiences spend all this money to go to an Imax theater is so they can see something that looks different from what they see every day,” Cao says. “Something that is more than real.” With its large sensor, the Alexa 65 “gives us this deep sense of reality, almost the equivalent of what the human eye perceives.”

In regard to lenses, he adds, “Unlike something like the Master Prime lens, which is inherently a cinema lens, the Arri Prime 65 that we customized originated from an older Hasselblad lens, and this helped us create a look that was sharp and soft at the same time. It gave a really unique kind of touch to the image — a unique feeling.”

The production’s Imax certification involved a collaboration between Arri and Imax, an initiative that has since expanded to include other camera companies, and is now known as the “Filmed in Imax” program. According to Imax Corp., the program is in place to “achieve the highest level of digital image capture for optimized playback on Imax’s proprietary projection systems.”

Though 1.90:1 is the standard aspect ratio for digital Imax, “the ratio for the Alexa 65’s sensor is 2.11:1 [54.12mm x 25.58mm], so I specifically sought to use that aspect ratio instead,” Cao says. The movie was projected at 2.39:1 in non-Imax theaters.

Lens Choice and Single-Camera Philosophy

Cao feels that “choosing the appropriate lens is the most important factor in composing the physical and visual space of the movie.” Though they could have used a vast array of lenses, considering the production’s reported budget of \$80 million, Cao and his team used three custom-tuned lenses — Arri’s Prime 65 50mm, and Prime 65 S 45mm and 55mm — for most of the production, and many scenes were shot from just one or two angles. The two-angle sequences, for which each angle was captured separately using a single camera, would result in “two-minute-long takes that would then be cut together in editing,” the

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Seeing beyond

Top: Chinese Lieutenant Colonel Xie Jinyuan (Du Chun, right) meets with Japanese Colonel Konoe Isao (Hideo Nakaizumi). Bottom: Residents witness the brutal conflict at the warehouse from the safety of the concession.



cinematographer says. It was only on rare occasions that a second camera shot simultaneously.

Regarding his overall preference for shooting with a single camera, Cao notes that “the biggest drawback of multi-camera shooting is that the more you shoot, the more you want to cover all the action from every angle. In the end, you lose the film’s focus and voice, and without that, the film has no spirit, no identity.” Setting limits amid an abundance of resources was key in his attempt to have “the audience’s eyes be restricted, their vantage point limited. This creates a more real-life, immersive experience.”

Musical, Emotional Approach

Cao’s approach toward composition is not shot-based; instead he focuses more on the film as a whole. “I think that shot composition and camera movement in a movie work in a way that is very similar to a piece of music,” he says. “And if we say that a camera move is the same as a

musical note, then the movie or the piece of music will only be good if all the notes fit together. You can’t just have a few good bars or notes; it has to work from beginning to end.”

In order to gauge this, Cao operates the camera himself whenever possible during production, which allows him to “feel” what he’s shooting — simulating, to a degree, the experience of the audience. “When you’re the one shooting, you actually feel the composition,” he says. “If the shot captures a strong performance from the actor, and it moves the audience emotionally, then it’s a good shot. It’s not about how unique or beautiful it looks — it’s about whether it evokes emotion.”

In one scene, 13-year-old Xiao Hubei (Zhang Junyi) crouches beside a heap of rubble, hiding from Japanese soldiers approaching on horseback in the upper left side of the frame as they behead Chinese soldiers with their sabers. We see the visceral fear and panic in the young boy’s expression while, just as vividly, we see the dilapidated environment around him — the context informing his fear. This balance between shooting in a way that keeps the viewer locked into the characters’ perspective, fully capturing their emotion while still providing a strong sense of the environment, is essential for Cao. “On an Alexa 65 for Imax, the 45, 50 and 55mm lenses actually behave like wide-angle lenses,” he says. “So even if you’re shooting a close-up, you can clearly see a lot of information in the background. This is very important to me, because we have to see these characters in their environment.”

Modern Look

Cao did not want the production’s visual design to mirror the time period

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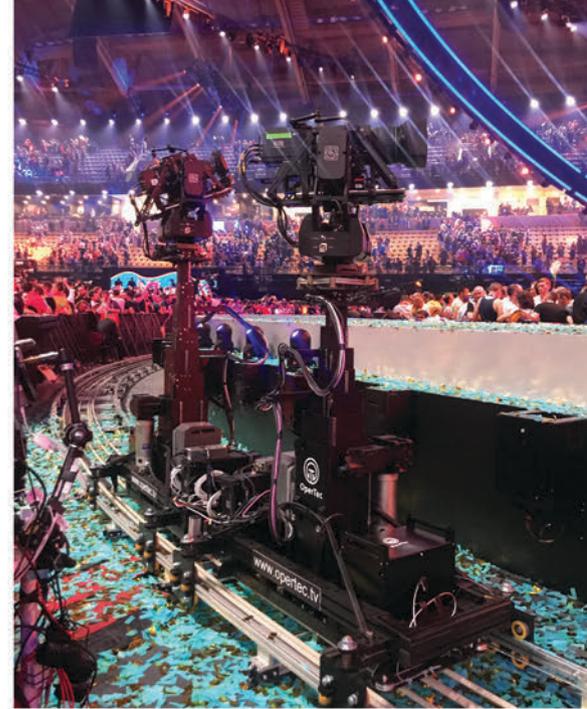
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A greenscreen-style background was constructed on a soundstage to help create a recurring motif of an ancient warrior on horseback.



of the story, as he felt that the central themes explored were universal and should embody a more contemporary look. In the production's visual guide, he wrote that the film "should have the texture and color of modern paintings, such as Picasso's work from his Blue Period and the works of Edvard Munch and Edward Hopper, with rich highlights and shadow levels. I will lower the color saturation and strengthen the greens, blues, yellows and blacks separately. On the whole, [I will] let it be a cold and modern composition."

In order to achieve this goal, Cao went through an extensive pre-visualization process where, with the aid of Blackmagic Design DaVinci Resolve, he developed a series of custom-made LUTs that served as a precise visual guide for the entire crew once shooting commenced. "We ended up using four LUTs — one for the day, one for the night, one for cloudy daytime scenes, and another for indoor night scenes." The difference between each is subtle. "The biggest change is in the contrast levels," Cao says, adding, "our daytime LUTs were more saturated than our nighttime ones."

