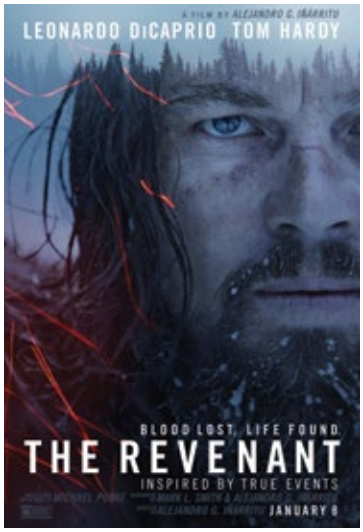
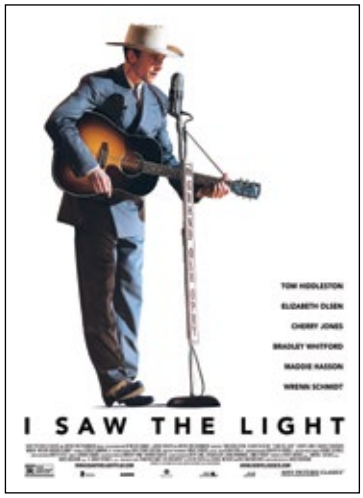
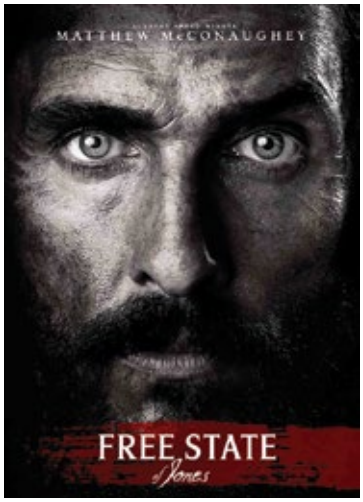
C O D E X

2016 - ISSUE 8

THE REVENANT | THE HUNTSMAN: WINTER'S WAR | TRUMBO







CAPTURED ON CODEX

Cover image *Sicario* – Captured on Codex Director Denis Villeneuve Cinematographer Roger Deakins ASC BSC

UPFRONT

What a year 2015 was for cinematography, and filmmaking in general. Some amazing stories were told with the use of stunning imagery – just take a look at *The Revenant* to see what Chivo can do with the right cameras, natural light and the beautiful scenery around Calgary. We were proud to support this production as well as other Academy Award winners like *Mad Max: Fury Road.* And as you'll see in this issue, Codex gear is used on all kinds of projects – from these blockbusters to independent movies like *The Land,* shot in Cleveland for $1.5M.

Moviemaking is always evolving of course and over the past few years we've seen the boundaries of what has traditionally been split into production and post production shifting. Post facilities have moved near-set and the need for collaboration is greater than ever before. And data is king but the promised savings have often not materialised, as so-called snowflake workflows have proliferated. We don't think this is the right approach – we want to provide a simple, unified workflow and so we've continued our close collaboration with camera manufacturers, providing a streamlined pipeline for multiple cameras from set to post, whether or not Codex recording technology and media are used or not. This is being proven right now on *Guardians of the Galaxy Vol 2,* which is being shot with RED WEAPON 8K cameras. Marvel have again relied upon Codex to provide a rock-solid workflow, incorporating an ACES colour pipeline, that can easily handle the large amount of data being generated.

We continue to work closely with DITs – in this issue you'll learn more about two British DITs, Ben Appleton and Dan Carling, who are amongst the many that we involved as we developed Codex Production Suite. Production Suite is a fully-featured dailies, review, QC and archiving system, supporting multiple cameras and media types. You won't need anything else. At Codex we believe in having our customers' backs so we've set up Codex Connect. Wherever you are in the world, Codex's world-class team of support and workflow experts are available to assist you, whether you just need a new licence, or you need help in setting up a complicated, multi-camera workflow.

We are always excited to see our customers grow and you'll read here about Radiant Images, a LA-based company who are so much more than just a camera rental facility. We are happy to support them as they push the boundaries of technology in order to provide solutions for their customers.

We're passionate about helping creative people realise their vision, by simplifying technology so they can focus on crafting images that tell a story. We don't mind being the indispensable technology in the background – cinematographers shouldn't need to worry about technology. As Emmanuel "Chivo" Lubezki says, "Codex have unlocked very important creative possibilities for cinematographers and directors with their brilliant work. Hat's off!"

Marc Dando, managing director, Codex

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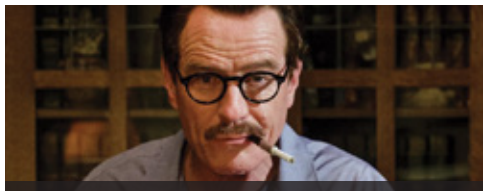

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WHO TO BLAME

Editorial Team and Contributors: Marc Dando, Sarah Priestnall, Brian Gaffney, Matt Walters, David Heuring, Ron Prince.

Design and Production: Craig Hildrew, Gareth Ewers

A big thank you goes out to everyone who contributed to this edition of Codex.

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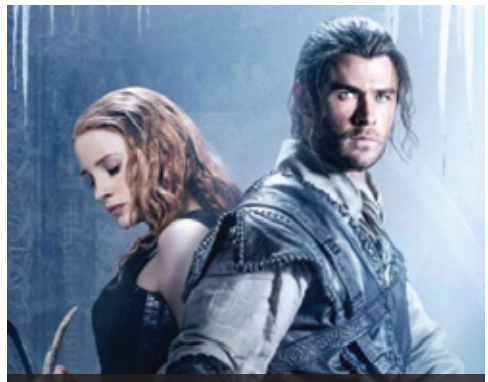


12. THE HUNTSMAN

CODEX + ALEXA SXT

Codex's relationship with ARRI dates back to the D-21 - even before the early development of the ALEXA, a camera that revolutionised filmmaking, dominating the feature film, television and commercials market.

Recognising the reliability and ease of use of Codex as well as its ubiquitous use, ARRI were eager to integrate Codex technology into the ALEXA XT and the ALEXA 65. And of course, Codex also provides rock-solid media and workflows for these cameras. The relationship continues to thrive and Codex is excited to be be working with ARRI as they roll out the latest addition to the family – the ALEXA SXT.

The ARRI ALEXA SXT (Super Extended Technology) range of cameras feature ProRes 4K output, improved image quality, frame rates up to 120 fps for most formats and enriched colour management capabilities. Once again, ARRI has relied upon Codex to provide the robust recording platform, media and workflow that our mutual customers have come to expect. This includes the ability to use a new high capacity, high performance Capture Drive from Codex – the SXR Capture Drive.

ALEXA SXT cameras keep the acclaimed 3.4K ALEV III sensor of previous ALEXAs but add the state-of-the-art electronics of ARRI's ALEXA 65 camera, which combine the latest generation of FPGA processors with a lightning-fast internal backplane. These new electronics enable a completely overhauled image processing chain, advanced pixel correction and optional noise reduction. This improves ALEXA's already renowned low-light performance, providing the ability to shoot at even higher EI settings. The maximum frame rate of all ProRes and ARRIRAW formats is now 100 fps, with most 16:9 formats having a maximum frame rate of 120 fps.

Because it's important to our customers for our products to have longevity, Codex has worked together with ARRI to provide maximum flexibility and extend the life of existing media with the ALEXA SXT. The camera can be used with four different adaptors – the SXR Adaptor, the XR Adaptor, the SxS Adaptor, and the CFast 2.0 Adaptor. This means the SXT can be used with all these media types – Codex SXR and XR Capture Drives, SxS cards, and CFast 2.0 cards.

> 4K PRORES RECORDING > IMPROVED IMAGE QUALITY > THREE INDEPENDENT HD-SDI OUTPUTS > HIGHER PERFORMANCE SXR CAPTURE DRIVES > IMPROVED COLOUR MANAGEMENT WORKFLOW

CODEX CAPTURE DRIVE® SXR

The Codex Capture Drive® SXR meets the requirements of the new generation of digital cinematography cameras, combining ultra-high performance solid-state storage with production-reliability in a compact package. Designed around the latest PCIe-based flash storage to deliver the fastest solid-state media available for professional media applications, it feeds seamlessly into Codex's industry standard workflows via Codex Vault and Codex Capture Drive® SXR Dock.

> UP TO 2 TB OF MEMORY DELIVERING UP TO 20Gb/s BANDWIDTH > OPTIMISED FOR PERFORMANCE > ADVANCED THERMAL DESIGN > ENGINEERED TO THE HIGHEST PERFORMANCE STANDARDS

And like all Codex media, the Capture Drives are the gateway to a straightforward, efficient pipeline from production through to post production with Codex Production Suite.

CAPTURED ON
CODEX

LIGHTFANTASTIC

After being one of the most hotly anticipated movies of 2016, *The Revenant* carried away a clutch of major gongs during awards season, including Academy Awards for Best Director and Best Cinematography.

In addition to key nominations for best film and best acting in a motion picture, the movie also received recognition for cinematography too. Little wonder that Mexican DP Emmanuel "Chivo" Lubezki ASC AMC was recognised by the Academy as well as the ASC. His work - harnessing the very latest large format cameras, in horrendous cold and using only natural light - has been lauded by the critics as the "consummate cinematic experience."

Lubezki is one of the most respected cinematographers working today, and he loves a challenge. He landed his first Academy Award in 2014 for helping to create the cutting-edge illusion of Sandra Bullock's space odyssey in Alfonso Cuaron's *Gravity.* He collected his second Oscar statuette in 2015 for outstanding creative and technical work on Alejandro G. Inarritu's *Birdman,* a movie that seemed to be one single take. Both movies incorporated Codex ARRIRAW workflows.

The Revenant, also directed by Inarritu, is based on the true story of fabled frontiersman Hugh Glass (Leonardo DiCaprio) who was left for dead, more than 200 miles from the nearest American settlement, following a savage mauling by a grizzly bear. Despite terrible injuries, the grief-stricken trapper toils through the wintry wilderness to track down John Fitzgerald (Tom Hardy), the former confidant who betrayed and abandoned him.

"CODEX HAVE UNLOCKED VERY IMPORTANT CREATIVE POSSIBILITIES FOR CINEMATOGRAPHERS AND DIRECTORS WITH THEIR BRILLIANT WORK"

Emmanuel Lubezki ASC AMC

Originally, Lubezki had planned to shoot the daytime sequences on film, with digital at dusk and at night. However, during the first stages of the shoot, in Canada in October 2014, in temperatures as low as -30°C, he discovered the digital cameras – ARRI ALEXA M and XTs – were outperforming the film cameras by a wide margin.

"With the digital cameras, we discovered there was a mystery and intrigue, in both tone and mood, to images that were shot at different times of day, that just did not appear on film," he explains. "So it was with some regret that we sent all of the film equipment back to Los Angeles and went completely digital."

As if by happenstance, Lubezki's decision to eschew celluloid on the movie came as ARRI Rental was releasing the first of its ALEXA 65 large format camera systems.

"From the very moment I got the ALEXA 65, I was sure I wanted only to use digital cameras, and to use the ALEXA 65 as much as possible on the movie," he exclaims. "The images had the immersive and experiential qualities we had imagined at the very start. Not a representation of the story, but reality – as if you are there, looking through a clean window."

In collaboration with the director, Lubezki elected to shoot 2.40:1 with wide spherical lenses, as this was the most immersive format. The production shot with Master Primes, mainly 12, 14, and 18mm, and also with the Leica Summilux 14, 16, and 18mm, as they are much lighter for handheld.

Lubezki says he didn't use diffusion, as he prefers to capture as clean and crisp as possible on the day and then make changes afterwards in the DI.

"THE EXPERIENCE OF PIERCING COLD – YOU CAN SEE FROZEN HANDS, AND THE CONDENSATION OF BREATH"

Emmanuel Lubezki ASC AMC

"We tried Anamorphics, but they have less depth-of-field, and you cannot get that close to the characters," he says. "I did not want to have blurred backgrounds. Shooting spherical allowed me to frame the characters in their context, but you can still make out the rest of the environment. We shot at a minimum of T5.6 so the images have lots of depth-of-field, and are composed with lines of perspective giving a dynamic look. The combination of these lenses on the ARRI ALEXA cameras, and the proximity we were able to achieve to the actors helped to give the experience of piercing cold – you can see frozen hands, and the condensation of the breath."

Lubezki estimates he used the ALEXA 65 about 40% of the time on the movie. "At the beginning I imagined that I would only use it for landscapes. It is much heavier than the ALEXA M so it was not suitable for handheld. In low light I had to switch to the ALEXA XT. But little-by-little, every time I was able to use it on a crane, dolly or a stand, I made sure I did. We did some Steadicam with it too.

"The reason I wanted to use the ALEXA 65 so much is that it is first time I have felt a camera and lens could capture what I was seeing, what I was feeling. Before the ALEXA 65 there was always some compromise – that you were only shooting part of what you wanted – but this gives you everything."

And he extends a note about Codex's role in developing the ALEXA 65 workflow. "I have huge respect for Marc Dando and Codex in supporting me on *Gravity* and *Birdman*. I love them. What Marc and the team have done is to create a recording system that lets cinematographers take full advantage of modern cameras – such as the ARRIRAW image with the ALEXA and now the ALEXA 65. Without Codex we could not record this amount of information, with this sheer quality.

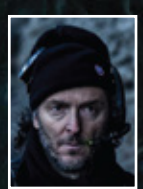
Images courtesy Twentieth Century Fox. Behind the scenes images, photo credit, Kimberley French.

"They have unlocked very important creative possibilities for cinematographers and directors with their brilliant work. Hat's off!"

Whilst Lubezki was able to use the ALEXA cameras to capture an environment imbued with a sensation of terror and fear, he's also appreciative of being able to shoot natural beauty too.

He notes: "As we were in a place without urban light contamination, sometimes we used the silvery light of the moon, and you will see stars in the movie. One night, we also captured the green shaft of light of an aurora borealis. It's one of the most mysterious, moving and beautiful things I have ever shot."

Lubezki completed the DI on *The Revenant* with Steve Scott at Technicolor. "Because we shot with natural light and had little control on-set, I knew exactly what I wanted to do in the DI – to darken backgrounds, lighten a face, change a sky. It was a complex DI in that respect, but I love this collaborative part of the cinematographic process."



SUCCESS STORY: THE REVENANT
CINEMATOGRAPHER: EMMANUEL "CHIVO" LUBEZKI ASC AMC
RELEASE: 2015

ALEXA 65

65 mm Reborn

CODEX + ALEXA 65

2015 was quite a year for the ARRI ALEXA 65. It was launched by ARRI Rental at the end of 2014 to immense excitement, with filmmakers clamouring to be among the first to shoot with it. During 2015 some of the world's leading cinematographers had a chance to use it on some blockbuster movies, including Emmanuel "Chivo" Lubezki ASC AMC *(The Revenant)*, Anthony Dod Mantle ASC BSC *(Snowden)*, Phedon Papamichael ASC *(The Huntsman: Winter's War)*, Rodrigo Prieto ASC AMC *(Passengers)* and Greig Fraser ASC ACS *(Rogue One: A Star Wars Story)*.

It was also used on several high profile commercials, one example being a *Halo 5: Guardians* spot shot by Jess Hall BSC *(Transcendence, The Spectacular Now)* and director Rupert Sanders *(Snow White and The Huntsman)*. This was one of the first projects to use the camera but the creative team didn't hold back, shooting in extremely bright, hot and dusty conditions near a disused mine in the Santa Clarita Valley north of Los Angeles.

At the time, celluloid fan Jess Hall said "It was great using a system that could stay in step with that imagery while allowing us to work with creative flexibility. I'm looking forward to the right opportunity to use it on a feature." It didn't take long for that opportunity to arise – Hall and Sanders are now shooting *Ghost in the Shell* with the ALEXA 65 in New Zealand.