Cao notes that using the LUTs while shooting allows the overall color scheme to be more cohesively developed. "[It can impact] the clothing and the makeup, for example — or what shade of red the blood should be," he says. "All of that [can be better determined when using] the LUTs." This allowed Cao to modify the color grade more precisely during post-production. The color-correction process typically takes about 15 days

in China, but Cao notes with gratitude that he was given 50 days for this production. "We [ultimately lowered] the overall saturation, and then we used more yellow in the highlights and more blue in the shadows. [The movie] ended up having a really subjective look" — nearly identical to what he had originally envisioned.

Wider Perspective

Cao considers *The Eight Hundred* a testament to the kind of future he sees for contemporary Chinese cinema. Reflecting back on the late '80s and early '90s, when Fifth Generation directors re-announced China's presence in world cinema, Cao says, "When we were all starting out, we looked up to Chen Kaige and Zhang Yimou, and of course we had outstanding DPs like Gu Changwei, who shot *Farewell My Concubine* [1993], but I think the visual experience these films gave us was very Chinese. So as a cinematographer from my generation, I hope to shoot the kind of motion picture that possesses an international sense." For Cao, *The Eight Hundred* — which has grossed more than \$460 million worldwide — is "of course a Chinese film, but it should be able to have an effect on people all over the world."

"After our movie was released," Cao adds, "the Sihang Warehouse in Shanghai became a place where many people went to lay flowers" commemorating the defenders, known as the Eight Hundred Heroes. "Many people went there every day, which really moved us as filmmakers." ◻

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Watching in Horror

Cinematographer Annika Summerson helps re-create 1980s horror-genre visuals for *Censor*.

By **Iain Marcks**

Extrême close-ups of shadowy eyes under hard light feature prominently in a U.K. horror flick about a young woman who discovers that the old hotel she’s inherited sits atop a gateway to Hell. The movie is called *Asunder*, and it doesn’t actually exist — rather, it’s one of several fictional clips that appear in *Censor*. These clips, along with the actual feature, were shot by Annika Summerson and directed by Prano Bailey-Bond.

In the 1980s, a number of low-budget horror and exploitation films were distributed on videocassette in the United Kingdom as a means of circumventing the British Board of Film Classification’s strict obscenity laws for theatrically distributed films. Public and political fear over the availability of such films to impressionable children prompted social advocacy groups and court prosecutors to target individuals and businesses distributing these movies, which came to be known as “video nasties.”

Parliament passed the Video Recordings Act in 1984, closing the videocassette loophole with stricter laws on content and subjecting all films seeking distribution in the U.K. to scrutiny by the BBFC. The law remains in place to this day, though its definition of obscenity has been relaxed.

Censor focuses its lens on Enid (Niamh Algar), a dedicated BBFC film censor who harbors a deep well of guilt and psychological trauma after the mysterious disappearance of her younger sister during their childhood years.

“I grew up in Sweden, so I knew nothing about the video nasties until a few years ago,” says Summerson. “Prano knows everything about them, and we also lived together for four years, so I received quite an education.”

The two filmmakers met in 2003 while studying film and television production at the London College of Printing — now the London College of Communication — and formed an instant rapport. However, the

Previous pages: U.K. film censor Enid Baines (Niamh Algar) is haunted by an eerie film that recalls a traumatic incident from her childhood. This page: In certain sequences, the filmmakers emulate the look of the B-grade exploitation movies Enid examines.



PHOTOS BY MARIA LAX. PHOTOS AND FILM IMAGES COURTESY OF MAGNET RELEASING.

cinematographer says, “We actually have quite different styles — our ways of framing a shot, for example — so we often have to discuss and negotiate, but the combination of our styles creates a new one.”

The duo’s collaboration yielded a number of short-form projects, including 2015’s giallo-meets-*Evil Dead* homage *Nasty*, shot on Super 16mm and Super 8mm film, in which a young boy begins seeing his missing father in the horror films his mother doesn’t want him to watch. His search for the lost parent eventually leads the determined son inside the films themselves.

Nasty’s Super 8mm sequences make an early appearance in *Censor* as one of the films Enid reviews for the BBFC, among other real-life nasties like *Nightmare* (aka *Nightmares in a Damaged Brain*), *The Driller Killer*, *Frozen Scream* and *Soultangler*. It also serves as the basis for *Censor*’s

main plot: Enid discovers that her parents are abandoning their search for her sister — and after viewing a particularly disturbing film where a young girl brutally murders her sister with an axe, the walls bolstering Enid’s fragile psyche start to crumble until she can no longer distinguish between fantasy and reality.

“The first films that Prano showed me before we made *Nasty* were *Cannibal Holocaust* and *The Driller Killer*,” Summerson recalls. “I was shocked by how cheap and unrealistic some of them looked. At the time, I was very seriously studying cinematography at the National Film and Television School, and at first I thought it was terrible craftsmanship. Then I realized the more ‘homemade’ films were clearly restricted by their budgets, and are actually quite innovative.”

Summerson concedes that there are plenty of beautifully shot video

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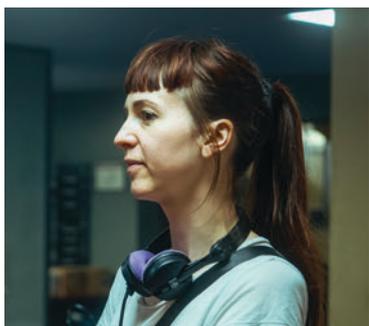
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Top: In a trippy flashback sequence, Enid recalls her sister's mysterious disappearance.
 Bottom left: Director Prano Bailey-Bond.
 Bottom right: Cinematographer Annika Summerson.



“We wanted the films within *Censor* to have a video-nasty feel, like we had no money or experience to speak of.”

nasties, but the filmmakers’ interest skewed toward films that were a bit rougher around the edges. She explains, “We didn’t want to end up with a film that looked cheap and trashy. We wanted the films within *Censor* to have a video-nasty feel, like we had no money or experience to speak of. We also had a lot of discussions about how to avoid going too far with it and ruining my career!”

Almost the entirety of *Censor* was filmed with Arricam LT and ST cameras, shooting 3-perf 35mm on Kodak Vision3 500T 5219 and 250D 5207 stock. Vintage Canon K-35 lenses provided an aged, low-contrast look that Summerson felt suited the movie’s world and the period, while certain scenes called for the use of Tiffen Pearlescent and Soft FX filters. “Shooting 35mm film was right for the period we were trying to portray, and also because the subject matter involved filmmaking,” Summerson explains. “Celluloid has a texture and a gentleness that is hard to re-create on digital, especially in the highlights. On digital, I always end up adding grain in postproduction to get closer to the film look, anyway. Maybe it has to do with the period I grew up in, but there is something magic with 35mm that is hard to put into words. It’s a feeling more than anything.”

Photos of beleaguered working-class Brits in photographer Paul Graham’s renowned book *Beyond Caring* inspired *Censor*’s palette and costumes, imbuing them with a sense of social realism. “We didn’t want to portray a colorful, pastel-y ’80s,” says Summerson. “We were trying to mirror the political atmosphere of the Thatcher era — an environment where social hysteria can ignite.”

The film that triggers Enid is called *Don’t Go in the Church*, and it’s



THE EIGHT HUNDRED

“ I wanted the texture of modern paintings such as those of Munch or Picasso’s early works, and ALEXA 65 was the ideal format. We had to film continuous shots in very high-contrast environments, like an indoor set looking out on a bright exterior a few hundred meters away. ALEXA 65’s large exposure latitude and ultra-high resolution was perfect for the film. ”

Cao Yu ASC, cinematographer on “The Eight Hundred”



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Top: Enid finds herself in a waking nightmare while visiting the forest location of a B-movie production. Bottom: Summerson (orange cap) captures part of the forest sequence.



one of the handful of video nasties that Summerson and Bailey-Bond made especially for *Censor*. It's also one of the more traditional-looking nasties — with an atmosphere of dread that pays homage to the 1974 American film *Lisa, Lisa* (aka *Axe*, photographed by Roger Corman regular Austin McKinney) and visually referencing 1971's *The Blood on Satan's Claw* (photographed by future BSC member Dick Bush). “We copied the muted color palette and soft, naturalistic lighting from *The Blood on Satan's Claw*. We wanted more of an everyday look — not so over-the-top, but still vintage and retro, almost like French New Wave,” says Summerson, who used a combination of Arri SkyPanels, Fresnels and Source Fours, all sourced from ProVision, to light the nasties and *Censor's* main story. “It's a fairly common look that's linked to English social realism — like if you wanted to tell a story that's about working-class hardship. You want it to look real, to almost have a documentary feel to it, for the audience to perceive it as reality.”

Lighting “badly” proved to be a challenge for Summerson. “Your inner DoP doesn't really want to give in to that,” she says. “You want it to look bad, but it has to be bad in the right way.” She created slashes of hard lighting with Source Fours, adding splatters of color with Lee ¼ CTS and Light Lavender gels.

Another of *Censor's* homages, the aforementioned *Asunder*, is based on Lucio Fulci's 1981 film *The Beyond* (aka *7 Doors of Death*, photographed by Sergio Salvati). The filmmakers chose to mimic Fulci's editing style and shot compositions. “We also looked at the camera movement,” Summerson adds. “We didn't want ours to seem too advanced, so instead of moving the camera intuitively, we kept it out of sync with the actors.” By way of example, she describes how an actor would “deliver his line, then wait for the camera to move, and then begin to walk after the camera had already started. As a camera operator, you have to fight your instincts and focus on the rules you have set out for yourself instead.”

The cinematographer intended to shoot the nasties on 16mm, but budgetary restrictions prevented the production from renting an additional camera body, so interiors were photographed on uncorrected 5207 daylight stock, pushed one stop to enhance the grain and contrast.

The rest of the original media that appears in the film claims no direct outside visual influence. *Extreme Coda* features a brutal rape scene that was thematically inspired by *I Spit on Your Grave* (1978), but was designed and photographed in a way that would emphasize the set's unique qualities — specifically, the wallpaper — so that Enid would recognize it when she later visits the home of a sleazy horror producer.

For a clip that appears on a screen in a viewing room, Bailey-Bond performed a brief cameo as a woman drenched in blood (actually tomato sauce), stabbing a huge knife at the camera. “We originally shot this on an old VHS camera we found in an attic, but it didn't work properly and the footage was ruined, so we captured it again on an iPhone 11,” Summerson says. Additional grain was applied to this material during the final grade, as were further adjustments to make it pass as older footage. “We also shot all of the news segments,” the cinematographer adds. “Those were done before principal photography, using a Panasonic M40

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Film Stock: Kodak Vision3 500T 5219, 250D 5207

Lenses: Canon K-35 Prime

Cameras: Arricam LT, ST; Panasonic M40; iPhone 11

Scenes set in the film's "reality" have a starkly different, more polished look than its fantasy sequences and B-movie segments.



VHS camcorder with shoddy zooms and intentionally average framing.”

Censor is presented primarily in a 2.39:1 aspect ratio, which was achieved by cropping the top and bottom of the spherically derived frame, though it dynamically shifts at points when Enid loses her grip on reality. (The filmmakers also employed this technique in *Nasty*.) For example, when Enid ventures into the woods to find the mysterious director of *Don't Go in the Church* and *Asunder* — as she believes her missing sister is acting in his latest production — her perspective gradually squeezes down to a pillarboxed 1.33:1 frame.

“We wanted to blend the two worlds together, to bring the audience into the video nasty along with Enid, [so they would wonder], ‘Are we in her mind, or are we in reality?’” says Summerson. “As a technique it can be leading, but as long as you take a balanced approach it can still be very effective.”

As Enid spirals further into madness, *Censor* employs ever more imaginative in-camera effects: gurgling impalements, sucking chest wounds with talking heart puppets, and spurting decapitations. “We wanted the

effects to be of the quality of old-school horror,” Summerson says.