The ALEXA 65 is a large-format camera with a sensor larger than a 5-perf 65mm film frame. The files it generates are RAW and uncompressed for the highest possible image quality – each frame is 31MB in size and the data rate required to shoot at 24 FPS is 733 MB/s. Some might be intimidated by the sheer amount of data generated and worried about how much it's going to cost. However, the ALEXA 65 is more than just a camera - it's a complete system, with recording, media and workflow designed by ARRI's trusted partner, Codex. A robust recording format and a cost-effective, production-proven workflow are critical for any digital production and Codex is providing both for the ALEXA 65, based on the existing technology of Codex Vault S and XL-Series, along with a new Capture Drive, featuring 1 or 2 TB of high performance solid-state storage in a compact form, delivering up to 20 Gb/s bandwidth.

"THE REASON I WANTED TO USE THE ALEXA 65 SO MUCH IS THAT IT IS THE FIRST TIME I HAVE FELT A CAMERA AND LENS COULD CAPTURE WHAT I WAS SEEING, WHAT I WAS FEELING"

Emmanuel "Chivo" Lubezki ASC AMC

Recognising the importance of a reliable, fast and secure method of moving data from on-set to near-set and beyond, Codex has partnered with ARRI Rental to design Vault Lab 65. We've spent years developing reliable workflows so that filmmakers can be confident that their digital negative is secure, and this experience serves us well when we are handling the multiple terabytes per day generated by ALEXA 65. And despite the large amount of data, the dailies process remains simple and efficient, with no significant difference in the amount of time needed and no extra training required. Alex Carr, the DIT working with Jess Hall on the *Halo 5* commercial, confirms this, stating, "Overall, working on-set with the ALEXA 65 was almost the same as working with an ALEXA XT."

On Academy Award winner, *The Revenant,* both camera and workflow were put through their paces in a very different but equally demanding location – the snowy, cold landscapes around Calgary in Canada. Emmanuel "Chivo" Lubezki ASC AMC wasn't planning on using the ALEXA 65, which was just becoming available from ARRI Rental, but once he saw that it could immerse the viewer in the story, he used it as much as he could. And of course, his cinematography was recognised for the third year running by the ASC as well as the Academy.

A RICH HERITAGE...

With all the fanfare surrounding the ALEXA 65, it is impossible to forget the filmmaking heritage that it came from. Franz Kraus of ARRI was clear that he wanted ARRI to revisit the 65mm format that they had supported with the ARRI 765 25 years previously, insisting the ALEXA 65 be a true 65mm camera, based on the existing technology of the ALEXA.

But at the same time as ARRI were introducing the ALEXA 65, certain filmmakers were yearning to shoot with 65mm film. With *The Hateful Eight,* Quentin Tarantino and Robert Richardson ASC showed that 65mm film is still alive as an origination format. And *The Hateful Eight* was not only shot with 65mm but for the first two weeks, starting with the December 25th release, it was only shown on 96 screens across the United States which were specially outfitted by the Weinstein Company to show 70mm film prints. Audiences once again had the opportunity to see a movie that was shot, finished and screened in pristine, extra-wide Panavision 70mm, following on in the tradition of classics like *2001: A Space Odyssey* and *Ben-Hur.* Academy-Award winning cinematographer Robert Richardson ASC followed up *The Hateful Eight* with *Live by Night,* a prohibition era gangster story directed by Ben Affleck. For this project, he chose to shoot digitally with the ALEXA 65. Working closely with SHED founder and world-class colourist Yvan Lucas, Richardson is aiming to bring a unique aesthetic to this digital project so the ALEXA 65 was the obvious choice.

"THE IMAGES FROM THE ALEXA 65 COME CLOSER TO 65MM FILM THAN THOSE FROM ANY OTHER DIGITAL CAMERA AVAILABLE TODAY. WORKING WITH YVAN LUCAS AND HIS TEAM AT SHED, I AM CONFIDENT WE WILL CREATE A UNIQUE IMAGE"

Robert Richardson ASC

VAULTLAB 65

SUCCESS STORY: THE HUNTSMAN: WINTER'S WAR
CINEMATOGRAPHER: PHEDON PAPAMICHAEL ASC
RELEASE: 2016

CAPTURED ON CODEX

GRIMM FANTASY

Phedon Papamichael ASC is a versatile camera pro perhaps best known for his Oscar-nominated black and white imagery in Alexander Payne's *Nebraska.* But his latest assignment takes place in a completely different realm: the dark fantasy world of the Brothers Grimm and Hans Christian Andersen.

The project brought Papamichael to the U.K., where he spent a good chunk of 2015 overseeing cinematography for director Cedric Nicolas-Troyan, whose resumé includes an Oscar nomination for Best Visual Effects on *Snow White and the Huntsman,* the progenitor of *The Huntsman: Winter's War.*

The complex story contains elements of both prequel and sequel. At its heart is a cold-hearted young ice queen who raises a legion of deadly Huntsmen trained to eschew love. Two of them fail in this cardinal injunction, and they must fight their way back to each other while the queen fights for possession of the legendary magic mirror. The cast features Charlize Theron, Chris Hemsworth, Emily Blunt, and Jessica Chastain. Locations included Waverley Abbey in Surrey,

"THE IMPORTANT THING IS THAT WE ARE DEPENDABLY CAPTURING WITH THE MAXIMUM IMAGE QUALITY THAT THE CAMERA CAN DELIVER, WHICH MEANS ARRIRAW AND CODEX"

Phedon Papamichael ASC

Windsor Great Park and Wells Cathedral, but the biggest sets were built at Shepperton Studios, on stage and on the backlot.

Papamichael says that *The Huntsman: Winter's War* is somewhat more romantic and less dark than the previous film, with more humour and a touch less stylisation. There's also plenty of action. He shot with a combination of ARRI ALEXA XT and ALEXA 65 cameras, with occasional shots done with an ALEXA Mini. He had the 65 on hand every day, usually on a 50-foot Technocrane. The lenses on A camera were older optimised Panavision C-Series anamorphics similar to the set he used on *Nebraska.* A set of G-Series anamorphics and anamorphised Angenieux Optimo zooms were used on B and C camera.

Regarding the ALEXA 65, he says, "I used it whenever I could. We had the 65 on a 50' Technocrane everyday of the shoot and rolled on wider masters or landscape beauty shots, coming down off of trees and finding our characters traversing the enchanted forest, with all its great detail. The visual effects people embraced it, because it gives them so much more space to play with."

Among the many technical challenges of the shoot were the techniques used to depict dwarves, who play important roles. Nicolas-Troyan pioneered the techniques, which use a combination of rostrums, or elevated platforms, careful in-camera perspective adjustments with wide-angle lenses and lots of headroom, and varying degrees of post VFX manipulation. For wider shots and coverage, some actual little people stood in. In the resulting images, actors of more or less normal stature appear much smaller. Often the shots destined for VFX manipulation were shot with the ALEXA 65 and spherical Hasselblad lenses.

"Those effects shots are usually lock-offs because you have all this extra space on the sides," says Papamichael. "You can reframe or build in a move. It adds lots of capability."

Switching between the ALEXA XT and the ALEXA 65 was invisible to Papamichael, and that's the way he likes it. "I'm non-technical, and I don't think about what's happening with file formats and the recording. To me, the important thing is that we are dependably capturing with the maximum image quality that the camera can deliver, which means ARRIRAW and Codex. We didn't lose a single shot. The rest is irrelevant to what I do."

DIT Ben Appleton had just come off of *Now You See Me 2* with cinematographer Peter Deming ASC. His job was to handle the details so Papamichael could focus on creating the image with lighting, framing, movement and lenses.

"CODEX IS ONE OF THE MOST FORWARD-THINKING AND MOST ACCESSIBLE COMPANIES. THEY LISTEN TO EVERYTHING I SAY, AND THEN THEY TRY TO CUSTOMISE AROUND ME"

Ben Appleton, DIT

"Ben was terrific, and really thorough," says Papamichael. "He handled all three cameras, adjusting filtration, talking directly to the VFX people about smoke levels, and with the gaffer about cloud saturation. On day exteriors in England, the sky is constantly going into clouds and you're pulling iris on the fly all the time, which he loved."

Appleton came onto the project at the last minute, and his procedures and equipment evolved over the course of the shoot. He says his job, essentially, was to make sure that the "negative" was always as good as it could be for the project. Generally, he applied a 4000 degrees Kelvin look to the imagery to even out the skin tones for the dailies. In the camera tent, Papamichael and Appleton used OLED monitors and created a quick look using LiveGrade, which was saved to CDLs and passed along to the dailies house.

Later in the production, Appleton purchased a Codex Vault and incorporated it into the workflow. Vault provides a standard, secure and configurable workflow and fast backup solution on or near the set. Part of his rationale for the purchase was his forthcoming assignment, *Assassin's Creed,* where cinematographer Adam Arkapaw was planning to shoot some scenes with three ALEXA 65 cameras at once, as well as using ALEXA XTs.

"I wanted to make sure that I would get the workflow that I wanted," Appleton explains. "Codex was extremely helpful in merging the two systems and customising Vault to give me all the control and functionality I expected. When the ALEXA 65 became available, I was very knowledgeable on the data transfer we would use.

"We're moving into a realm where data becomes so much greater," says Appleton. "Codex Vault is a system that has proved itself. On *The Huntsman,* I was able to refine the workflow. At times on *Assassin's Creed,* we were generating 20 terabytes a day, and the S-Series Vault was the only way we could actually make two copies at the same time and still be finished 45 minutes after shoot time. It's absolutely incredible in the transfer stage to do that. That's why I was really keen on purchasing a system. As far as I'm concerned, Codex is one of the most forward-thinking and most accessible companies. They listen to everything I say, and then they try to customise around me."

Looking back on *The Huntsman: Winter's War,* Papamichael says. "I've done some big movies, but this was the biggest I've done so far. I learned a lot. It's a fantasy movie, so visually, it should be fun and enjoyable. My eight-year-old daughter absolutely loved the trailer, so maybe we're on the right track."

Papamichael recently finished directing a short and is currently prepping for Alexander Payne's next feature film.

CODEX PRODUCTION SUITE

All you need for a complete dailies, review, QC and archiving system, whether you're on-set, near-set, on location or in a studio. You really won't need anything else.

The challenges facing any production are daunting. The costs involved in planning and developing a project are a challenge, let alone the timeline required to assemble a team of creative professionals to capture and produce the images and sounds required to fully realise the vision of the director and storyteller. Codex Production Suite will streamline and simplify your workflow and save you time and money. Most importantly, Codex safeguards your most valuable asset, your digital negative, so that it lives on into the future.

However big or small, productions today demand a pipeline that delivers camera original data, metadata, editorial media, VFX deliverables and production reports securely and efficiently to whoever needs access to them. Codex makes it simple for any production to manage assets, with Codex Production Suite, Codex Vault and Codex Media Vault, all connected securely through Codex Backbone.

"CODEX VAULT WAS THE ONLY WAY WE COULD ACTUALLY MAKE TWO COPIES AT THE SAME TIME AND STILL BE FINISHED 45 MINUTES AFTER SHOOT TIME"

Ben Appleton DIT

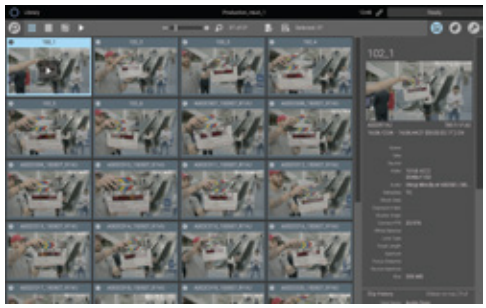
With world-class image science, high quality image processing, the flexibility of the Codex File System (CFS) and a completely redesigned user interface, Codex Production Suite is a fully-featured dailies and archiving system. Codex's Production Suite features sophisticated tools for colour grading and LUT management, QC, metadata editing and audio sync so you can manage and create all your deliverables within one unified system. Transcode to all the formats you need faster than real-time, even with an input LUT, CDL and a 3D LUT.

Flexibility and adaptability are more critical than ever so Codex Production Suite is now available on Mac Pro and MacBook Pro as well as Codex's own hardware – the S-Series and XL-Series Vault. Ideal for DITs, it has all the tools needed to produce on-set or near-set dailies. From camera through to post with one efficient workflow. You simply won't need anything else.

PRODUCTION SUITE KEY FEATURES

- Non-destructive CDL-based colour grading - create or modify looks and communicate them through to editorial and final colour. CDLs and LUTs can be imported and processed so that externally created looks can be applied, either overall or on a shot by shot basis. These looks can be baked into the editorial dailies or appended in the metadata information for other deliverables.
- Integration with Codex Live for a colour pipeline from camera through to deliverables and beyond.
- Add Tangent panels for grading.
- Metadata checking, fixing and appending – metadata can then be attached to dailies for increased efficiency in post production.
- QC tools – flag any issues, make notes and generate a detailed QC report, with or without thumbnails.
- Audio Sync – import WAV files, playback shots in a proxy window, and synchronise the audio files to the shots, based on the timecode.
- Full ACES colour pipeline.
- Fast but high quality transcoding to common dailies formats, including Apple ProRes, Avid DNxHD and H.264.
- High quality debayering to DPX and Open EXR for VFX deliverables.
- Archiving using LTFS with full verification to LTO-6 tape with Codex Archive.

Codex Review - Colour



Vault Library - Shot Selection

Timeline

Today's productions demand flexibility as much as they crave simplicity. Perhaps the main unit is shooting with ARRI ALEXA XT but a splinter VFX unit is using a RED DRAGON on a MoVI. Or a stunt unit is using multiple GoPros. Designed by people who've worked in the trenches of modern movie-making, Codex Production Suite works with most of today's cameras and media so there's one unified, secure workflow that ties everything together. And for your colour pipeline, Codex supports ACES.

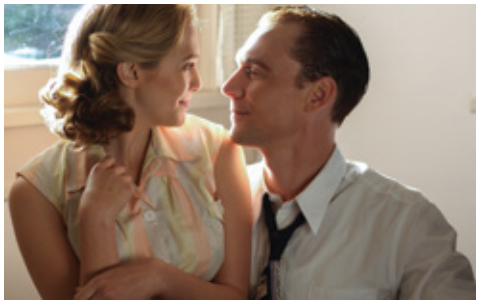
"CODEX HAS COME FORWARD AS A STANDARD, WHICHEVER CAMERA YOU'RE ON"

John Mathieson BSC

- ARRI (RAW and ProRes)
- Canon (RAW and XF AVC)
- Sony (RAW and XAVC)
- Panasonic (RAW, AVC-INTRA)
- RED (RAW, ProRes, DNxHD)
- GoPro (H.264)
- Phantom (RAW)

READY TO ROLL ON OS X

For a smaller footprint, ready to travel wherever you need it to be, Codex Production Suite running on a MacBook Pro is an ideal solution. With Codex Production Suite, just add a Codex CFast 2.0 reader to ingest files from ARRI Amira or Mini (ProRes) or Canon EOS C300 Mark II (XF-AVC) and you have a complete, battle-tested workflow for these compressed formats. Or add a P2 card reader to ingest files from the Panasonic VariCam 35. It's an entire dailies system for your laptop.



CODEX XL-SERIES

Designed to handle the large amounts of data generated by today's cameras with ease, Vault XL is a rack-mounted, networked attached device that's easy to integrate into an existing near-set or post production infrastructure.

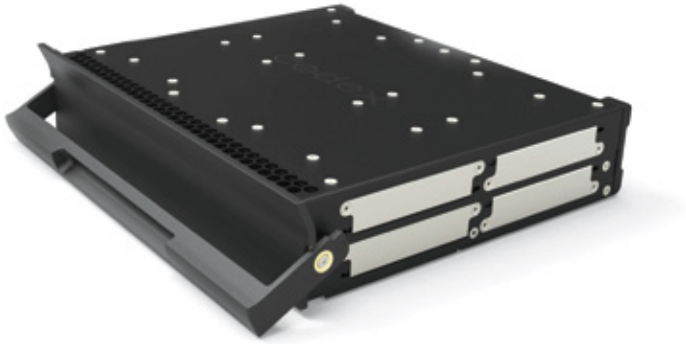
It's simple to operate and reliable in the toughest conditions. XLs can do the heavy lifting for cameras like the ALEXA 65 or RED WEAPON 8K, making the amount of data generated by these amazing cameras easy to handle.

Combine the power of the Codex File System to deliver whatever files you need in whatever format you require with the benefits of network storage and the power of GPU-processing for a fully-featured toolkit for productions of all sizes.

> Codex Production Suite plus powerful CPU and GPU processing for dailies, QC, review and archiving.
> Unleashes the power of Codex Review to play back even 6K files in real-time to a 4K display.
> Gateway to Codex Media Vault and Media Vault Library.
> Easy integration with an existing SAN environment.

CODEX TRANSFER DRIVE

Available in 8 or 16 TB sizes, Codex Transfer Drives are an ideal mechanism for moving critical data from on-set to near-set, or from location to post. They are secure, reliable and rugged. Why trust an off-the-shelf hard drive when you can secure your data with Codex?



"CODEX IS A ROCK-SOLID PLATFORM AND WORKFLOW, BACKED BY WORLD-CLASS SUPPORT"

James Neihouse ASC, cinematographer 'A Perfect Planet'

codex connect

JOIN THE CODEX COMMUNITY THROUGH CODEX CONNECT

Wherever you are in the world, Codex Connect means you can be rest assured that Codex has your back. Codex's world-class team of support and workflow experts are available to assist you, whether you have a specific technical question or need help designing a workflow. With Codex Connect you get access to the latest software upgrades for the Codex Production Suite.

Need a refresher on how to use a particular module like Sound Sync or Colour? Access online tutorials with Codex Connect. **Do you have a tried and tested workflow that you use on every job?** Codex Backbone makes it easy to migrate the job templates to a new project. **Need to share some looks that you created in pre-production so that everyone's on the same page?** Just create a project and upload them to Codex Backbone and securely share them with your team. **Want a lens grid for a particular lens?** Connect to Codex Backbone and see if one's available. **Just had to characterise a bunch of lens for your favourite DP?** Now you can save them in Codex Backbone so they can be shared with VFX or be reused on your next project. **Tired after a 12 hour day of supporting a production?** With Codex Backbone, you can simply and quickly generate reports for the script supervisor and editorial.

CAPTURED ON
CODEX

SOLIDSENDER

Dan Carling

Dan Carling is one of the UK's most sought-after Digital Imaging Technicians. Dedicated to his profession, and continually curious about the latest advances in digital workflows, he has successfully deployed Codex recording and technology for leading cinematographers, such as Florian Ballhaus ASC and the Oscar-winning Anthony Dod Mantle ASC BSC, and has an enviable resumé that is brimming with motion pictures.

Selected Codex filmography

The Darkest Hour (2011), Gambit (2012), Trance (2013), Rush (2013), One Chance (2013), The Book Thief (2013), Maleficent (2014), In the Heart of the Sea (2015), Bastille Day (2016), Snowden (2016), Our Kind Of Traitor (2016), Rogue One: A Star Wars Story (2016).

How did you start off in the industry?
After studying media technology at Leicester University, I applied for, and got, a job as an art department trainee on *A Cock and Bull Story* (2005, dir. Michael Winterbottom, DP Marcel Zyskind). I quickly realised I wanted to pursue a career in the camera department.

And how did you get into DIT-ing?
I worked at Metro Broadcast in Soho for nearly three years on all sorts of corporate shoots, gaining experience with their HD cameras as well as assisting the grip, lighting and camera teams. After that I worked as a clapper/loader on C4's TV comedy series *Totally Frank* (2005), shot with Sony HDWF-900Rs, and did live colouring via a remote colour-painting box (RMB-150) on a 24-inch CRT monitor. I got valuable experience working with the DP adjusting the lift, gamma, gain and black point settings. Although I was a clapper/loader, it was really a nascent DIT role. I was using the same colour tools we use today, except we were burning the results on to the live video image from the camera and recording to tape, rather than applying colours non-destructively in a data-centric workflow.

I was also working as a camera trainee on 35mm productions and in between jobs, being naturally inquisitive, spent time in the London rental houses, such as ARRI, Panavision and Ice Film, learning all I could about the technical aspects of film and the emerging digital cameras, such as the RED One. I found it a great way to learn, going through the menus, learning the controls and adjustments, building up my knowledge.

This helped me to secure the role of DIT on a succession of British movies including *Tormented* (2009), *StreetDance 3D* (2010), *The Devil's Double* (2011) and *TT3D: Closer To The Edge* (2011).

When did you first see Codex?
It was around 2010. I went to see Codex in Poland Street in connection with *The Darkest Hour* (2011, DP Scott Kevan), a 3D sci-fi movie shooting in Russia on Sony F35s. Working as the assistant data capture engineer with Steve Chambers, we deployed four Codex Portable Recorders for the four 3D camera rigs, one of which was Steadicam. The HD-SDI from camera was recorded to the Codex Portable Recorder, and to try to minimise data volume we would to trim the tops and tails of shots. A HD-SDI feed out of the Codex Portables allowed us to QC and check sync of the L&R footage, The full data packs were then sent to the Codex Digital Lab where transcoding for the Avid edit was done. This system worked seamlessly. It was apparent how much better the Codex workflow was compared to anything else I had used, and it has since become a solid, standard workflow.

Gambit was amongst the first-ever ARRIRAW productions with Codex, with innovative colour management. Tell us more about your set-up.
Yes, *Gambit* (2012, DP Florian Ballhaus) was quite progressive. It was my first ARRIRAW experience.

Two productions from Carling's filmography

The Codex Onboard Recorder enabled playback of the ARRIRAW directly after a take, allowing us to verify that the material had been captured correctly or to playback an earlier shot. Tethered via an Ethernet cable to a Mac laptop, I also had the option of inputting or changing metadata, such as scene, slate, take and other notes.

Florian, with whom I have since worked on *One Chance* and *The Book Thief,* also using Codex, wanted to do live painting during the production. We took the LogC image-feed, and applied CDL (Colour Decision List) grading to this, viewing the result through a custom-made 3D LUT stored on the Truelight On-Set colour management system, via a Grade 1 monitor. Any colour changes were saved as CDL values and were pinged back to the Codex Onboard and stored within the metadata of each frame. The Codex did its job perfectly well in supporting the visual quality and colour consistency that Florian wanted.

Thanks to Codex and its management of CDL metadata, DPs, DITs and colourists know where colour should be all of the time. It's been a great help on productions where on-set colour has been of prime importance, such as *Rush* and *Snowden* with Anthony Dod Mantle ASC BSC.

You were also one of the first to use the in-camera recording technology, developed by Codex for the ARRI ALEXA XT and ALEXA 65 cameras. Please share your thoughts.
Although it was bound to happen, the progression of miniaturisation – from external devices to integrated recording systems – has been amazing to watch, firstly with the ALEXA XT and more recently the ALEXA 65 cameras. I saw a demo of the ALEXA XT on *The Book Thief,* and I got to use it on *In The Heart Of The Sea.*

The advent of the ALEXA XT made capturing and managing ARRIRAW even more straightforward than it was before. Considering the sheer data rates required to handle ARRIRAW, it's a great tribute to the R&D teams at Codex and ARRI that they successfully created an elegant in-camera solution.

It's even more impressive with the latest Codex Capture Drive technology, which delivers bandwidth of up to 20Gb/s, and is optimised to work with cameras like the new ALEXA 65 and ALEXA XT as well as the Panasonic VariCam 35.

What's your experience of using Codex Vault with the ALEXA 65?
The industry is moving from shooting 2K to 4K and now 6.5K. The Codex Vault S and XL-Series solutions are seriously impressive, so fast and powerful. I love that it can ingest from multiple sources and card readers, clone material, make LTO back-ups and transcode all in the one box via a touchscreen interface (Vault S-Series only). With ALEXA 65 supported by beefy Codex Vault processing, cinematographers can shoot and rapidly review their artistic intent with no compromises. ALEXA 65 is only going to get more attractive for cinematographers and I would not be surprised if ARRI doubles the number of these camera systems.

How did you use Codex Vault on Snowden?
Anthony shot *Snowden* using ALEXA XT, Canon C500, Codex Action Cam, the ALEXA 65 and a prototype ALEXA Mini. We did a lot of live grading on *Snowden,* very subtle for different points in the narrative.

We had an on-set data wrangler and used a Codex S-Series Vault. We changed the naming conventions on the C500 and Codex Action Cam material at capture so it would be consistent with that of the various ALEXA formats and simplify things downstream in post. This was made straight forward with the Codex Onboard Recorder.

We ingested all of the footage from the various cameras, and the processed ALEXA 65 material, onto the removable 8TB Transfer Drives, (we carried five on the movie). For security purposes, we also made a second copy of the data to another sled, which always remained on-set with the camera original cards.

The Transfer Drive, containing the ARRIRAW and original Codex files, was sent to the lab, at ARRI Munich, at call time plus five hours, where the Vault XL was used to create LTO back-ups and transcode for editorial. As there's a pre-processing step with ALEXA 65 footage, it was an efficient use of time to do this on-set for our workflow.

What would you say to anyone considering their workflow options with and without Codex?
If you want to make things much easier, raise your degree of certainty to the highest level, then Codex is the only way to go. Other systems are just not as robust as Codex for critical data handling. They are not so streamlined in the workflow as Codex either. For example, if you are using different cameras, you can easily streamline the naming conventions of say, ARRIRAW and Canon RAW files. Plus, Codex have always been excellent on technical support.

As a DIT your goal is always to create a workflow that meets the various creative, practical and financial requirements of production and post, and Codex will get you there.

CHECCO VARESE ASC TAKES CODEX DEEP UNDERGROUND FOR...

Checco Varese ASC says that *The 33* was the most difficult movie he's ever done. It's an impressive statement from a veteran of more than 50 narrative projects dating back to his time as a Steadicam operator in the 1990s. *The 33* retells the story of the Chilean miners who were trapped in a gold and copper mine for 69 days in 2010. Half the film was shot miles underground in a stand-in mine in Columbia.

"I'M VERY CONFIDENT WITH THE ALEXA CAMERAS AND THE CODEX SYSTEM" Carmen Del Toro

Darkness was an integral part of the story, and it also defined the environment in which the filmmakers worked, seeping into their consciousness. The other half of the story unfolds above ground, in Chile's stunning Atacama desert, one of the driest places on earth, where the blinding sunlight and blowing sand dealt the filmmakers other challenges.

With these extremes in mind, the director, who is Varese's wife, Patricia Riggen, warned him early on not to squander the project's powerful visual potential.

"Our first conversations after reading the script were related to the realistic sense that she wanted to imprint on this story," says Varese. "I'm a firm believer that you have to start by anchoring yourself to some kind of reality, even in science fiction. That way, you can maintain the suspension of disbelief. I usually start by thinking of a painter, and in this case, the painter who came to mind was Caravaggio, because he has this chiaroscuro, with very dark and very bright areas in the frame."

Varese also took inspiration from a series of photographs of Afghani coal miners taken by master stills photographer Steve McCurry (www.stevemccurry.com).

The cast included Juliette Binoche and Antonio Banderas. The decision to shoot in a real mine added authenticity but also complexity in terms of logistics, lighting, safety and other concerns. "But the way Patricia wanted to shoot it, there would never have been a stage big enough or a budget generous enough to contain it," says Varese.

Varese and Riggen had made three previous feature films together, and they share long service in documentary film, Varese having worked in war zones through the 1980s. That experience informed their approach to the imagery as well, with plenty of handheld camera work. Varese operated the A camera himself.

Gaffer David Lee helped Varese plan and execute the lighting. In the mine, that essentially meant mimicking flashlights, industrial lamps, and an occasional candle, until in the story all the batteries die and the men are starving and desperately thirsty. Often the miners lit each other with headlamps that were slightly warm in colour.

Varese shot on ARRI ALEXAs, using ARRIRAW recorded to Codex Capture Drives. The lenses were Ultra Primes and Angenieux Optimo zooms. Underground, the cameras were pushed to EI 1280 or 1600, sometimes under-exposing as much as five stops. Rental equipment was provided for the most part by Equipment Film and Design (EFD)'s Columbia branch.

The filmmakers spent about six weeks in each locale. Digital Imaging Technician Carmen Del Toro says that *The 33* was "a life-changing project."

"The images just give you the feeling that you are right there with them, watching everything happen," she says. "Not only is the mine falling apart, but they begin to fall apart as humans." For the first two weeks of the shoot, Del Toro sent Varese's colourist, Stefan Sonnenfeld, ARRIRAW files so he could confirm that the 1600 rating was not resulting in unacceptable grain or noise. On the set, she generated CDLs from the live feed signal. She would convert that to Rec709, which was then sent to video assist, where Sony BVM series OLED monitors, calibrated by Del Toro, presented the image to Riggen and her team.

Each Capture Drive gave about 40 minutes of record time. Off-load was away from the set, because computers and hard drives don't take well to conditions in a salt mine. Corrosion was a major issue. And in the dry Atacama desert, Del Toro had to continually replace and clean the calcification off the connections.

Del Toro's equipment included a Mac Pro tower with 96 gigs of RAM running Resolve, connected to a 48-terabyte RAID and a Codex Dual Dock.

"I thought it was important to have the negative verified by the same company that makes the Capture Drives, and designed the whole workflow, which is Codex," she says. "So we used the Codex VFS to offload the material to the two rigs we had on the set. One copy would go to a shuttle drive and the other to the 48-terabyte RAID."

Because CDLs weren't being generated at the time of recording, Del Toro would generate CDLs for each scene and camera. The data manager would add the CDL info to the ARRIRAW files, which were then downloaded and verified inside Resolve. Each night, that Resolve project was shared with the lab, Bling Digital, which provided dailies and did the final handoff to DI.

The brutal conditions tested Del Toro's skills. In the blazing sun, she followed Varese into a crowd with 120 metres of cable, because the antennas were overheating and dropping out. She would open her Mac tower to find the green motherboard completely obscured by fine sand. She never lost a computer though. At one point, a RAID went down, but the material was backed up in three different places.

"Because we were shooting ALEXA XTs with Codex inside, we had one computer working on the camera instead of two," she says. "The cameras were left in the mine overnight, covered, and they survived. We never had a camera issue.

"In the mine, you get grey hair quicker," Del Toro says. "But I'm very confident with the ALEXA cameras and the Codex system. I just knew that the things that might break were things we could easily replace. It was a big challenge to do it well, to have it feel realistic, and yet give the audience the ability to see what's going on."

Looking back on the experience, Varese says, "We did crazy things. There was no light. And everyone says, 'Oh my goodness, it looks terrific.' And besides that, it's a fantastic movie."

SUCCESS STORY: THE 33
CINEMATOGRAPHER: CHECCO VARESE ASC
RELEASE: AUGUST 2015

CODEXLIVE
COMMAND&CONTROL

Look and colour design, such a critical piece of every production, is best started in pre-production, with conversations between the DP, DIT and colourist. Codex Live is a tool with an easy-to-use user interface that helps the creative team to communicate, develop and save these looks and apply them on-set, working directly with the live camera feed over HD-SDI. These looks and grades can then be used to share the creative intent to others involved in the production and as a starting point for dailies and post production, meaning less ambiguity and clear communication.

"COLOUR DESIGN IS A CRITICAL COMPONENT OF MODERN PRODUCTIONS. I OFTEN GET INVOLVED BEFORE PRODUCTION EVEN STARTS. CODEX LIVE IS A GREAT TOOL FOR MANAGING COLOUR ALL THE WAY THROUGH FROM PRE-PRODUCTION TO PRODUCTION AND INTO POST PRODUCTION." Yvan Lucas, Founder SHED

Looks can be applied automatically when generating deliverables via Codex Production Suite (on Mac OS X, Vault S-Series or Vault XL-Series), and can be exported in various formats (ASC-CDL, 3D LUTs in various formats) so that they can be applied in other software. This ensures that the looks created by the creative team are carried forward into editorial, viewing and then onwards for VFX and DI.