At the movie’s climax, Enid’s psychosis becomes complete as she imagines a scene involving her parents and her lost sister, which plays out in front of the family’s childhood home on an idyllic street in Leeds. Two versions of the day-exterior scene were shot on 5207 daylight stock: a beautiful, colorful fantasy enhanced by Tiffen Pearlescent and 85 filters; and a cold, harsh “screaming world” of reality, shot without any filtration. The versions were then intercut to present two jarringly contrasting iterations of the scene.

Cinelab London — which handled the film’s processing and scanning — provided dailies, which were graded by colorist Paul Dean. The final grade was performed by colorist Vanessa Taylor at Dirty Looks in London. “A lot of *Censor*’s look was done in-camera, and the decisions we made in post reinforced the decisions that were made on set,” says Summerson. “While we were shooting, I’d always ask, ‘Is this too much?’ But with Prano, nothing was ever too much. We were going full out.” ◊

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Perilous Expedition

Filmmakers capture a Himalayan climb and a Sherpa's inner conflict in the mountaineering documentary *The Wall of Shadows*.

By Patricia Thomson

The camera peers upward at a climber inching along amid stiff winds and the haze of heavy snowfall. Not far above him, powder and ice avalanche down a cliff. The fearsome east face of Kumbhakarna in Nepal had never been scaled, and *The Wall of Shadows* charts a harrowing attempt.

The winner of the *American Cinematographer* Award at the 2021 Salem Film Festival in Massachusetts is not your typical Himalayan expedition documentary. “It doesn’t fall into the standard of Western climbers reaching the top and waving their ice axe in the air,” says specialist mountain cinematographer and drone operator Keith Partridge. Director Eliza Kubarska had a different idea in mind: Eschew the “hero” point of view and focus on the Sherpas instead.

“The question is, who are the real heroes?” asks the Polish documentarian, who is herself an accomplished mountaineer. “The idea was to turn the camera around and focus on the other side. I told the climbers that I just needed them as background to my story about Sherpas. I think they were surprised, because they planned to climb one of the hardest mountains in the world.”

The first part of the feature starts quietly enough with an intimate portrait of its protagonist, Ngada Sherpa. Kubarska and Polish cinematographer Piotr Rosołowski devoted a full month to shooting the hardscrabble life of Ngada and his family at home, capturing quotidian moments alongside the lore and legends of Kumbhakarna — a peak that rises to 7,710 meters (25,300’).

At that point, “I didn’t know what kind of film it would be,” the director notes. She knew that Sherpas in Nepal were mostly Tibetan Buddhists, and for them Kumbhakarna is sacred. She wanted to contrast mindsets — Sherpas’ belief in the holiness of the mountain versus alpinists’ quest to conquer the peak — and the moral quandary that can result for the Sherpas.





Preceding pages: An alpine climber confronts the challenges presented by the Himalayan mountain Kumbhakarna. This page: A Sherpa family faces emotionally wrenching issues after opting to assist the expedition.



PHOTOS BY DMITRY GOLOVCHENKI, SERGEI NILOV, KEITH PARTRIDGE, PIOTR ROSOŁOWSKI AND ELIZA KUBARSKA, COURTESY OF TILT PRODUCTION.

“I told the climbers that I just needed them as background to my story about Sherpas.”

But she couldn’t be sure she’d have the ingredients. “Kumbhakarna is so hard, there are few people in the world who can climb it,” she explains. “Expeditions there happen maybe once every 10 years.”

As luck would have it, she heard about an elite Russian duo — Dmitry “Dima” Golovchenko and Sergey Nilov — who hoped to climb the mountain in the alpine style. They were looking for Sherpas, so she connected them with Ngada, and the expedition was set in motion. A third climber from Poland, Marcin Tomaszewski, joined in.

Ngada agreed to the expedition despite heavy objections from his wife. Because Kumbhakarna is holy, Sherpas have refused to climb it. But Ngada reluctantly decides to break the taboo because his son wants to become a doctor, and schooling costs money. His wife protests: “It’s climbing God’s body.”

Logistics and Gear

During the expedition, the idea was that Rosołowski would cover the Sherpas and Partridge the climbers, plus any shooting above base camp (4,800 meters). Rosołowski is not a climber, but knew from trekking in Nepal that he’d be okay up to that elevation — whereas Partridge specializes in extreme environments, including high elevations like the



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Top: The crew captures imagery and sound as the alpinists prep for the climb. Bottom: Flanked by director Eliza Kubarska and cinematographer Piotr Rosołowski, mountain cinematography specialist Keith Partridge monitors a drone shot.



“The main challenge was maintaining steadiness when you’re out of breath.”

Andes (*Touching the Void*) and Everest.

Rosołowski had constructed an intimate style during his time capturing Ngada at home. “Mainly I was trying to be close to them with just one lens,” a Canon CN-E 35mm prime mounted on a Canon EOS C200. I was searching for powerful images in the daily life of our protagonists, but after the expedition got going, that plan partly fell apart; everyone was just trying to keep up with events as bad weather intervened. “The more dramatic the climbing,” he says, “the less we stuck with the aesthetic guidelines established at the beginning.”

Partridge adds, “The mountain is a character, and every character will have good days and bad days, be in a happy mood or a less happy mood.” Kumbhakarna first showed its ferocious side on the trek to base camp. Heavy snow fell, cutting off the pass. The group had to take another route, which added 100 kilometers and cost them five days. The detour also cut into the time the climbers had set aside to acclimate to the altitude, and the problems cascaded from there. “I think Kumbhakarna was

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This page: Kumbhakarna is one of the most technically difficult climbs in the world. Opposite: Guided by Ngada Sherpa, the expedition treks toward its objective.