Codex's software development team worked closely with DITs to ensure that Codex Live meets their needs. Francesco Giardello was involved from a very early stage and recently used the software on *The Coldest City,* shot in Budapest with DP Jonathan Sela. Here's what Francesco had to say about his experience.

"I immediately loved the stability of the software, the accuracy of the real colour science applied in the background of every look designed, the opportunity to link the data to Codex Production Suite which streamlines and simplifies the dailies pipeline by linking any colour decision to the right clip automatically. Also the simple but totally user-friendly gui doesn't allow any mistakes on set."

Codex Live works seamlessly with Tangent panels for interactive colour grading. Looks can be applied interactively to signals going from the camera to the on-set monitor via LUT boxes such as the Fujifilm IS-mini, Teradek COLR, Black Magic's HDLink and OffHollywood's OMOD, or directly where the camera or monitor is capable.

Codex Live is fully synchronised with Codex Backbone where the look-related metadata is securely managed in the "Look Library" for collaborative use in the creation of dailies and then onwards into post production and VFX.

COLOURGRADING

Codex Live has controls to adjust:

- Offset/Power/Slope/Saturation and Printer lights
- Looks can be saved with a user-defined name in the Codex Look library.

Codex Live

Codex Vault

"IT'S ALL PROFESSIONALLY DESIGNED AND EXTREMELY ESSENTIAL: SIMPLE BUT EFFICIENT" Francesco Giardello

EXCHANGINGLOOKS

The look will be applied to the recorded material automatically during playback so that it can be seen on-set. When a look is sent to the LUT Box the settings are saved and marked with the current timecode and the exposure index (EI).

Codex Live synchronises the saved looks with Codex Production Suite:

> When the media is offloaded, the timecode and EI of each clip is checked. The look that was applied to the corresponding LUT box at that time is then put into the clip's metadata.
> The look can then be applied automatically when playing back or when generating deliverables.
> The settings are picked up by Codex Production Suite so that the colour parameters can be further adjusted during dailies review.
> The look can also be exported in various formats so that it can be loaded into other software for dailies and colour grading.

SUCCESS STORY: ZOOLANDER 2
CINEMATOGRAPHER: DAN MINDEL ASC BSC
RELEASE: 2016

ROMAN HOLIDAY

When you've spent the best part of a year in concentrated production, shooting one of the most hotly-anticipated movies ever, what better way to wind down than by shooting another movie with one of the world's biggest comedy stars?

After completing the cinematography on JJ Abrams' $200m production of *Star Wars: The Force Awakens* for Walt Disney Studios, Dan Mindel ASC BSC says he had no hesitation in heading to Italy to frame *Zoolander 2,* Paramount Picture's $50m sequel to *Zoolander* (2001), co-written, directed by and starring Ben Stiller.

"Having been so dedicated to *Star Wars,* the idea of shooting comedy out of Cinecitta Studios was a gift," recalls Mindel. "I had never worked with an actor/director before, and the chance to work with Ben in this role was a key attraction. *Zoolander 2* also allowed me to shoot digital, and to pair-up the ARRI ALEXA with a particular set of lenses. Although I have shot many commercials digitally, and tested digital cameras ad nauseam for movies, I am a film dude and have never done a digital picture before. The fact that it was to be shot in Rome was an attraction too. The city is spectacular and I love the cuisine. As it turned out, we were there at the same time as Alexander Witt was shooting second unit on 007 *SPECTRE.* So what's not to like?"

Packed with a parade of real-life celebrities and fashionistas, *Zoolander 2* stars Stiller as Derek Zoolander, with Owen Wilson as his hapless sidekick Hansel McDonald, as the pair are recruited by Interpol to investigate the systematic assassination of "the world's most beautiful people".

Mindel says, "Everyday there was a different superstar celeb on-set. With the locals and tourists clamouring to get a closer look, it made things all the more interesting." The glitterati performing cameo roles include Sting, Kanye West, Kim Kardashian, Justin Bieber, Lewis Hamilton, Katy Perry. and Willie Nelson, to name just a few.

Pre-production started in February 2015, with principal photography taking place from April to July of 2015 in Rome. Mindel elected to capture the comedic caper on ARRI ALEXA XTs fitted with some of the same Panavision Retro C-series Anamorphic lenses that he had used on *Star Wars,* prepped at Panavision in Los Angeles, with supplementary ATZ zooms and Primos provided by Panavision in London.

"For me, shooting spherical is more about TV formats," he says. "I like 2.40:1 anamorphic because of the inherent idiosyncratic looks that the elements in those lenses give you, which is more about the movies. Those C-series lenses though are pretty sharp, so I used some Tiffen Black Velvet diffusion, which I ended up really liking, to soften-up the image a bit."

Along with the filmic framing of the movie, Mindel was also keen to harness a celluloid-style of workflow to ensure colour consistency from set into post production.

"I don't use a DIT on-set and never go in the tent, as I am not a fan of that system," he explains. "I prefer to have the DIT keep an eye on the waveform and alert us as to when we're over or under as we shoot. I also much prefer to review my work by doing properly graded rushes, to my taste, every morning. This avoids the director and everyone downstream viewing uncoloured, one-light rushes with the wrong look. "So I asked Deluxe's colouring facility, Company 3 (C03), who I had gotten to know through *Star Wars,* to manage the data wrangling and oversee the colour workflow. This gave me the freedom to explore the parameters of the camera, to learn about the threshold of where to go exposure and ISO-wise, and discover how to use the properties of the digital image and anamorphic glass to emulate film grain."

"THE CAMERA TEAM FIND THE XT EASY TO WORK WITH – FROM THE LENSES TO THE IN-BUILT CODEX ARRIRAW WORKFLOW"

Dan Mindel ASC BSC

Shooting with ALEXA XT and harnessing Codex ARRIRAW recording, around 30 Codex Capture Drives were regularly recycled between the set and C03's near-set dailies facility in Rome. C03 managed the integrated dailies and DI under the supervision of senior DI colourist Stefan Sonnenfeld, with senior dailies specialist Jonathan Smiles in Rome.

During production, DIT Francesco Scazzosi was responsible for guarding the exposure on-set. Main Data Manager Brando Bartoleschi, co-operating with Additional Data Manager Giacomo Rebuzzi, made dual safety copies of the rushes every day, before the drives were sent to C03 in Rome.

There the Codex ARRIRAW files were ingested into C03's EC3 on-location dailies system, via the Codex Capture Drive Dock, and the footage was then tagged and QC'ed. Every evening, dailies colourist Gino Panaro liaised remotely with Mindel about the colour requirements, and the following morning Mindel personally supervised the dailies grade. The colour-corrected deliverables were then made for editorial, along with verified LTO-tape archive copies of the ARRIRAW files.

"It all ran very smoothly," says Mindel. "I have used ARRI equipment my whole professional life, and their pedigree is cinema is undeniable. Overall, there's no denying that the ALEXA is the only camera system out there to use. The camera team find the XT easy to work with – from the lenses to the in-built Codex ARRIRAW workflow. Also, I am wary of failure of equipment on-set on these sorts of movies, where time is money, but the reliability was great, and the pictures looked exactly the way I wanted them from production to the DI."

Mindel's crew included long-time collaborators in the forms of gaffer Chris Prampin, focus puller/first AC Serge Nofield, and A-camera operator Philippe Carr-Forster. The rest of the camera, lighting and grip crew were, "pure Italian, many of whom I have worked with before on *Mission: Impossible III* (2006)," he enthuses. "I love their creative and professional sensibilities in bringing pizzazz to the images, and anyone who can talk about food, wine and football is good with me."

Speaking about his lighting strategy, Mindel comments, "I lit this movie just as I would a celluloid production, using traditional fixtures to create beauty lighting in a slick cinematic way, plus a bit of pop and fizz. It was great to work in Italy with the culture and the elegance of the Italian grips. For a rock 'n' roll fashion catwalk scene, Chris built a huge rig using vast quantities of motorised robotic lighting from PRG in Germany, worked by a board operator, which was a lot of fun."

Regarding night shoots he observes, "One of the key stories with digital has been the prowess of the cameras to work in low or minimal light at night. I know you can get an image and for a scene at The Pantheon, we had to shoot available light, as we could not take lighting equipment in there. But, I have never been convinced that street lighting is a good way of lighting at night. You have to work with it to give the pictures soul, and I ended up lighting virtually everything we did at night."

Of his overall experience shooting his first digital movie Mindel says, "What I took away, and I'm only speaking for me, is that you don't have to be so precise with digital as you do with film, when you have to pay acute attention to detail as it's so easy to screw it up. Digital is a different tool. There so much forgiveness in the digital universe, and you don't necessarily have to watch or take readings incrementally of every set-up, camera move and actor's step. You can easily slip into a lazy way of working as a DP. It would be very simple to say I would never use film again, but I am not done yet with exploring and learning how emulsion works, and I am not ready to hand over my light meter just yet. But, this was a short and sweet production, and overall it was a great learning experience for me. I am totally happy with the results and it proved a huge success all round."

CODEX+RED

Codex provides simple, unified workflows for the leading digital cinematography cameras, including RED.

GUARDIANSGORED

RED and director James Gunn recently announced that RED's WEAPON 8K digital cinema would be used to capture the incredible images created for Marvel's cosmic adventures in *Guardians of the Galaxy Vol. 2.* The cinematographer is Henry Braham BSC, who has previously used RED EPIC cameras on *Tarzan* and will be one of the first DPs to use this exciting new camera. The first *Guardians of the Galaxy* utilised a solid Codex workflow that has become the standard for Marvel Studios. So naturally Marvel is again relying on Codex for an innovative, efficient RED workflow that could meet the data challenges of this 8K camera.

The size of the 8K full frame is a massive 8192 x 4320 and the RED WEAPON can capture this resolution at up to 75 frames per second. With multiple cameras the amount of data generated every day on a visual effects blockbuster like this is going to be substantial, even with mildly compressed REDCODE RAW as the acquisition format. But for a cutting edge production services company like SHED, based in Santa Monica, Atlanta and London, this is all in a day's work. SHED has the necessary experience serving "big data" projects like *Live by Night* which utilised the ARRI ALEXA 65, as well as *Jungle Book: Origins, Captain America: Civil War* and *War for the Planet of the Apes.*

For *Guardians of the Galaxy Vol. 2,* SHED is employing a Codex-based workflow from on-set and near-set through to post production, visual effects and archiving. The 1 TB RED MINI-MAGs are immediately loaded into a Codex Vault S-Series close to the set, where an initial check of the metadata is be carried out, prior to the data being cloned to an 8 TB Codex Transfer Drive. Codex Transfer Drives are the fastest and most secure method of moving data from set to post, utilising super-reliable SSDs and backed by the proven Codex File System. A pair of Codex XL-Series Vaults is doing the heavy lifting at SHED Atlanta – processing the R3D RAW files with LUTs applied and rendering all the necessary deliverables through Codex Production Suite, a fully featured dailies system. The original camera data and editorial deliverable creation are tied together and tracked by Codex Backbone – a production management system providing reports and facilitating the flow of information amongst all interested parties. Codex Backbone is then used to manage and provide all VFX pulls for the various VFX vendors.

"CODEX HAS BECOME THE STANDARD FOR OUR DIGITAL PRODUCTIONS"

Jesse Torres
VP Post Production at Marvel

As always, Codex has worked closely with the Marvel team to set up an efficient pipeline. Jesse Torres, VP Post Production at Marvel explains, "Codex has become the standard for our digital productions as they are the natural choice to facilitate the flow of data from set to post. Codex Vault is extremely robust. We can trust that our post partner SHED will be able to use the system without any issues. By choosing Codex, we can be completely confident that our data is not only secure, but delivered on time to whomever needs it."

THE RED DRAGON

The RED DRAGON sensor takes RED cameras to a whole new level. Advancements in the underlying colour science allow for wider dynamic range, even better colour rendition (softer skin tones, more vibrant primary colours) and improved low light performance. And capturing at 6K will produce better-looking images with more detail even when the final delivery is 4K or HD.

As is always the case with RED, the new sensor doesn't mean new gear - all existing accessories, rail components, and modules designed for EPIC-X or M are compatible regardless of what sensor is installed. As for lenses, Leica-M, Canon, Nikon, and PL lenses are all compatible and fit precisely, without the need for a back focus adjustment.

"I'M INTERESTED IN BEING ONE OF THE MANY WHO HELP TO CREATE A NEW KIND OF MAGIC THAT WILL USHER THE CINEMATIC EXPERIENCE INTO THE FUTURE"

James Gunn, Director 'Guardians of the Galaxy Vol. 2'

THE RED WEAPON

The RED WEAPON DRAGON features RED's smallest and most lightweight camera BRAIN® ever. It takes the best aspects of EPIC and SCARLET but is re-engineered from the ground up. The new BRAIN® features enhancements like automatic black shade calibrations, improved low light sensor performance, a new intelligent OLPF system and 1D and 3D LUT support. Peripherals are easily incorporated without cables.

For director James Gunn, the size of the camera was also important. In a Facebook post explaining why he chose the RED WEAPON he explained, "*Guardians of the Galaxy Vol. 2* will be utilising another new technology I'm very excited about but can't quite go into yet. But, for this technology, you need a camera the small size of the RED WEAPON."

A new, integrated media bay simplifies workflow and provides higher data rates to RED MINI-MAGs. For even more flexibility, Apple ProRes can be directly recorded as well as RED's R3D format. And third parties are able to build modules for the DSMC2 platform, further increasing ease of operability and compatibility.

COLOURITRED

Developed by OFFHOLLYWOOD, OMODs are the first third party modules for RED's DSMC2 camera platform. OFFHOLLYWOOD's long experience with RED cameras and workflows allowed them to identify a need and develop a product to enhance the functionality of RED cameras.

Designed for the colour management requirements of today's workflows, three independent HD-SDI outputs can be routed in any configuration from RED's SDI & HDMI monitor paths. Each output can have a CDL and/or 3D LUT applied, controlled and stored independently. Codex Live, Codex's colour management and look-creation system enabling set-to-post colour confidence, works seamlessly with OFFHOLLYWOOD's OMOD for RED digital cinema cameras, enabling a simple colour pipeline from camera through to dailies and beyond.

"CODEX'S REPUTATION FOR EFFICIENT, SECURE WORKFLOWS IS UNSURPASSED, AND CODEX LIVE JUST ADDS TO THEIR PALETTE OF TOOLS. WE ARE EXCITED TO WORK WITH THEM AS WE INTRODUCE OMOD, A PRODUCT THAT WE BELIEVE WILL BE EAGERLY RECEIVED BY RED USERS EVERYWHERE"

Mark Pederson, CEO OFFHOLLYWOOD

For more information on OMOD, visit: shop.offhollywoodny.com/pages/omod

CODEX BACKBONE

Your Complete Digital Production Pipeline

Codex Backbone answers the many questions that come up during a production; what was shot yesterday? Did we backup this roll? What is on this LTO tape? Where is that shot? With Backbone, information about your data is omnipresent and available immediately to those who have access.

Codex Backbone is a complete digital production pipeline from the moment you conceive your project to the moment you deliver it and the central repository for your images and data. So you'll always have the answers.

With Backbone, information about a production can be accessed and utilised quickly and efficiently. Codex Backbone is an end-to-end pipeline that integrates Codex's production-proven Vault technology with the Codex Backbone Server and features a secure web based login with an easy-to-use interface that a producer can use to browse and access this critical information. It will deliver the time and money savings that have long been expected from digital productions but often not achieved.

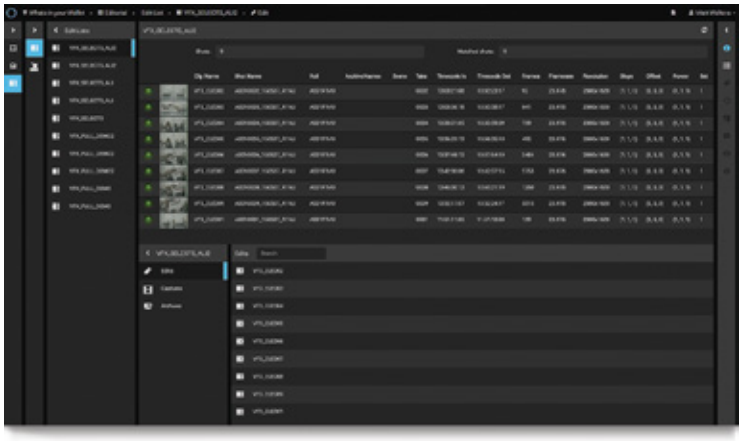
"IT MAKES PERFECT SENSE, FROM CAPTURE TO ARCHIVE WITH CODEX SYSTEMS. CONTINUING THE INFORMATION FLOW IN ONE UNIFIED SYSTEM IS THE INNOVATION I HAVE BEEN WAITING FOR"

Ron Ames, Visual Effects Producer

Studios and individuals alike are able to track and re-use their information across shows, streamlining production by creating a knowledge repository. Projects can take advantage of having files and data locally, plus use the distributed hardware of the cloud where it makes sense, making it easy to collaborate locally or all over the world.

VFX TURNOVERS

The VFX delivery pipeline is critical to almost every project – getting the correct shots to the right facility with the associated metadata as efficiently as possible. This has traditionally been done by post facilities. Backbone gives control back to productions by providing a simple tool for ingesting EDLs, pulling visual effects plates, transcoding them to the formats needed, and delivering the shots and metadata to the right place. This can be managed by a studio or a production's editorial department, providing time and money savings, and a valuable level of extra security because the production itself is in control.



Backbone VFX Pulls

CODEX VAULT + PRODUCTION SUITE

Codex's Vault has proven its value time and time again. When a show gets to the shooting stage, Vault will do the heavy lifting in getting the shots cloned, archived, and transcoded and will automatically update Backbone every time media is inserted and removed from the system. And now Codex Production Suite runs on Mac OS X making it easy to integrate into a non-Vault workflow.

Original camera files that are archived to LTO tape and to the Codex Media Vault are routinely synced with Codex Backbone. The metadata is uploaded to the cloud for immediate browsing and information recall from the web-based Codex Backbone interface.

CODEX BACKBONE SERVER

Codex Backbone Server is your own private piece of the cloud that you completely control. It lives inside your internal network so you can run Backbone behind any company firewall, or in any location in the world. No internet? No problem. Codex Backbone has been designed to give you the information you need at all times. No matter what happens in the outside world, your show will not stop.

"CODEX'S MEDIA TOOLS WITH BACKBONE AND MEDIA VAULT LIBRARY WILL PROVIDE US WITH A SECURE WAY OF HOW WE MOVE VALUABLE DATA. IT WILL INCREASE DATA EFFICIENCY AND HOW WE SUPPLY TO VENDORS. THIS WILL STREAMLINE VFX TURNAROUND AND THE ENTIRE MOVIE-MAKING PROCESS."

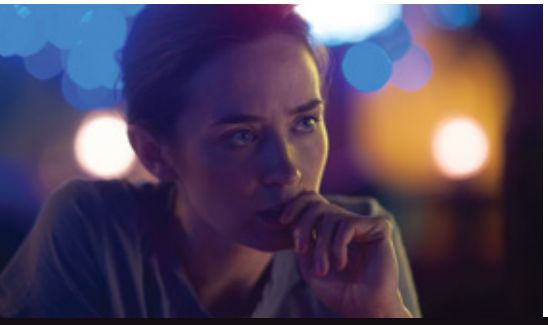
Jesse Torres, VP Post Production, Marvel

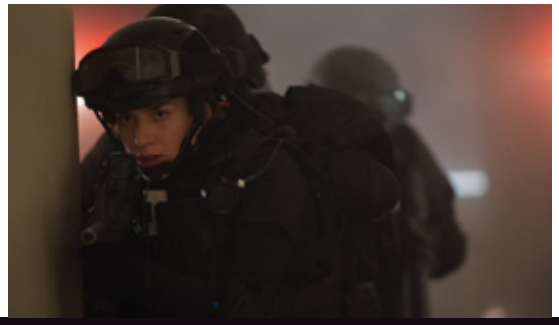
IN THE **CLOUD**

As bandwidth gets faster and faster and reaches the most remote production locations, tracking your production in the cloud is a reality, wherever in the world you are. Codex Backbone can be run on public cloud-based servers such as Amazon Web Services, private cloud services like Sohonet Media Network, or locally using a Codex Backbone Server.

Wherever productions go to work, Codex Backbone can travel with them. It works offline or online and in remote locations sharing files around the world and allowing crews in multiple locations to easily collaborate; saving time and money.

Codex Backbone allows production information and pipeline stages to be securely viewed and edited anywhere, any time, by approved crew members, using any desktop or mobile device with an internet connection. Users, Vaults, and S-Series Servers can be added and removed as necessary providing flexibility and saving money.





CODEX **BACKBONE** AWARE

Codex has always worked in harmony with other systems and Codex Backbone is no different. It is built on open REST APIs that can be shared with partners including VFX tools such as Shotgun, PIX for dailies, Sohonet services, or your own internal pipeline systems.

"WE ARE EXCITED TO BE COLLABORATING WITH CODEX, WHO ARE COMPLETELY AWESOME ON SET. BRINGING OUR TECHNOLOGY TOGETHER WILL PROVIDE OUR JOINT CLIENTS WITH MAJOR EFFICIENCY/SPEED BOOSTS THAT ULTIMATELY SAVE TIME AND MONEY"

Don Parker, Senior Director, Shotgun, Autodesk

CAPTURED ON CODEX

SUCCESS STORY: THE BOSS
CINEMATOGRAPHER: JULIO MACAT ASC
RELEASE: 2016

WATCH YOUR ASSETS!

After beginning his career as an assistant to masters like John Alcott and Chris Menges BSC, Julio Macat ASC has made a career of shooting comedies, beginning with *Home Alone* (1990) and continuing through hits like *Wedding Crashers, Pitch Perfect, and Daddy's Home*. One key to his success with funny material is that he treats comedy as if it were a drama.

"It's never bright or overlit," he says. "For scenes in a lighter vein, it doesn't make sense to make it dark in the extreme. But I've always done comedies that are grounded in the real moment. My second rule is that I always want to enhance how the actors look, and I use every trick in the book to achieve that. After that, it's making an interesting movie that is good storytelling. It's as simple as that."

His most recent assignment was *The Boss,* a Universal feature comedy vehicle for Melissa McCarthy. *The Boss* was directed by Ben Falcone and stars McCarthy as a filthy-rich business tycoon who is sent to prison for insider trading. Upon her release, she undertakes a PR campaign to convince the world that she is sweet, kind and considerate. Enemies from her previous life have other plans. McCarthy originally created the character when she was doing stand-up comedy with the Groundlings.

Principal photography took place in the Atlanta, Georgia area in the spring of 2015. The cast also includes Kristen Bell, Peter Dinklage, Kathy Bates and Kristen Schaal.

The film starts with a vignette of McCarthy's character as an orphaned child who decides that she will make it to the top no matter what it takes. Cut to adulthood, and a Lady Gaga-worthy entrance at a motivational speech event, complete with fog, lightning, rock'n'roll lighting and McCarthy descending on a golden phoenix.

"It's bigger than life," says Macat. "You don't get a second chance to make a first impression, so we put a lot of resources into that scene, and the results were just stunning. I was amazed by how well the ALEXA 65 handled the lightning and strobing and the other overly exposed elements. You can see more detail in the shadow area, deep in the back of the house, and the wide angle lenses are just brilliant with that level of detail."

Macat was overseeing seven different cameras on that scene, so he couldn't afford to have any additional headaches. The majority of the cameras were ALEXA XT models with internal Codex recording, making for a seamless production pipeline.

> **"TO DELIVER ALL THAT RECORDING TIME WHEN YOU'RE SHOOTING RAW REALLY BLOWS YOUR MIND"**
>
> Julio Macat ASC

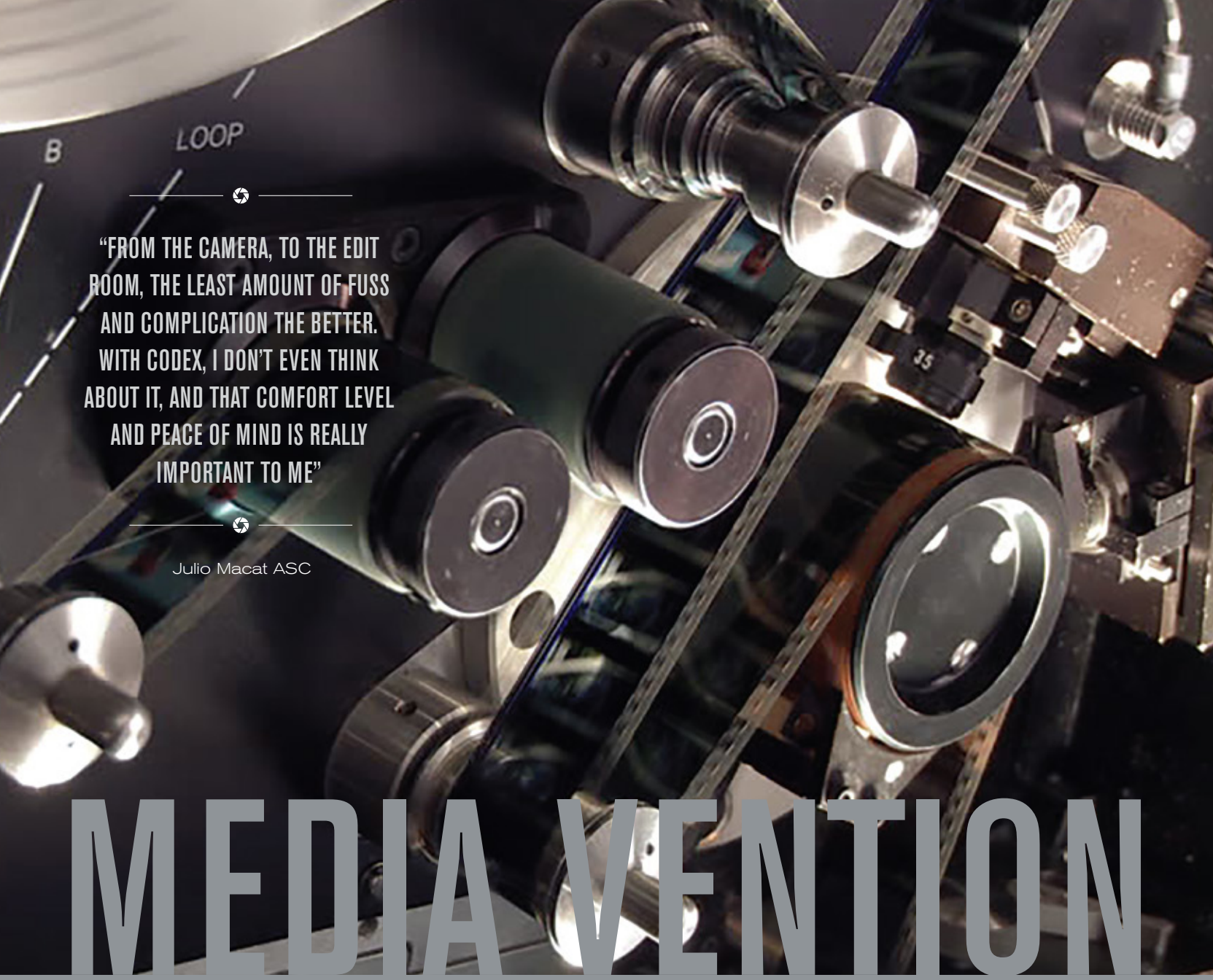
Macat's team used a Codex Vault system to offload and back up the imagery coming from camera. "Codex is brilliant," he says. "I found it to be really dependable, and very fast to reload under the gun. It's got a very good fail-safe backup where you almost can't make a mistake. One is always looking for a way to streamline the workflow. From the camera to the edit room, the least amount of fuss and complication, the better. With Codex, I don't even think about it, and that comfort level and peace of mind is really important to me."

Macat says that on a comedy like *The Boss,* there's a lot of freewheeling and improvisation to find the funny, and the capacity to keep rolling is key to that freedom. The ALEXA XT with internal Codex recording can deliver 47 minutes between reloads. "For something that small – the drives are maybe the size of three iPhones – to deliver all that recording time when you're shooting RAW really blows your mind."

Like many cinematographers, Macat sometimes misses the days of film emulsion, But he's happy for the strengths that digital brings. "What we gain is the bravery of pushing yourself more because you have a good monitor to use as a reference," he says. "You can be more bold, and sometimes when you see the dailies, and add a little contrast back in the DI, you find that you've dug into shadows area that you never would have found otherwise."

After *The Boss,* Macat went on to shoot *Middle School: The Worst Years of My Life.* He is currently planning to shift gears and return to his roots in dramatic cinematography.

The Boss was released in early April 2016.



"FROM THE CAMERA, TO THE EDIT ROOM, THE LEAST AMOUNT OF FUSS AND COMPLICATION THE BETTER. WITH CODEX, I DON'T EVEN THINK ABOUT IT, AND THAT COMFORT LEVEL AND PEACE OF MIND IS REALLY IMPORTANT TO ME"

Julio Macat ASC

MEDIA VENTION

When the industry moved from film processing and telecine dailies for editorial, it seemed that the advent of file based workflows would streamline the entire process and make it faster, easier and cheaper to transition a production from set to post production.

In fact, due to the variance in camera types and their associated file types, the process has actually become more complex. Rolls of film in production were contained to specific lengths. Digital productions can vary much more in the amount of data that is generated just by the selection of the camera type.

Digital cameras now offer everything from HD and 2K recording in high dynamic range, to high frame rates at 4K, 6K and even 8K resolutions. Some cameras are compressed and some are uncompressed. With a 1,000 ft. or 2,000 ft. roll of film, the only other things a producer needed to know was the format and film stock to properly budget dailies on a project.

The costs for processing and turn around were practically set in stone after a 100 year evolution in the filmmaking process. Digital technology evolution seems to happen on a nanosecond time scale and is cloaked in technical-sounding acronyms that further deepen the confusion for producers and UPMs.

This confusion continues into post production. In years past the lab did the processing and managed the production while the post facility would receive a known quantity of film to transfer. It was easy and simple to count up the number of rolls and their known lengths and plan how much tape would be needed to transfer for editorial.

Planning the post schedule for editorial, QC and review was much easier as it only required rooms and tape machines, and a good scheduling person who would coordinate with operations to have the room ready for work with the client.

Of course it all wasn't that easy. Editors and shows preferred specific formats. Tape machines supported one specific format only and needed a dedicated tape operator. Copying files from a hard drive to a laptop seemed so much easier and controllable.

Easier until the post facility had to store the hard drives that don't stack or sit on the shelves like videotapes and film rolls did. The files need to be accessed quickly, so using discreet drives on a shelf, in a box, that need specialised connectors to connect to a computer, isn't as easy as asking a tape operator to insert a tape into a tape deck.

ACCESS ALL AREAS

Easy file access anytime from any room is the ideal dream. To address this goal, facilities have invested in the infrastructure to support the ability of having the project files stored on a Storage Area Network connected to each room. They all now realise that they still need operators and engineers in the backroom to make things work. So accessibility seemingly got better, but the cost to manage this ideal dream went up and of course the clients' willingness to pay seems to always go down.

Scaling this storage is not cheap. More storage requires more network bandwidth to support the playback of larger data files. When file-based workflows first appeared, file sizes were based on HD and 2K. Today's files are often 4K, and is four times HD. One hour of HD storage uncompressed is 600 GB per hour, now one hour of ARRI ALEXA 65 material is close to 2.5 TB per hour.