Drone Work

Thin air increased the difficulty of flying a drone. Working with a small DJI Mavic 2 Pro, Partridge managed to capture spectacular shots over glaciers and icefalls that showed how vast and treacherous the terrain was. In one case, he took the drone up to 5,300 meters. “The problem is keeping it airborne when the air density doesn’t support it,” he notes. The motor is working extra hard, so “instead of getting 18 to 24 minutes of battery time in the air, we were down to six. During virtually every flight we did, all the warning lights were on. You always have a 20-percent contingency. We were well on reserve power, battling to get the drone back.” (For more on drone cinematography, see page 18.)

fighting against us,” says the director.

As Partridge recalls, “Moving into base camp, conditions took a turn for the worse through heavy snow — to the point where we were breaking trail thigh-deep in snow. That’s pretty hard work when you’re pushing 5,000 meters.”

It was Rosolowski’s toughest day. “I was on the edge of my physical limits,” he says. “It was very difficult to keep going. Forget about filming!” Nonetheless, he managed to run ahead to capture shots of the climbers struggling against the snow. “It was really difficult, physically. You have to be in good condition, because you have to be quicker than the whole group and then catch up [after they pass].”

There were technical troubles as well. A generator broke early in the ascent, and the group had to wait a week for a replacement to be carried up from Katmandu. But they managed to eke out six days on batteries

Tech Specs: 1.85:1
 Cameras: Canon EOS C200, C300 Mark II; GoPro
 Lenses: Canon CN-E primes, Compact-Servo zoom

thanks to smartly chosen camera systems, combined with strategic planning. “That week was more like shooting a documentary on film, when you have to plan exactly,” Rosołowski says.

Shooting in 4K, Rosołowski continued with his Canon EOS C200 and Canon CN-E EF primes. Partridge had a Canon EOS C300 Mark II, and mostly relied on a Canon 18-80mm T4.4 Compact-Servo zoom. “The Canon systems are incredibly reliable, with very good battery life in the cold,” says Partridge, who brought six batteries that could last three continuous hours each. “[Other cameras are] too heavy or power hungry. So everything escalates — if you need more power, you need more batteries, and that adds more weight, so you’d need more porters, more Sherpas. Can you carry it up yourself? Probably not.”

The production mainly shot handheld, but occasionally used a tripod or gimbal. Handheld shots could be tough, especially when a camera’s operator was utterly winded. “When you’re running around doing handheld work, you’re short of breath pretty much all the time,” Partridge says. “So that’s the main challenge: maintaining steadiness when you’re out of breath. The heavier the systems, the worse the situation becomes.





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Left: Exhausted climber Dmitry "Dima" Golovchenko descends from the mountain. Below: Rosołowski at work.



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Primarily, it was a case of keeping the main cameras as stripped-down as possible.”

To protect gear from the cold, they built special cases and threw in chemical hand-warmer packets. “We were taking all the electronic equipment into the tent at night,” Rosołowski recalls.

Final Push

After everyone reaches base camp, conflicts begin to break out. The climbers argue about strategy while the Sherpas grumble that the climbers only listen to themselves.

Golovchenko and Nilov take a day to scout. The next morning, the trio sets out with Ngada to confront the formidable climb. One shot is a dizzying low angle looking up at an alpinist on a rope scaling a 300-meter vertical wall. And that’s not even the *real* east wall, which towers 3,000 meters. In between, there’s a ragged icefall to traverse.

Ngada realizes it’s beyond his capabilities and turns back. At base camp, his boss explains that if he doesn’t climb, he won’t get paid. But Ngada doesn’t want to risk his life. The climbers return that night and hash out what went wrong. The Polish climber resigns, claiming the

Russians weren't acting like a team and didn't allow sufficient time to acclimate. The next day the Russians set off as a duo. "This film is not about climbing," Golovchenko comments as he packs for the ascent. "It's about people."

The director accompanied the climbers to 5,200 meters, scaling the wall by climbing the ropes the Russians had fixed — a technique known as jumaring. She shot some scenes on the plateau where they all camped, then turned around. After that, the climbing footage was shot by the Russians, who had been provided with GoPros. Partridge returned to England, while Rosołowski and Kubarska waited at base camp along with the Sherpas.

Two lingering GoPro shots show the seeming impossibility of this climb, as we watch Nilov slowly pick his way up a vertical wall caked with deep snow. Then Kumbhakarna shows its unhappy side again by whipping up a blizzard.

When the director gave the Russians their GoPros, she told them, "You can make very long shots. You have to be patient." When she later collected the cameras, she was first struck by the fact that they kept shooting, and then by how powerful the footage was. "I knew they were fighting for their lives," she says. "All the shots when Sergei is on the wall climbing very slowly were made by Dima. I discovered he is so great! He was really patient. I was impressed. They wanted to keep their promise [to capture long shots]." Her only regret was that they didn't record their own faces while inside the tent. "Dima told me he didn't think it was interesting," she says.

Meanwhile, Rosołowski continued to document life at base camp during the two-week wait, "but you can film this kind of thing [for] only so many days," he says. "We didn't know what to do, because it wasn't clear if they'd come back the same way or on the other side of the mountain. Psychologically, it was very difficult. You're just waiting there at 5,000 meters, and the weather is getting worse. We were like prisoners of this base camp."

Ultimately, bad weather forced the Russians to stop 300 meters short of the summit and descend on the other side, following an old route mapped out by French climbers in 1962. The director had to use a satellite phone to convey step-by-step directions provided by her alpinist husband and his topographer friend.

Everyone else at base camp packed up and left, while Kubarska, Pasang Sherpa, and the

production's very athletic soundperson, Zofia Moruś, trekked around the mountain to meet the climbers. It took six days. The filmmakers brought food, which the Russians had depleted. Kubarska shot their descent and a close-up of Golovchenko's ravaged, haunted face. "They looked very bad," she recalls.

Kubarska felt the mountain was fighting

against them, while Rosołowski looked at the challenges they faced as the conflict that a narrative needs. "The struggle with the weather and all the obstacles was a gift from Kumbhakarna, because we had different stages of progress, and obstacles the protagonists had to go through — it was interesting for the dramatic structure." ◊



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Lighting for LED Stages



Soft toplight helps blend the actors into a VFX environment in an Unreal Engine production test, shot by Matthew Jensen, ASC.