Post production constantly needs to scale this infrastructure by adding more storage to the network. The network has to scale and this topology is constantly changing. Sometimes making a change means replacing the current infrastructure altogether. The costs are huge and the return is very little. The entire process hasn't become any easier, it has become more difficult.

Managing Data

Managing this data on-set during production and in a facility has required the creation of a new role - the data manager.

The data manager works on-set to back-up the data and to make sure that all of the production material is passed securely to the near-set team. The near-set operator will document what is received and will verify that the data passes onto post production in the form of an archive and as transcoded deliverables for editorial and visual effects.
At every step in the process, the production wants to make sure that no data is lost or stolen. The costs to reshoot are sometimes insurmountable and there is sometimes no time for a reshoot should data go missing. Redundant copies are requested. Captured material is quarantined until dual-verified LTO archives are made and sent to post production for vaulting. This slows down the recycling of capture media and raises the cost to production for rental as they need to have enough media to keep recording while the previously captured material is archived.

Codex is well known for its expertise in recording and storing large format material at high frame rates with proven and solid workflows. The new Codex Capture Drive can record data at the rate of 2500 MB/sec. Cloning to a Codex Transfer Drive in the Vault system can maintain these transfer rates and offload the material at these same high data rates. This means that 60 minutes of material can be cloned to redundant raided storage in just 15 minutes.

CODEX TRANSFER DRIVE

Typically, after break or wrap, a data manager on-set, if not using a Codex Vault workflow, would need to offload material to an external removable hard drive that would be transported to near-set. These external drives cannot maintain 2500 MB/sec, but instead are three times slower.

This means that 60 minutes of material will require three hours to copy onto redundant raided storage. That adds up in overtime charges for the data manager, plus the electrical and transportation departments that need to wait around at the end of wrap until this material is copied.

This same slow process is unfortunately repeated at the post facility. Instead of receiving a Codex Transfer Drive, ready to mount and allow immediate playback and file review, they get a hard drive that needs virus scanning and confirmation that it works before it can be copied onto the facility's SAN. Another three hours are needed to ingest this material.

CODEX ATTACHED STORAGE

With Codex, the storage is already attached. Simply insert the Transfer Drive into a Codex Vault and like a tape machine, you can playback the media at data rates of 2500 MB/sec. This will allow real-time viewing of 6K files at HD, 2K or 4K resolution to a monitor or projector. The content is accessible immediately for the client and colourist. This powerful playback performance allows the files to be reviewed in a non-linear fashion, with full custom colour or in ACES colour space.

Using Codex Production Suite, the media can be QC'd and the metadata updated while reviewing playback. Audio Sync is automated. Editorial deliverables from ProRes to DNxHD and H.264 files can be generated in the background while the review process is still happening with the client.

When the client has gone, simply generate camera native data across the connected network to an external NAS, SAN or Codex Media Vault. With the Codex Transfer Drive still loaded in the Codex Vault, initiate an LTO tape archive with full CRC and MD5 checksum verification. Codex is connected to the content directly as it is more often than not recorded on our media. No other solution exists that can securely track and record a production's content and manage its workflow with such ease and elegance.

Codex attached storage solutions offer the realisation of the file-based workflow dream.

CODEX MEDIA VAULT

A full integrated ingest and transfer station with 36 TB or 64 TB network attached storage for near-set cache of original camera media while LTO tapes and shot reviews are still in process. Connects via 10GbE, 40GbE or via dual port 16Gb Fibre channel to external SAN or the Codex Media Vault Library.

"IF YOU WANT TO MAKE THINGS MUCH EASIER, RAISE YOUR DEGREE OF CERTAINTY TO THE HIGHEST LEVEL, THEN CODEX IS THE ONLY WAY TO GO"

Dan Carling, DIT

CODEX MEDIA VAULT LIBRARY

Codex Media Vault Library featuring Codex Production Drives, provide portable near-line storage, offering secure, fast access for production, editorial and VFX vendors. Each Production Drive provides 24 TB storage in an easily transportable form.

Approved users can access any asset at any time. Codex Production Drives are designed with productions' critical tasks in mind, enabling collaboration and increasing efficiency. They connect the production workflow with downstream production services and 3rd party post vendors, with no compromise in security, scalability, or performance.

They smartly scale into any near-set or facility location, providing hundreds of terabytes to multiple petabytes of storage.

TRICK OF THE NIGHT

The Land debuted in the NEXT programme at Sundance 2016. Shot on a 22-day schedule at over 30 locations in Cleveland, *The Land* tells the story of one summer in the life of four teenagers who try to escape the grim reality of their surroundings through roaming their neighbourhood on skateboards.

DP Steven Holleran grew up as an outdoor-loving kid in north county San Diego, passionate about surfing, skateboarding, and nature photography. After graduating from Bowdoin College, Holleran won a Thomas Watson Fellowship and used the grant to fund a documentary feature about over-fishing in the South Pacific, travelling for a year to New Zealand, Samoa and Chile. He then built upon this incredible experience while attending USC's MFA production programme, where he met *The Land's* director and writer, Steven Caple Jr. We caught up with Steve Holleran after *The Land's* debut at Sundance.

How did you end up being the cinematographer for *The Land?*

Steven Caple Jr. and I became close friends at USC and I was able to read early versions of the script and hear his ideas. We developed a trust and a shared vision and about two years ago we shot a short in Los Angeles, *The Land of Misfits,* which captured the visual sense of the film we wanted to make. I had been shooting commercials since film school and this was the perfect opportunity to shoot my first feature.

Why did you choose to shoot ARRIRAW with the ALEXA as your main camera?

I knew from early on that I wanted to shoot anamorphic due to the format's unique depth of field and separation between foreground and background. It gave me the ability to draw the viewer's focus to the boys but also capture the essence of the world around them with all its texture, colour and light. The footage has a subtle dimensionality to it that separates the boys from their surroundings.

Because about 2/3rds of the movie takes place at night and we were on a very tight budget, I needed fast lenses so the ARRI/Zeiss Anamorphics were ideal. This naturally led us to want to shoot with the ALEXA XT Plus so we could take advantage of the 4:3 sensor. I would also be shooting handheld a lot so I needed a camera that was very comfortable on my shoulder. And again, because of all the night shoots and limited lighting budget, I knew that ARRIRAW would give me the latitude I needed to capture my vision and the flexibility to manipulate the image in the DI.

Tell us about shooting in Cleveland? That's a very different environment from Southern California!

I really feel that Cleveland is a silent character in the movie. There's grandiose architecture, abandoned steelyards and warehouses and neighbourhoods where every other house is empty. We did a three week location scout prior to the shoot and I stayed with Steven and his extended family. I really got a feel for the city, and the neighbourhoods Steven grew up in – we explored derelict warehouses, schools, and even an abandoned mall. At the end of the three weeks, we had identified almost all our locations and I had a really good sense of the environment that we wanted to capture. We found some amazing skateboarding locations – an 80-acre skate park in the woods called Skatopia, which really was a skate anarchists paradise – and an old disused warehouse that offered up some amazing skate opportunities. One of the benefits of shooting RAW with the ALEXA was the extra flexibility it gave me in terms of lighting in these locations.

How did you capture the scenes of the boys skateboarding?

It was important to the story to immerse the audience in the boys' world. I also wanted to evoke the feeling of freedom that skateboarding gave them, in contrast to their difficult everyday lives. I quickly realised that the best way to do that was to shoot them from a skateboard – in other words, I would skate behind them, next to them and in front of them.

My background as a surfer and skateboarder came in handy while shooting these scenes. The many hours I spent skateboarding in my youth were very useful. I had a special U-shaped top handle created for the B-Cam, which allowed me to hold the camera with both hands while I was on my skateboard. Steven and I decided to shoot a variety of frame rates up to 120 fps to give it a dreamlike quality.

What were some of the challenges of the shoot?

Some of our locations were very tight, which made shooting with anamorphics particularly challenging. One of them, Uncle Steve's Diner was incredibly narrow, making fitting the ALEXA, 4 to 6 actors and the crew, into a tiny space, very tough, but I think it was definitely worth it for the authenticity. Physically the shoot was also very difficult for me – I had a fully-loaded ALEXA PLUS on my shoulder, weighing around 40 pounds every day, and when I was shooting the skateboard sequences I was working with the RED DRAGON on my skateboard. And it was summer – temperatures were in the upper 80s with high humidity. At the end of every day I was drained! We also often had multiple location moves in one day, which was a logistical challenge, particularly with some of the locations – an almost inaccessible rooftop, a street festival and an abandoned subway are just some examples. In the end, having the opportunity to spend a large amount of time in pre-production living in and scouting a world I knew little about, gave me invaluable insight into the characters of our film and the motivations that made them tick.

The Land was picked up after Sundance by IFC and will be released theatrically in the fall.

SUCCESS STORY: THE LAND
CINEMATOGRAPHER: STEVEN HOLLERAN
RELEASE: 2016

"CODEX WAS ROCK-SOLID, NO MATTER HOW CHALLENGING THE ENVIRONMENT"

Steve Holleran, DP The Land

RADIANTIMAGES

As soon as you enter the new Radiant Images facility in Northeast Los Angeles, it is clear that it is far more than your regular camera rental facility.

Established in 2005 by Michael Mansouri and Gianna Wolfe, Radiant Images began as a production company, focusing initially on the automobile industry, but quickly growing into a full-service rental house. As early adopters of digital technology as production transitioned from film to digital, the company has differentiated itself by working with productions to develop solutions rather than just renting out a camera package, becoming in essence the technology arm of production companies.

Located on the 4.17-acre campus known as the Los Angeles Media Tech Center with 28,000 square feet of space, the new facility is more than double the size of their previous one and is the fourth expansion since their inception. The new facility features a huge camera prep area with an adjacent kitchen/lounge; ample parking; plus a dedicated wing housing Radiant's newly created VR division in partnership with VRLIVE, a virtual reality live-streaming network that delivers 360-degree content to any mobile device anywhere.

Already well-known for working with small cinema cameras and customising rigs, Michael Mansouri is always on the lookout for new technologies and business opportunities. He saw the potential of virtual reality (VR) and augmented reality (AR) early on and moved quickly to develop solutions that would work for productions of varying quality, difficulty and budget. In a move that shows how Radiant Images differentiates itself, he also hired a post supervisor, Shyam Kannapurakkaran, who works with producers to design workflows that ensure the transition from set to post in this daunting new environment is both seamless and efficient.

Radiant Images is also fortunate to have Sinclair Fleming on

"WE'VE DESIGNED SIMPLE SOLUTIONS – TEMPLATES REALLY – FOR VR PRODUCTIONS. CREATIVITY IS STIFLED IF THE PROCESS IS TOO COMPLICATED"

Michael Mansouri, Radiant Images Founder

staff as Director of Engineering. Fleming has years of experience developing cutting-edge products and oversees an on-site rapid prototyping capability that is a critical part of Radiant's ability to quickly provide tailor-made solutions for their clients.

Evidence of this is apparent in Radiant Images' collaboration with Headcase VR on a custom rig utilising 17 Codex Action Cams – the Headcase Cinema Quality VR 360. The request from Andrew Shulkind and Lucas Foster at Headcase seemed almost impossible – create a cinema-quality VR camera rig in less than a month. Mansouri and his team considered many camera options – the SI-2K, Indiecam, NOVO, Sony A7S and ALEXA Mini, amongst others. But all had something missing – some had limited dynamic range, others had no genlock, others were simply too big for this application.

Fortunately, Radiant Images knew of a camera that might provide an ideal solution – in fact, they already had one in their rental pool. The Codex Action Cam was the right size with great dynamic range, the ability to genlock and an established, reliable workflow. The design of the rig itself was an iterative process, requiring 27 revisions in a month and ending up with a rig that can produce stunning images backed up with Codex's solid media and workflow. Simple things like having matching timecode and metadata between all the cameras greatly simplify the post production process.

Following on from their successful collaboration with Codex, Radiant is now working with the Foundry on a Nuke plug-in. They are also involved with VRLIVE, who capture and distribute VR content for immersive experiences on multiple mobile platforms. VRLIVE's live streaming solution offers a 360-degree video stream, distributed to any smart phone, viewable as a 360-degree scrollable live-video or with a virtual reality headset.

CAPTURED ON
CODEX

ACTION CAMERA | VR CAMERA
WITNESS CAMERA | POV CAMERA

...the creative possibilities are endless

CODEXACTIONCAM

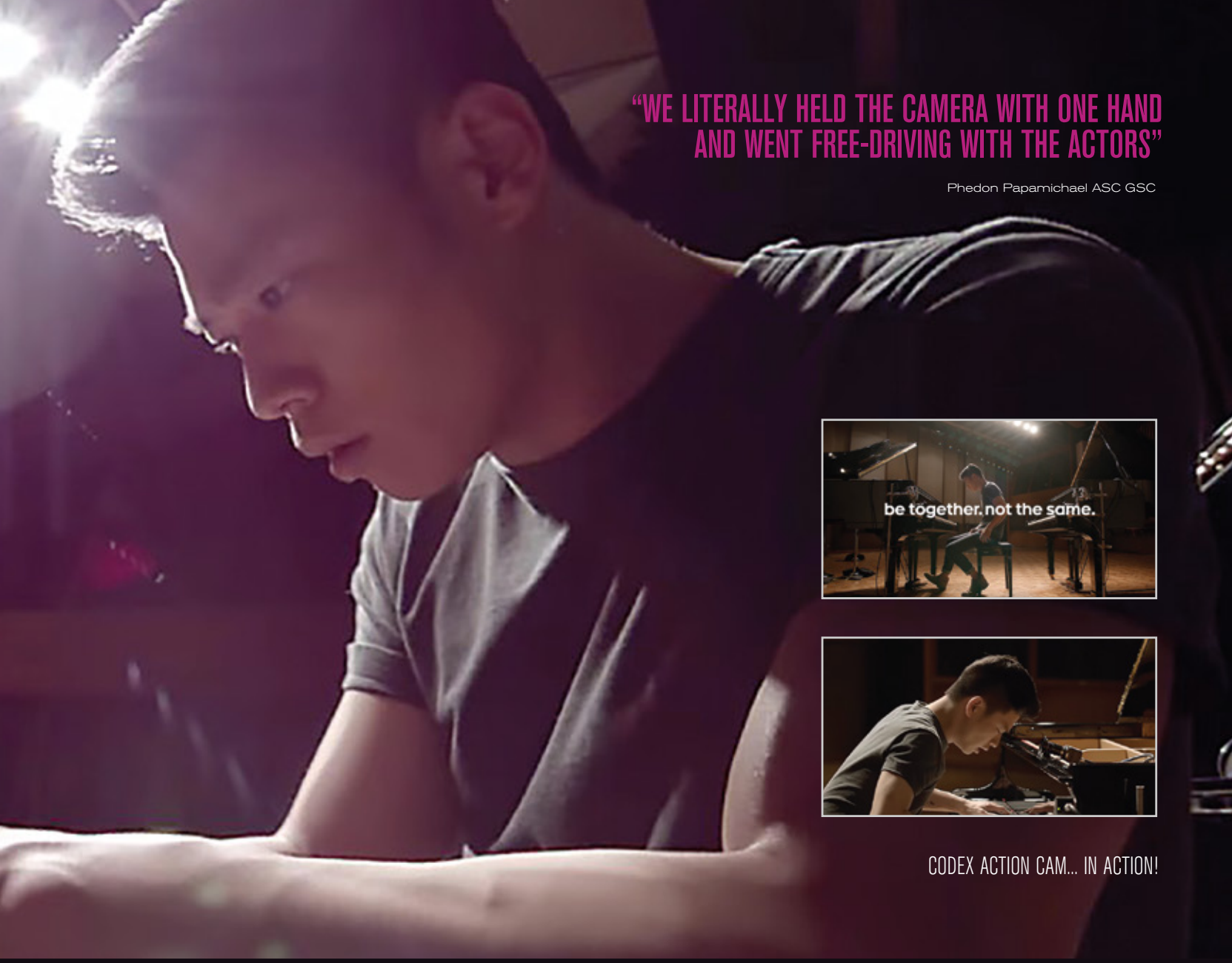
Phedon Papamichael ASC, Claudio Miranda ASC, Linus Sandgren, Robert Elswit ASC – these world-class cinematographers and more have already used Action Cam all over the world for feature films, commercials and promos, confident that the images will cut in seamlessly with other cameras without compromise.

Whether you're making commercials, TV or movies, sometimes your camera is just too big for the situation or location you're trying to shoot in. This was demonstrated on a recent commercial for Google's Android mobile platform, shot by Alwin Küchler, which has the advertising world buzzing.

Codex Action Cam itself is a tiny remote head camera for shooting at up to 60 fps but it's not just a camera – it's a complete shooting, capture, transcoding and data management solution for situations that require a compact form factor and low weight, without compromising on image quality. It comes packaged with the Codex Camera Control Recorder, providing full remote control of the camera plus the proven, industry-standard Codex workflow.

KEY FEATURES

> Lightweight and compact
> 2/3" Single Chip Sensor with global shutter
> Synchronises with ARRI ALEXA, Sony F65, F55, and F5
> Excellent high-definition image quality at up to 60 fps
> Wide dynamic range
> C-mount with EF, PL and B4-mount options
> Reliable and robust Codex recording and workflow



"WE LITERALLY HELD THE CAMERA WITH ONE HAND AND WENT FREE-DRIVING WITH THE ACTORS"

Phedon Papamichael ASC GSC

CODEX ACTION CAM... IN ACTION!

The ad, titled "Monotune," is designed to demonstrate the Android catchphrase "Be together. Not the same." The concept is to show a pianist playing the third movement of Beethoven's "Moonlight" Sonata on two different pianos – one a standard concert grand, and the other a purpose-built instrument on which each of the 88 keys sounds a single note – middle C. The message is that Android is superior due to its potential for customisation.

At the piano is Ji-Yong Kim, a native of South Korea and former child prodigy who was the youngest person ever to win the New York Philharmonic's Young Artist Competition. The spot first aired during the Grammy Awards telecast and also ran during the Oscars. To execute the spot, agency Droga5 turned to director Jonathan Glazer and cinematographer Alwin Küchler. The lighting and production design was intended to feel like a real rehearsal space – not fussy or fancy.

"We didn't want anything to feel glorious, or bombastic, or artificial," says Küchler. "We wanted a minimal feeling, so people would focus on the sounds and the player. Jonathan wanted to approach it almost like a scientific exercise. When he showed me the first test, I noticed that the pianist seemed to be more engaged and expressive when he played the correct piano, which makes sense. Responding to the music myself, I processed in my own imagination and came to the exact feeling we were trying to evoke from the audience."

The "scientific" approach meant that the filmmakers needed a camera that was as unobtrusive as possible, and yet delivered a high quality image. "We wanted very small cameras, in order to minimise interference," says Küchler. "We didn't want to surround the pianist with a lot of big cameras in his face. I also felt that a global shutter, as opposed to a rolling shutter, would be important on a piece where we were dealing with a lot of horizontal lines. The question was, what is the best version of the smallest camera on the market? After doing some research, we decided to go with the Codex Action Cam." Küchler used Action Cam with C-mount lenses with wider focal lengths including 12mm and 16mm. (Camera package by Keslow Camera) "The Action Cam allowed us to get camera positions we couldn't have gotten with any other camera," he says. "We used the ARRI ALEXA Mini from angles that were further away, but with the Codex, we were able to get a shot from the space between the piano player's face and the keyboard. We were able to get emotionally close to the pianist, which was very important to Jonathan, without the distraction of other cameras in the shot."

Küchler's next assignment is to photograph Jamaican sprinter Usain Bolt, the world's fastest human. He is planning to use the Codex Action Cam again on that project. "I love the idea of putting a camera down on the floor while he's doing push-ups, for example," Küchler says. "Once you get a good quality picture with a spatial impact that is that small, it becomes interesting. You can try out new things. And it feels less intrusive for the actors. People respond to it differently. It's not a massive camera staring at you from ten inches away. If you are an artist or an athlete, you can forget about it and focus on your own process. And that is a wonderful thing."

CODEX + CANON

Having entered the professional cinematography market with a bang a few years ago with the Canon EOS C300 and C500, Canon continues to build on their success with the second generation EOS C300 Mark II.

Codex is proud to continue to support Canon with Codex recording systems already used by leading cinematographers like Stephen Poster ASC *(Amityville),* Rodrigo Prieto ASC *(The Human Voice)* and Shane Hurlbut ASC *(Need for Speed, Fathers and Daughters)* as well as going into space on the International Space Station for the production *A Beautiful Planet,* directed by Toni Myers with DP James Neihouse ASC. All the C500 footage captured on Codex Capture Drives for *A Beautiful Planet* was safely delivered back to Earth and the movie will be released by Disney and IMAX on April 29th.

Codex fully supports Canon's new XF-AVC format - an MPEG-4 AVC/H.264 video compression format which provides a high data compression rate without sacrificing image quality. Combine this with an efficient, reliable workflow, and you have a scenario ideal for productions of every size and budget. Codex Production Suite on a MacBook Pro is a fully-featured dailies and archiving system in a small footprint that can travel wherever you need to be.

CODEX PRODUCTION SUITE

With CDL-based colour grading, metadata tools, QC and audio sync, Codex Production Suite has everything you need to produce a full range of deliverables on-set or near-set. Add Codex Live for on-set CDL-based look management that syncs seamlessly with Codex Production Suite. For archiving, add a Codex Thunderbolt LTO-6 drive. And it all connects seamlessly to Codex Backbone so that production elements and metadata can be securely accessed, viewed and edited by authorised users.

SUCCESS STORY: FATHERS AND DAUGHTERS
CINEMATOGRAPHER: SHANE HURLBUT ASC
RELEASE: 2016

RAWEMOTION

Shane Hurlbut ASC really put the pairing of the Canon C500 and Codex Onboard Recorder through its paces on *Need for Speed.* Although *Fathers and Daughters,* directed by Gabriele Muccino and starring Russell Crowe and Amanda Seyfried, couldn't be more different, Shane again decided to rely on the C500 and Codex Onboard S Recorders.

What attracted you to *Fathers and Daughters?*

I was aware of the script – it had been on the black list for a couple years. When I read it, I was crying by page 30 – I have a daughter and it's a particularly emotional experience for the fathers of daughters. I found the dialogue and relationships to be so realistic and once the amazing cast was onboard, I knew that I had to shoot it. Gabriele, the director, was incredibly well-prepared – he had broken down the script into shots and embedded them into the script. Every person working with this script knew the vision and the size of that vision. It really was one of the most economical, organised shoots I've ever experienced. Richard Middleton, our Line Producer, really put it all on the screen for us.

How did you decide which camera to use?

I'd used the C500 shooting RAW to the Codex Onboard Recorder on *Need for Speed* so I was very familiar with it. It's unlike any other digital camera – the sensor seems to energise light and I love the saturated colours that it renders. I like to describe the look as real but turned up to 11.

Tell us how the cinematography advances the story and characters?

Fathers and Daughters features two actresses playing the same character – Kylie Rogers plays the young Katie Davis and Amanda Seyfried plays the grown-up character. I wanted to use the camera and look to accentuate the difference. In the scenes with the young Katie, I wanted to show the world through her eyes, a child's eyes, seeing everything warmer and colder than it actually is. For Amanda's scenes, I wanted the camera to be like her character, always moving, slightly unsettled. Freefly's MoVI system was the obvious choice because Buzz Moyer, our A Camera operator, Eric Swanek our key 1st AC and I could be close and immersive without restricting the movement of the actors. We often shot with three cameras, meaning we could capture the performance then and there. It took a bit of extra time to light but it paid off in shorter days and freed up money that I could spend on lights.

What about the colour pipeline and DI?

I used minimal LUTs on-set – around 6 in total. I really believe that the digital mags should be treated like film negative and sent to a lab. We did the DI at LightIron in New York and again our pre-planning really paid dividends – we finished the DI in 4 days. The colourist, Sean Dunckley, had never worked with C500 material before but it was an easy introduction - we made minimal adjustments, tweaking the blacks and cranking the contrast.

"CODEX RECORDERS ARE MY GO-TO DEVICE FOR THE C500 - THEY ARE TRIED AND TRUE"

Shane Hurlbut ASC

So what's next?

I've been shooting a TV series for AMC called *Into The Badlands*, with David Dobkin and Guy Ferland as directors and Al Gough and Miles Millar as creators, but my next project is a Chinese-language movie called *The Adventurers* with Stephen Fung directing who had directed the fight unit on *Into the Badlands*. It's a heist film, shooting all over the world, and I'm really excited to take on this challenge. I'm going to use RED DRAGONS with Cooke S4 lenses.

And Shane's Inner Circle continues to grow and grow. "I'm passionate about mentoring and teaching and it gives me a way to reach out to people around the world who want to learn about filmmaking." To learn more, visit hurlbutvisuals.com/blog/shanesinnercircle.

SUCCESS STORY: TRUMBO
CINEMATOGRAPHER: JIM DENAULT ASC
RELEASE: 2015

BLACKLISTED

Trumbo dramatises the story of blacklisted Hollywood screenwriter Dalton Trumbo, the storyteller behind dozens of cinema classics including *Roman Holiday, Spartacus,* and *Papillon.*

With Bryan Cranston in the lead, director Jay Roach and cinematographer Jim Denault ASC sought to present the communist-obsessed world of the 1950s without a period patina. Still, the story called for a number of specific looks that transition from flat-lit archival footage to more modelled portrayals of those situations, and from 50s-era movie sets to recreations of the hard-light look of those films. The goal was to evoke the period without making the images look old. All in all, it was a visual feast for a cinematographer.

"CODEX VAULT SEEMS TO MAKE IT FOOLPROOF. IT JUST HAPPENS. IT KEEPS TRACK OF EVERYTHING"

Jim Denault ASC

"It was a chance to do something very old school, and it was fun," says Denault, whose credits include *Boys Don't Cry, Maria Full of Grace, The Believer, Recount* and *Game Change.* "There's a certain clarity when you're shooting with hard light. It brings things more into relief, and a character like *Trumbo* and an actor like Bryan can take it. In most situations, that wouldn't fly today. What amazes me about the hard light portraits of women from the golden age of Hollywood – we all know George Hurrell's work – is how careful they had to be, and

how wrong you can go. It really looks great, but in a very unnatural way."

Denault referred to a book titled "Hollywood in Kodachrome." "It wasn't how the Kodachrome rendered colours, but rather what people did with colour in the backgrounds, the lighting and the costumes," he says. "I was searching for a way to make that fit in with our approach to this project."

The aspect ratio would often change depending on what was being shot – 1.33 for the House Un-American Activities Committee meetings, Cinemascope for the *Spartacus* recreations, and 1.85 for the majority of the film. Denault cooked up LUTs for each situation with dailies colourist Justin DeLong. Those were applied to the images the filmmakers were seeing on the set.

"That starts the conversation, basically," says Denault. "It's helpful that from the very beginning, everybody's looking at that approximation. I don't tend to use an on-set DIT for movies, because there's too much other stuff to worry about aside from what is essentially grading the dailies."

The cameras were ARRI ALEXA XT Plus models with Cooke S4 glass. The Codex Capture Drives were offloaded using Codex Vault on the camera truck. Then the Capture Drives went to Technicolor, and when the images were verified, Vault could be cleared. Denault says this procedure mirrors most closely that of the standard film shoot.

"When you're shooting ARRIRAW, there's so much data that you can't just quickly make a bunch of copies and send them everywhere," says Denault. "There's a whole time and data management issue when you're handling that many digits. But Codex Vault seems to make it foolproof. It keeps track of everything."

Denault is working with the same loader, Dan McKee, on the job he's doing now, an untitled Jon Lucas and Scott Moore comedy with Mila Kunis and Christina Applegate, where he is also using the Codex system to record ARRIRAW.

> "WITH THE COLOUR DEPTH OF RAW, WE WERE ABLE TO GET MUCH MORE PLEASING SKIN TONES VERY QUICKLY"
>
> Jim Denault ASC

"When people used to ask me about the film inventory, I used to make a joke," he says. "I visualise the film as one continuous roll that comes out of the door at Kodak, runs through the camera and goes to the lab. It gets broken up into thousand-foot pieces, but I don't really think about that – that's for the camera assistants to think about. With the Codex drives and Vault, it's kind of the same thing. There's a continuous back and forth with the actual physical magazines, but I try not to worry about that too much. It's been that way since my first Codex shoot, which was *Game Change*."

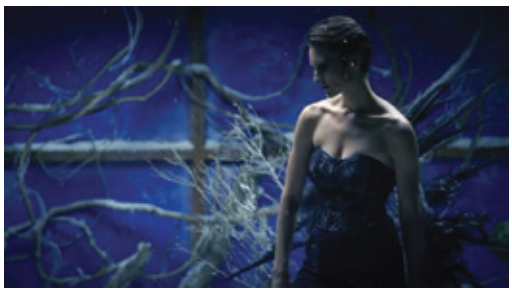
During the prep for *Trumbo,* there was some consideration of shooting in ProRes, the main concern being the amount of data recorded with ARRIRAW. The biggest proponent of ARRIRAW was David Johnson, Roach's longtime visual effects supervisor. He was concerned about the quality of the compositing that was necessary. Scenes in the HUAC Caucus Room were a primary example. The foreground action was shot against green screen, and the background plates were stills that the production took in the Cannon Caucus Room, in Washington, DC, after obtaining permission from then-Speaker of the House John Boehner.

Denault says, "I've done a couple of features on ProRes at the request of the post production supervisors, and I was under the impression that the differences between that and ARRIRAW were subtle. However, the colour correct for *Trumbo* was so much easier than any of the ProRes DIs I've done. With the colour depth of RAW, we were able to get much more pleasing skin tones very quickly. Doing the colour correct just felt completely different."

The various looks that had been established with the LUTs were perfected in the DI. "You have more time to focus on less material, and there are so many amazing tools that allow you to adjust for different parts of the frame," says Denault. "I know some people are purists about post production controls, but I started out as a still photographer, and when I began shooting movies, I missed the control I had in the darkroom – the ability to dodge and burn and selectively diffuse parts of the image. Now I can have that degree of control on movies. For me, it's not cheating. It's another tool to control and interpret the image. Photography is not reality. It's an interpretation of the world, no matter how transparent you're trying to be."

After *Trumbo,* Denault went on to shoot *All the Way,* an HBO film about Lyndon Johnson also directed by Roach and starring Cranston. Along with David Johnson, Denault again pushed for ARRIRAW. "HBO was worried about the amount of data, but we were able to convince them that the cost of the additional storage was modest compared to the advantages to the visual effects artists and DI colourist," says the cinematographer.

Trumbo was a project that Denault could really sink his teeth into. "It's one of the things I've done recently that I'm most proud of," he says. "It's a serious drama, which is where I started my career. I've wanted to get back to that kind of material. I really enjoyed working with Bryan and Helen Mirren and Diane Lane and Elle Fanning. The performances were all amazing. There's nothing wrong with disposable entertainment, but it's good to feel you're doing something worthwhile."



VARICAM

PANASONIC VARICAM 35 WITH CODEX V-RAW RECORDER

4K is now a viable consumer entertainment platform, particularly in the home where content providers like Amazon and Netflix are streaming 4K content to 4K televisions. For acquisition they are mandating that programming is acquired in 4K or higher resolution wherever possible. For Netflix Originals, for example, there are very specific requirements. The camera image sensor must support a true resolution of 4K/UHD and the image data must be RAW. This means that only the Sony F55 and F65, RED DRAGON, ARRI ALEXA 65 and Panasonic VariCam 35 are approved. For *The OA,* a one-hour original drama series from creative team Zal Batmanglij and Brit Marling *(The East),* the production team decided to use the VariCam 35 and the Codex V-RAW recorder.