UNREAL PRODUCTION-TEST PHOTOS COURTESY OF EPIC GAMES. ASC MASTER CLASS PHOTOS BY ALEX LOPEZ. COURTESY OF THE ASC.

The introduction of LED walls into the virtual-production landscape has opened up a new world of lighting possibilities, empowering cinematographers to continue to do what they do best: leverage technology to create images that serve the story. As the art of lighting is just as vital in an interactive LED environment as it is in traditional cinematography, it's essential that directors of photography who delve into this milieu become familiar with its methods of illumination.

There are numerous types of LED-wall systems, from a single standalone-style wall setup to a full mixed-reality (XR) stage with 3D-tracking volume, and many variations in between. Working with these different configurations requires different techniques and creates different results.

The fundamental premise is that the images appearing on these walls are displayed via LED panels, which create varying degrees of

emissive lighting, while additional lighting on actors and physical objects can come from LED ceilings or sidewalls, practical lights, and movie lights. Combining these tools can deliver highly realistic results.

In a standalone-style LED-screen environment, the primary screen's content can be synchronized with other, off-camera LED screens to create additional reflections and interactive lighting effects. Also able to be synced with the system is "kinetic lighting" — via the Digital Multiplex (DMX) network protocol — which can imitate the lighting effects of the content that appears in-camera. (For example, when a streetlight passes by in the background footage on the screen, a lighting instrument can perfectly match its hue and intensity.)

The DMX control in such a setup can be driven either by "pixel mapping" or by manually programming specific patterns or effects; these options would be accomplished

with, respectively, pixel-mapping software or a dimmer board. Pixel mapping is a process that samples the hue and intensity of the source footage and then, via DMX, sends those values to the lights.

Charlie Lieberman, ASC recently completed an LED-wall shoot with Arri Creative Space in Burbank, Calif., for an ASC Master Class on virtual production, and he was impressed with the results. "The shots we captured in front of the LED wall are completely believable as 'live,'" he says. "We were able to adjust the contrast, color, brightness and black levels of the screen content, in-camera, to match what was going on in the car, using calibrated monitors. That's always been the problem with lighting for bluescreen and greenscreen — you never see the results until much later."

Compared to standalone-style LED-wall systems, full LED enclosure environments typically have large, curved screens with ceiling

panels and full side panels. They are designed to create immersive environments.

Because the screens encompass the entire set, LED-enclosed volumes generate a large amount of interactive, emissive lighting solely from the screen content. Cinematographers can select the quality of the overhead sky fill, adjust its color and saturation, and then adjust any other virtual lighting sources, such as VFX-generated practical fixtures within the virtual sets. A significant degree of additional customization is possible on set — and it's important for the filmmakers to determine beforehand which elements of the on-screen content will have this level of malleability — which is coordinated through the virtual-production supervisor and the brain-bar team. (The virtual-production supervisor serves as the liaison between the cinematographer, gaffer and virtual content to provide virtual lighting tools that augment

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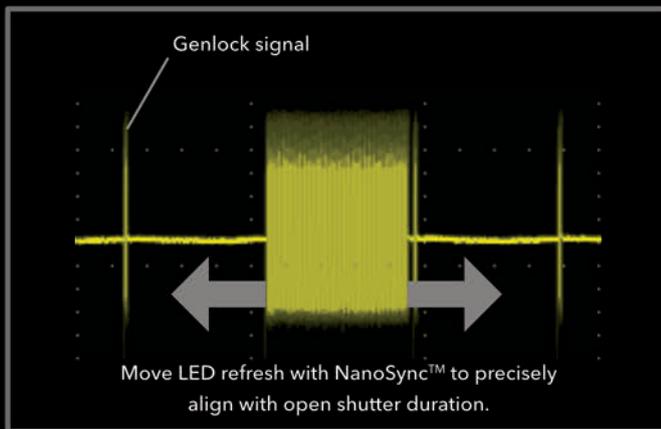


Location: ARRI Studio London
LED tiles: ROE Visual
Landscape plate: David Noton
Photo: Will Case, Creative Technology



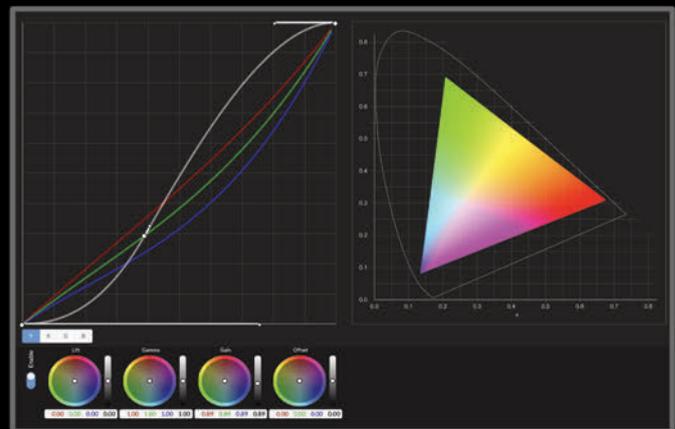
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For an ASC Master Class demonstration on the Arri Creative Space stage in Burbank, Calif., an overhead solid selectively limits reflections.



the interactive content. The brain-bar crew handles all the onscreen content — taking the tracking data and integrating it to Unreal Engine and exporting the imagery back to the screen.)

An LED volume comprises hundreds or thousands of LED panels that can each be addressed individually. Therefore, portions of LED surfaces that are out of view of the camera, such as the ceiling, side walls, or any portion that's not actively being captured — i.e., anything outside the frustum area — can run at higher or lower

brightness levels, or be manipulated in any number of ways, to create specific reflection effects on, for example, a vehicle or costume.

VFX simulations of movie lights can also be created on the screens of the LED volume as off-camera effects. For instance, a large, solid shape can be conjured on the ceiling panels to create ambient lighting over the foreground subjects, mimicking Arri SkyPanels, space lights, or large solid silks. The solid can be any shape, color and intensity that's desired.

Virtual negative fill can be

designed and incorporated into LED screens as well. For the off-camera periphery of a scene, a virtual translucent frame can be placed over a section of the 3D environment to model the lighting as the cinematographer wishes, simulating the nets and silks that would be used on real locations.