Panasonic has really stepped up to the plate with their 4K digital cinematography camera, the VariCam 35. Even if HD or 2K are your delivery format, acquiring in 4K RAW or higher produces stunning imagery, plus your content is future-proof.

The Panasonic VariCam 35 camera is a 4K camera with a newly developed Super 35 image sensor and a modular design. The sensor size is 4096 x 2160 (17:9) for 4K image capture. With 14+ stops of latitude, this new image captures high-contrast, wide dynamic range imagery without compromise with the V-RAW format. To maximise the dynamic range of the recorded images, Panasonic has developed a new log curve (V-Log), which maps the 14+ stops of image data to the recorded file.

"ONE OF THE MOST CHALLENGING PARTS OF SHOOTING *THE OA* HAS BEEN THE NEED TO CAPTURE THE NIGHT EXTERIORS USING ONLY AVAILABLE LIGHT. THE CODEX V-RAW RECORDING SYSTEM FOR THE VARICAM 35 WAS THE BEST SOLUTION"

Matt Selkirk, DIT

Panasonic of course turned to Codex for recording the uncompressed 4K V-RAW output at up to 120fps, as well as to provide an efficient, industry-standard workflow for on-set and near-set dailies, review and archiving. Taking advantage of the VariCam 35's modular design, the Codex V-RAW recorder bolts on the back of the camera, eliminating the need for any cables. Power is supplied to the camera via the recorder and the recorder also has three 12V accessory power outlets, adding flexibility and usability to the camera/recorder combination.

CODEX V-RAW RECORDER

The V-RAW recorder for the VariCam 35 continues Codex's tradition of providing not just the most reliable recording and media, but also a streamlined workflow from production to post and archive for features, commercials and television. Specifically designed for the VariCam 35, with more than enough bandwidth to handle 4K at up to 120fps, the V-RAW recorder records onto Codex Capture Drive, the highest-performance, commercially available media.

SPECIFICATION

Interface	Direct Attach Module	Control	Camera
Recording Media	Codex Capture Drive® (1 TB or 2 TB)	Maximum Frame Rate	120fps uncompressed RAW
Recording Formats	4K RAW, 4K UHDTV RAW, uncompressed 12-bit up to 30fps, 10-bit beyond 30fps up to 120fps	Metadata	Camera metadata only
		Weight	3.3lbs (1.5kg)

CODEX CAPTURE DRIVE®

Capture Drive (available in 1 TB and 2 TB capacities) is designed around PCIe-based flash to deliver the fastest solid-state media available for professional media applications. It combines ultra-high performance solid-state storage with production reliability in a compact package.

> 1 OR 2 TB OF MEMORY DELIVERING UP TO 20 GB/S BANDWIDTH
> ENGINEERED BY CODEX TO THE HIGHEST PERFORMANCE STANDARDS
> ADVANCED THERMAL DESIGN > RECORDS UNCOMPRESSED 4K RAW AT UP TO 120 FPS FROM THE PANASONIC VARICAM 35

The Codex Capture Drive is the gateway to the production-proven Codex workflow through Codex's Production Suite, a fully-featured suite of tools for dailies, review and archiving, available on Mac Pro and MacBook Pro as well as Codex S-Series and XL-Series hardware platforms. Vault is used around the world by all kinds of productions, on-set, near-set or in post production facilities and backed up by our world-class 24-hour support team.

CODEX COMPLETE WORKFLOW

Codex also provides a rock-solid workflow for Panasonic's AVC-Intra format as well as RAW so when you shoot with the VariCam 35, you don't need anything else. QC your images, clean your metadata and archive your RAW or AVC-Intra files, and then quickly transcode to whatever deliverables you need. Each format can be generated with and without LUTs and burn-ins as required, and with all the associated sidecar formats and metadata. Codex Production Suite includes look management with primary CDL-based colour grading plus a simple but sophisticated audio sync tool.

Add full integration with Codex Media Vault via Codex Backbone and you can smoothly manage your production from the set into post and VFX.

CODEX WORKFLOWS

No matter what camera you shoot with or what media you use, simplify and safeguard your workflow with Codex. From production to post with no fuss.


ARRI ALEXA XT/SXT/65


ARRI AMIRA


ARRI ALEXA Mini


Codex Action Cam


Canon C300 Mark II/C500


GoPro


Canon C300 Mark II/C500


Phantom Flex 4K


Sony F5, F55, F65


RED WEAPON/DRAGON


Panasonic VariCam 35

MEDIA


CODEX CAPTURE DRIVE


SxS PRO CARD


PANASONIC P2 CARD


AXSM CARD


CFAST 2.0 CARD


RED MINI MAG

BACKBONE AWARE


CODEX XL-SERIES

HD-SDI LOG

CAMERA VIDEO OUT


LUT BOX

HD-SDI LOG


OMOD FOR RED

HD-SDI LOG + LUT

DIRECT CONTROL FROM VARICAM AND XT

BACKBONE
AWARE

NEAR-SET/PRODUCTION

CODEX MEDIA VAULT
[CAN CONNECT TO MEDIA VAULT LIBRARY]

CAMERA ORIGINALS
& METADATA

ON-SET CLONE & ARCHIVE

CODEX TRANSFER DRIVE

SYNCHRONISED METADATA

LOOK, TIMECODE, EL, CDL
VIA CODEX BACKBONE

HD-SDI LOG + LUT

ON-SET MONITOR
CALIBRATED

CODEX COLOUR CART

BACKBONE
AWARE

LUT + TC WIFI

iPAD

CAPTURED ON
CODEX

COUNTRY TONES

For a cinematic biography of Hank Williams titled *I Saw the Light,* master cinematographer Dante Spinotti ASC AIC teamed with director Marc Abraham. Abraham moved into the director's chair after a stellar career as a producer going back to 1991's *The Commitments* and encompassing dozens of memorable films. Spinotti's amazing C.V. reaches back forty years and includes two Oscar nominations, for *L.A. Confidential* and *The Insider.*

All this cinematic acumen was focused on the tragic life of a country singer whose influence is everywhere in popular music. Williams brought hillbilly music to the masses through recordings, relentless touring and a unique talent for writing and performing direct, affecting songs. The tremendous fame he generated was a harbinger of today's celebrity culture, and *I Saw the Light* chronicles the toll it took on his personal life – Williams died in the back of a car on New Year's Day 1953, on the road between gigs, at age 29.

"Because of the subject matter, it's a very important film for me," says Spinotti. "It's about a musician, a tormented individual who inspired so many people around the world with his incredible songs. Marc and I prepared over two or three years, and it was a great pleasure to work with a friend on such a fascinating project. Marc has a great sense of humor and makes decisions in a very cooperative and collaborative way. We had to move fast – we shot it in about eight weeks, on a huge number of locations with great flavour."

"THANKS TO THE WIDE DYNAMIC RANGE OF THE ALEXA, ARRIRAW AND CODEX, THE RESULTS ARE REAL AND BEAUTIFUL"

Dante Spinotti ASC AIC

The locations included a number of old theaters and barn dance locales in Nashville, Shreveport and elsewhere. Visual effects techniques were used at times for period accuracy and audience enhancement. "The way Merideth Boswell transformed the locations, and Lahly Poore made the costumes, they went beyond the idea of shooting a film with a period setting," Spinotti says. "They were adding a beauty of their own that is timeless."

Spinotti is known as a fan of anamorphic, and in this case, the

layout of the bands and the stages fit with wide frame, and later, it helped in conveying Williams' loneliness, which he referred to endlessly in his songs. Rather than presenting the story with filmmaking techniques that echoed those of the era, Spinotti and Abraham chose to tailor the film to the sensibilities of today's audiences. That meant multiple cameras – usually two ALEXA XTs. There was never any filtration aside from the occasional internal ND.

"We used visual language that can be achieved in a feature film today, meaning we made full use of the ALEXA and other tools, including the sensitivity in the shadows," says Spinotti. "The camerawork is very agile, moving with our actors, Tom Hiddleston and Elizabeth Olsen, who are both extraordinary performers."

The approach extended to colour, contrast and lighting. Spinotti used modern sources rather than seeking out period lighting fixtures.

"A follow spot is a follow spot," he points out. "But we used the modern fixtures in a way that could be believable for the period. I did use a number of China heads, which you often see in black and white photography of the time. They deliver a very sharp light coming down. I had the inside of the lamps painted black so that only the filament was creating light on the characters."

The lenses were Panavision G-Series anamorphics that were detuned almost imperceptibly by Dan Sasaki, Panavision's lens guru. The modifications weren't designed to render a less modern look, but to mitigate some of the digital edge and to integrate the imagery more seamlessly with footage shot on anamorphic zooms, of which there were several, including an Angenieux lightweight model.

"I'm not trying to imitate the look of film – I don't care about that," Spinotti says. "But if the digital technical surface comes out in the images, it's not a good idea. I'm happy with the autonomous particularities of these G-series lenses."

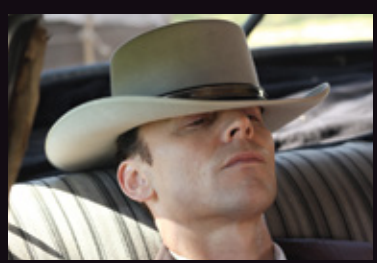
In an older New York City location where an interview was filmed, Spinotti used a technique he borrowed from *Eyes Wide Shut,* the Stanley Kubrick film. "We made frames with hundreds of tiny Christmas lights strung on them, which cast a soft fill light that is almost invisible," he says. "It's not movie lighting, and it has a Spartan quality – it's very beautiful on the skin of the actors. We had table lamps, and we enhanced that only with a Chimera with a very sharp crate that added a little light on the close-ups.

"Then we pushed the cameras to higher speeds – 1600, 3200, whatever it took to achieve the result," he says. "Thanks to the wide dynamic range of the ALEXA, ARRIRAW and Codex, the results are real and beautiful. They have all the qualities I look for.

"I try to shoot with ALEXA and Codex on most projects," he says. "You can compromise on a lot of things – you can be

"IT USED TO BE THE RIGHT FILM, THE RIGHT LAB, THE RIGHT CAMERA. NOW IT'S THE RIGHT RECORDING SYSTEM..."

Dante Spinotti ASC AIC



fast, and you can simplify your lighting system – but you need to have the basic aspects completely reliable. It used to be the right film, the right lab, the right camera. Now it's the right recording system, an optimised workflow and the colouring system. When that is reliable, you can make other compromises without worry, and in so doing, create the quality of the movie."

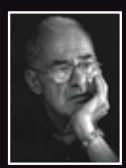
Spinotti works on the initial colour and contrast on the set, between setups, with his DIT Daniele Colombera. He says that this process helps make the final colouring smooth and efficient, saving time and money in post. Columbera's setup used a DP Lights 2 system in collaboration with Technicolor, software to which Colombera contributed design input.

"That was the software used by EC3 to finalise dailies near-set," says Colombera. "It was a top-notch, seamless colour pipeline. We were able to see the images on a big plasma screen and also, occasionally, on projectors in theatres in 2K and 4K formats. Before the movie started, we projected some selected shots and everything we were seeing on the big screen and on the plasma matched exactly with the final colour Dante wanted on the set. That's the way Dante likes to work – he does very intensive colour on-set. He pretty much treats on-set colouring as a DI. I deliver the CDLs to the lab and often they don't even have to tweak it. That serves as a starting point for the final DI."

Colombera prizes simplicity in the workflow. "I find that when it comes to software for cinema applications, you pay for simplicity," he says. "That way, you're not getting the manual out every two seconds. You spend some time learning it, but you don't have to become a nerd to use it. The knowledge of the DIT can be more about helping the director of photography bring the images to life, rather than dealing with strings of computer code. When it comes to workflow, the simpler, the better.

"With Dante, he doesn't want to get deep into the technical aspects of it," says Colombera. "I deal with that, and he creates the look of the movie. I'm there to convey it. Dante loves anamorphic, so as soon as the 4.3 ALEXA was available, it became the go-to camera for him. He could deploy the same lenses he used for film, chosen according to the project, so it was a natural transition. He could get the best quality and still get the anamorphic picture he was used to – the best of both worlds."

I Saw the Light made the rounds on the festival circuit, where Spinotti's cinematography was widely praised, and was released on March 25, 2016 by Sony Pictures Classics.



SUCCESS STORY: I SAW THE LIGHT
CINEMATOGRAPHER:
DANTE SPINOTTI ASC AIC
RELEASE: 2016

APPLETONASCENDING!

From film loader to the ASC Awards in a few short years, Ben Appleton is one of the UK's top DITs, working with cinematographers like John Toll ASC and Phedon Papamichael ASC on some of the biggest budget movies shooting in the UK. We caught up with Ben early in 2016 in Los Angeles.

How did you get to where you are today?
I started working at Visual Impact, a Sony dealer. I became the key technician going out with the F900 camera. I quickly realised that I preferred the on-set life so I started working as a film loader on TV shows and then movies. When the digital revolution happened, I was well-positioned to become a DIT. One of my first projects was working with Darius Wolski ASC on *The Counselor* and then I worked with John Toll ASC on *Jupiter Ascending.* Now I have a few 1st ACs that I work regularly with – Olly Tellett and Dave Cozens to name a couple. I also first worked with Will Gardner on *The Counselor* and *Jupiter Ascending* and he's worked with me as my data wrangler ever since. The last three movies I did were with Olly. I was fortunate enough to work the whole of 2015, moving from *Now You See Me 2* to *The Huntsman* to *Assassins Creed.*

When did you first come across Codex?
I was working on commercials using the ALEXA plus Codex Onboard Recorder combination. Then on *Jupiter Ascending* I came across the ALEXA XT which was a revelation because the Codex recording engine was inside the camera.

How's your experience with Codex been?
Codex's support team are superb – always straight back to me with an answer to my questions. I now own a Codex Vault

> "WITH THE NEW PRODUCTION SUITE SOFTWARE, I HAVE EVERYTHING I NEED FOR ARCHIVING, REVIEW AND DAILIES"
>
> Ben Appleton DIT

myself. With the new Production Suite software, I have everything I need for archiving, review and dailies. It's the ideal solution for the massive amount of data that is being generated on-set nowadays. On *Assassins Creed* we generated at least 9-10 TB per day and 22 TB on the biggest day. No other system could handle that volume so efficiently – we were done 30 minutes after wrap every day.

Do you have any mentors?
I love being on set and the collaboration between everyone on a movie project. I've been fortunate enough to work with several incredible cinematographers that I consider to be mentors – John Toll, Phedon Papamichael, Peter Deming, John Mathieson and Mark Patten – to name a few.

Tell us about a particular movie that was challenging but enjoyable.
Assassins Creed gave me the opportunity to work with Adam Arkapaw, a very talented young DP, and the great team he had assembled for this challenging project. We worked in some difficult locations – the tops of old, historic buildings in Malta for example – and pushed the envelope of what could be achieved, sometimes filming four or five massive stunts in one day. We used a combination of ALEXA XT and ALEXA 65 – 65 for the modern day scenes and XT for the historical sequences. There were new challenges every day, along with vast amounts of data, but it was an amazing project to be involved in.

How is the role of the DIT evolving?
I am becoming more involved in the digital intermediate process. I like to see a job through from beginning to end and understanding the DI helps me to make better decisions up front.


L to R: Ben Appleton Mike Green C Camera Focus, Tobias Eedy B Camera Focus,, Mark Deasey DIT Second Acc

Ben Appleton with Phedon Papamichael


On-set for The Huntsman

CODEX FILMOGRAPHY GUARDIANS OF THE GALAXY, JUPITER ASCENDING, VICTOR FRANKENSTEIN, THE HUNTSMAN: WINTER'S WAR, ASSASSIN'S CREED.

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