Virtual light effects are fed to the LED screens via such software as Unreal Engine, MadMapper, Disguise, ILM's StageCraft/Helios, DaVinci Resolve, Zero Density, Mo-Sys VP Pro or Notch — which factor in the entire volume's geometry.

“The process of adjusting the lighting tools on the LED wall to create virtual fill and negative fill is remarkably fast and incredibly versatile,” says Matthew Jensen, ASC, who shot in LED volumes for three episodes of *The Mandalorian's* second season, and for a recent Unreal Engine production test for Epic Games. “While shooting close-ups, I often [virtually] neg entire walls of the content while adding a bit of sparkle to an actor's eyes with virtual fill. We can change the shapes of these virtual flags and sources, or [their] colors, to match

ASC members Craig Kief (left) and Charlie Lieberman at work for the Master Class.



a particular light in the content with ease. I'm usually accompanied by someone from the brain bar who's holding an iPad with all the virtual tools at their fingertips."

As the screens' emissive lighting is relatively soft, actual movie lights, such as Fresnels, can be brought in to simulate the hard light of the sun or other hard sources. These lighting instruments are placed off-camera, either on the floor or suspended from the ceiling. In the latter case, depending on the configuration, individual screen modules may be removed from the volume to accommodate overhead movie lighting — though it can

take a fair amount of grip work to reach the panels and take them out, depending on the screen's access configuration. A growing number of XR stages are incorporating efficient panel-access into their designs.

Care must also be taken to keep practical or movie lighting from falling directly onto the LED screens, even when using panels with matte finishes. When extraneous light hits the screen, it can wash out the image or reflect the source on the screen itself. Thoughtful positioning of instruments and flags is critical.

"Light contamination is a big challenge, because it doesn't take much to start milking out the blacks

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The Virtual World

Movie-light fixtures supplement the emissive lighting from the LED wall on the Unreal test shoot.

on the screens,” says Craig Kief, ASC, who worked with Lieberman on the ASC Master Class, and recently shot *Muppets Haunted Mansion* for Disney Plus in an LED volume. “With soft sources, you have to use egg crates and big solids, and with hard sources you need to use barn doors and siders,” he adds. “Depending on the reflectivity of the screens you’re using, something [as minor as] a candle or a bounce card — or even other parts of the volume — can reflect. I equate our challenges to the growing pains during the early days of digital capture or LED lighting equipment. This technology is already great, but it’s still very emerging, and its potential is incredible.”



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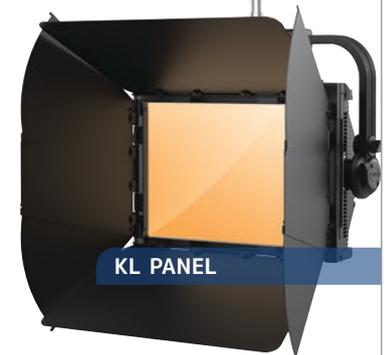
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Five LED Volumes Team With ROE Visual

ROE Visual is providing equipment and technical support to five new LED volumes in North America and Asia. XR Stage's new LED volume at Line 204 Studios, in Pacoima, Calif., features a 270-degree curved screen comprising 1,020 ROE Visual Black Pearl BP2 LED panels. The LED installation at Pixomondo's Toronto facility comprises approximately 2,000 Black Pearl BP2 V2 LED panels, and the LED ceiling consists of 750 ROE Visual Carbon Series CB5 LED panels, all running on Brompton processing. Creative Technology's virtual-production facility in Las Vegas features a large, curved LED wall consisting of ROE Visual Black Onyx BO3, a Black Marble BM4 LED floor and an LED ceiling comprised of Vanish V8. The LED volume at Singapore's Aux Immersive Studio features a 20'x20' LED floor comprised of ROE's Black Marble BM4 and a 40'x12' LED wall comprised of ROE's Diamond DM2.6 LED panels. Hibino's recent open house in Tokyo spotlighted the new ROE Ruby RB1.5F LED panel.

For more information, visit roevisual.com.



Arri Unveils Hi-5

Arri has introduced the Hi-5, a fifth-generation hand unit providing wireless camera and lens control in demanding situations on set. It features an extensive radio-link range and swappable radio modules for different territories and shooting challenges. With an often congested 2.4 GHz ISM band and different frequency regulations in different countries, the ability to exchange radio modules poses a significant advantage, allowing crews to choose the module that best suits a location. Arri will release three radio modules in the 900 and 2,400 MHz ranges, using direct sequence and frequency-hopping spread-spectrum technology to cut through interference.

For more information, visit arri.com.

Panther Updates ISO Dampener Pro

Panther has reengineered its ISO Dampener Pro based on user feedback. Designed to absorb horizontal crane vibrations while remote heads are in use, the ISO Dampener Pro has a maximum payload of 198 pounds. Adjustable dampeners and new integrated springs in the X and Y axes ensure that the user's remote head always returns to a level horizontal position. The level of dampening can be adjusted simply by turning a knob.

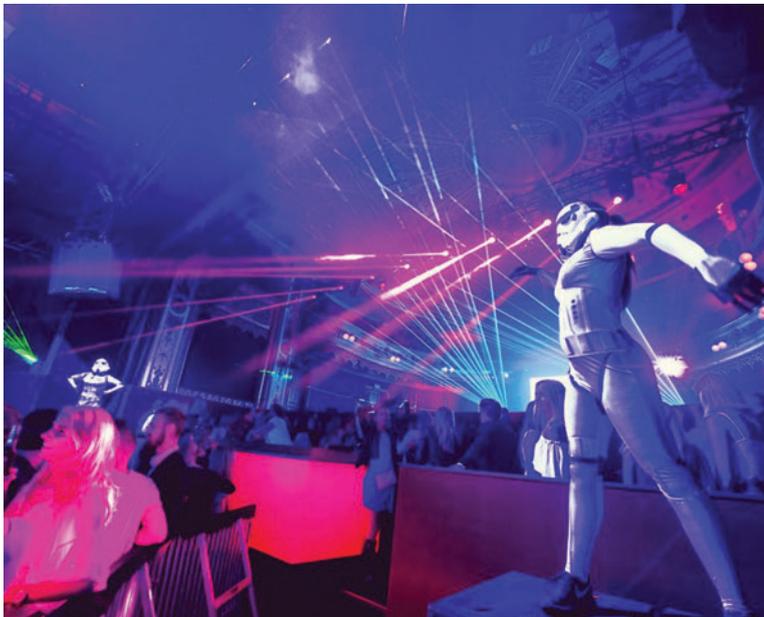
For more information, visit panther.tv.



LumenRadio Creates Wireless DMX Standard

LumenRadio has combined CRMX and W-DMX to create a standard for Wireless DMX. LumenRadio will provide all OEM customers with modules featuring combined W-DMX and CRMX technology. This means all fixtures with Wireless DMX will listen to both W-DMX and CRMX at the same time and automatically select the protocol used by the transmitter. The user does not have to select modes of operation or configure fixtures; all will be automatically configured during linking.

For more information, visit lumenradio.com.



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Teradek Unveils New Bolt 4K Solutions

Teradek has introduced the Bolt 4K LT Max, a 4K HDR wireless video solution featuring 5,000' line-of-sight range in a compact form factor, and the Bolt 4K Monitor Module TX, a SmallHD-integrated system featuring built-in wireless camera control. With a redesigned wireless chipset and RF hardware sending 10-bit 4:2:2 video at up to 4Kp30 via HDMI and 1080p60 via SDI, Bolt 4K LT Max provides sharper images and richer color detail. The Bolt 4K Monitor Module TX enables users to take control of their Arri cameras wirelessly from up to 750' away.

For more information, visit teradek.com.

Tiffen Releases Lowel Blender XL

The Tiffen Co. has introduced the Lowel Blender XL, a compact LED fixture that uses 45-degree-angle optical lenses to produce a narrow flood beam. It produces a high-quality light (98 CRI) that is four times brighter than a traditional 1x1 panel light but in a smaller package (5.375"x4.25"x3.125"). The fixture weighs 2 pounds and features a steel and aluminum housing. The included diffusion ensures light sources and colors blend for an even, consistent output to match any ambient scene, and the included D-Tap power cable can power the light anywhere.

For more information, visit tiffen.com.

SmallHD Announces Cine 13

SmallHD has announced the Cine 13, a 13" 4K monitor that can fit into nearly any production scenario. Cine 13 users can view both HD and 4K video on a 13" IPS LCD screen capable of 1,500-plus nits of brightness. It includes 4x independent 12G-SDI inputs/outputs, integrated accessory power ports, a dovetail mounting rail for battery plate or accessory mounting, and a removable bottom cheese rail for additional mounting flexibility. The aluminum unibody chassis weighs 6.8 pounds.

For more information, visit smallhd.com.



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Wooden Camera Announces Panasonic Lumix BGH1 Solutions

Wooden Camera is now shipping a range of custom kits and accessories for the Panasonic Lumix BGH1. Every tier of these kits features the Panasonic BGH1 Camera Cage alongside a new Mini Top Handle (3/8"-16) and LW 15mm Baseplate. Options include three new universal utility pieces that can be used on any rig: an updated bolt-on Arri Rosette (3/8"-16), a compact Tilt Monitor Hinge (3/8"-16) and a Mini Top Handle (3/8"-16). Accessories in the collection can be purchased individually or in one of three kit tiers: Base, Advanced and Pro (available in V-Mount and Gold Mount).

For more information, visit woodencamera.com.



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Clubhouse News

Latest Bulletins From the Society



ASC Clubhouse Reopens to Members

In March 2020 the ASC Clubhouse was closed as a place for members to visit due to the gathering storm of the Covid-19 pandemic. On July 15, 2021, 16 months later, the Society's historic home in Hollywood reopened to (vaccinated) members with an outdoor social gathering on the Sim Plaza. "Our members were happy to see each other in person and begin the process of getting to our new normal," says ASC President Stephen Lighthill.

Roughly 50 members attended the event, which allowed for conversation, camaraderie, and an opportunity for new members to visit the Clubhouse for the first time. "The reopening meant different things to different people," says Patty Armacost, honorary ASC member and the Society's longtime events director. One new member, she adds, said that when she walked into the Clubhouse for the first time as a member, she had tears in her eyes.

Founding ASC tenets include sharing ideas and contributing to the art and craft of cinematography, and Lighthill says that this mission continued even through the closure. "We have continued to foster this core ASC tenet through *American Cinematographer* magazine and our website, and by building the curriculum for the online and in-person ASC Master Class. Many members worked in person on the physical production of the ASC Master Class. This is a research and educational project for us as we push the subject matter of the classes into advanced technologies, such as virtual production."

Armacost reflects, "It was a beautiful evening, the food was great, and everyone felt like they were having the best time. I think the overall feeling was, 'We're back.' For a lot of members, the Clubhouse is their second home."



ASC members socialize for the first time in more than a year at the Society's Clubhouse, where ASC President Stephen Lighthill (top right) greets them.



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Wrap Shot

No Time to Die



PHOTO BY NICOLA DOVE, SMPSP, COURTESY OF DANJAQ, LLC AND MGM.

Linus Sandgren, ASC, FSF (right) and key grip David Appleby line up an Imax 65mm shot in Matera, Italy, during production of the 25th James Bond film, *No Time to Die*. Additional location work for the spy thriller was done in Port Antonio, Jamaica, and in Nittedal, Norway, with studio shooting completed at Pinewood Studios outside London. AC's extensive coverage of *No Time to Die* was published in April 2020 to coincide with the film's original release date, which was postponed due to the global coronavirus pandemic. The movie is now scheduled to premiere next month, on October 8, 2021.

An aerial photograph of a city, likely Montreal, with a prominent mirrored effect in the water. The city's buildings, streets, and green spaces are reflected in the dark water, creating a symmetrical, dreamlike scene. In the foreground, a person stands on a grassy hill, holding a large orange and white striped umbrella, looking out over the city and its reflection. The overall tone is serene and artistic.

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