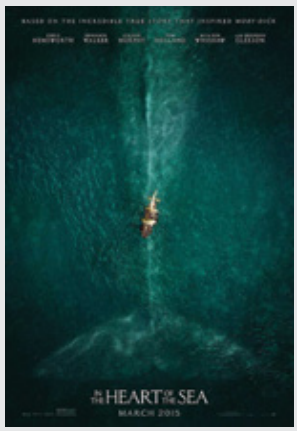
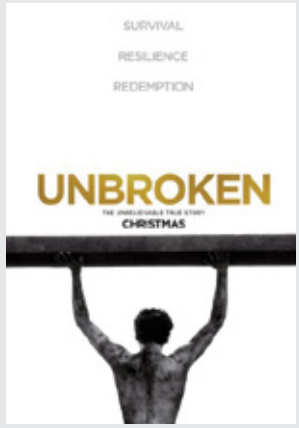
C O D E X

2015 - ISSUE 6

AGENT CARTER
BIRDMAN
WOMAN IN GOLD





CAPTURED ON
CODEX

LINE UP ISSUE 6

Captured on Codex 02
Codex Upfront 04
Feature: Agent Carter 05
ALEXA 65 08
The 65mm Interview 09
ALEXA SXT 10
ALEXA Mini 11
Feature: Woman in Gold 12
Codex Action Cam 14
Feature: Sum of Histories 16
Panasonic + V-RAW 18
Feature: Birdman 20
Codex Review Live 22
Feature: Into the Storm 24
Codex Backbone 26
Feature: Selma/A Most Violent Year 28
Feature: Don't Grow Up 30
Codex Vault 32
Codex Review 35
Workflow 36
Storage/Archiving 38
Feature: Codex in Space 42
Canon C300 Mk II 44
Captured on Codex 45

WHO TO BLAME

Editorial Team and Contributors: Marc Dando, Sarah Priestnall, Brian Gaffney, Jurgen Kantenwein, 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.

U P F R O N T

First off, congratulations to Emmanuel 'Chivo' Lubezki ASC AMC on account of his Oscar, Bafta and ASC award success for Best Cinematography in 2015 for his work on *Birdman,* which followed the same trio of prestigious prizes in 2014 for his work photographing *Gravity.*

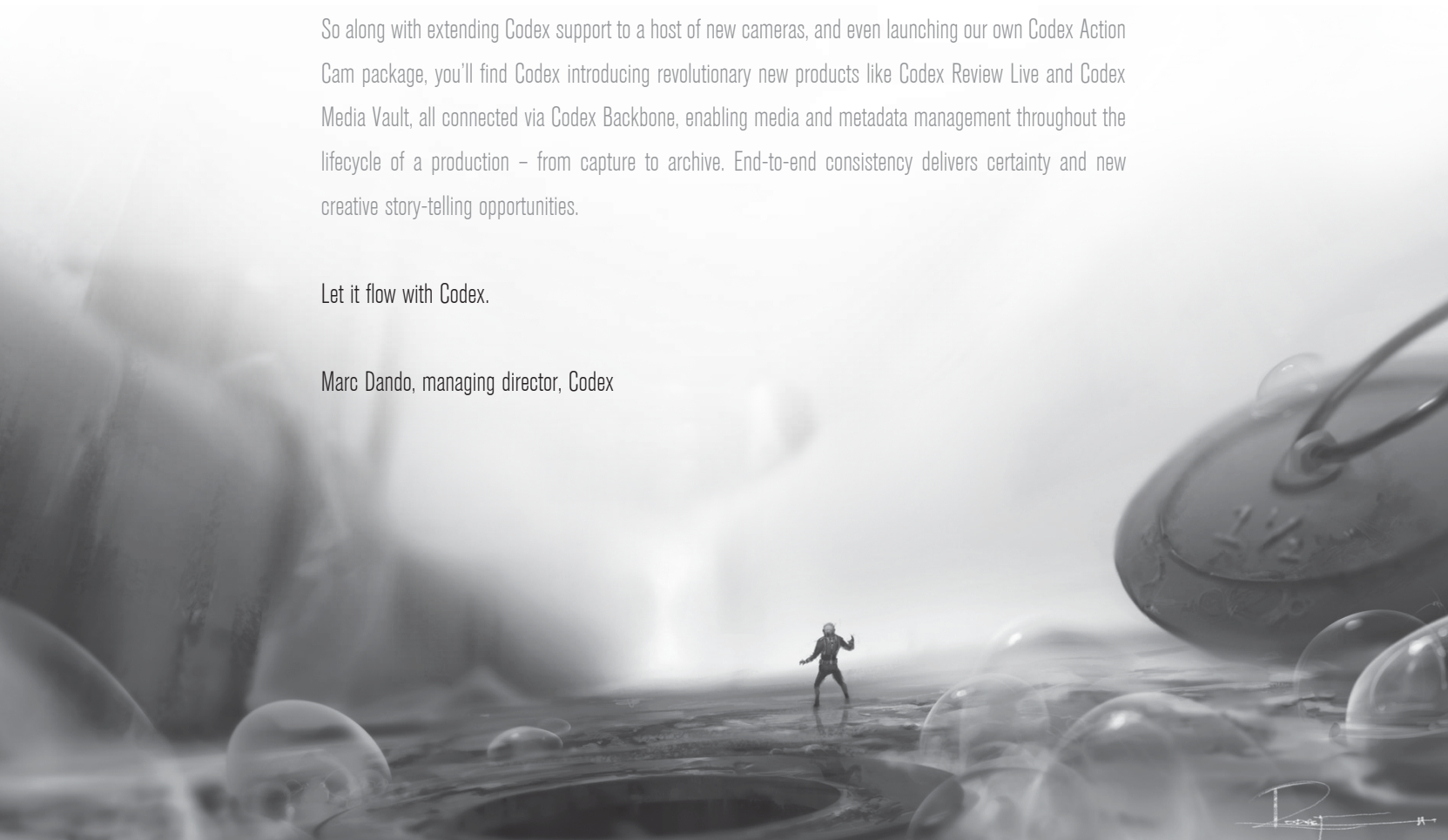
This year in fact, Codex supported 14 motion pictures, variously nominated for best picture, cinematography and visual effects – covering the wide variety of budget-conscious art-house independent features to effects-laden Hollywood blockbusters. We congratulate those filmmakers and thank each of them for relying on Codex.

Whilst we continue to advance and refine the Codex capture and production experience, we work with our eyes on the future. From engaging daily with film and television cinematography professionals in their pursuit of on-screen excellence to helping directors and producers create amazing content efficiently and cost-effectively, we strive to raise the bar for quality and productivity. We know that vital metadata must flow as quickly and efficiently from set as the raw digital negative. And of course, this data must be sent securely.

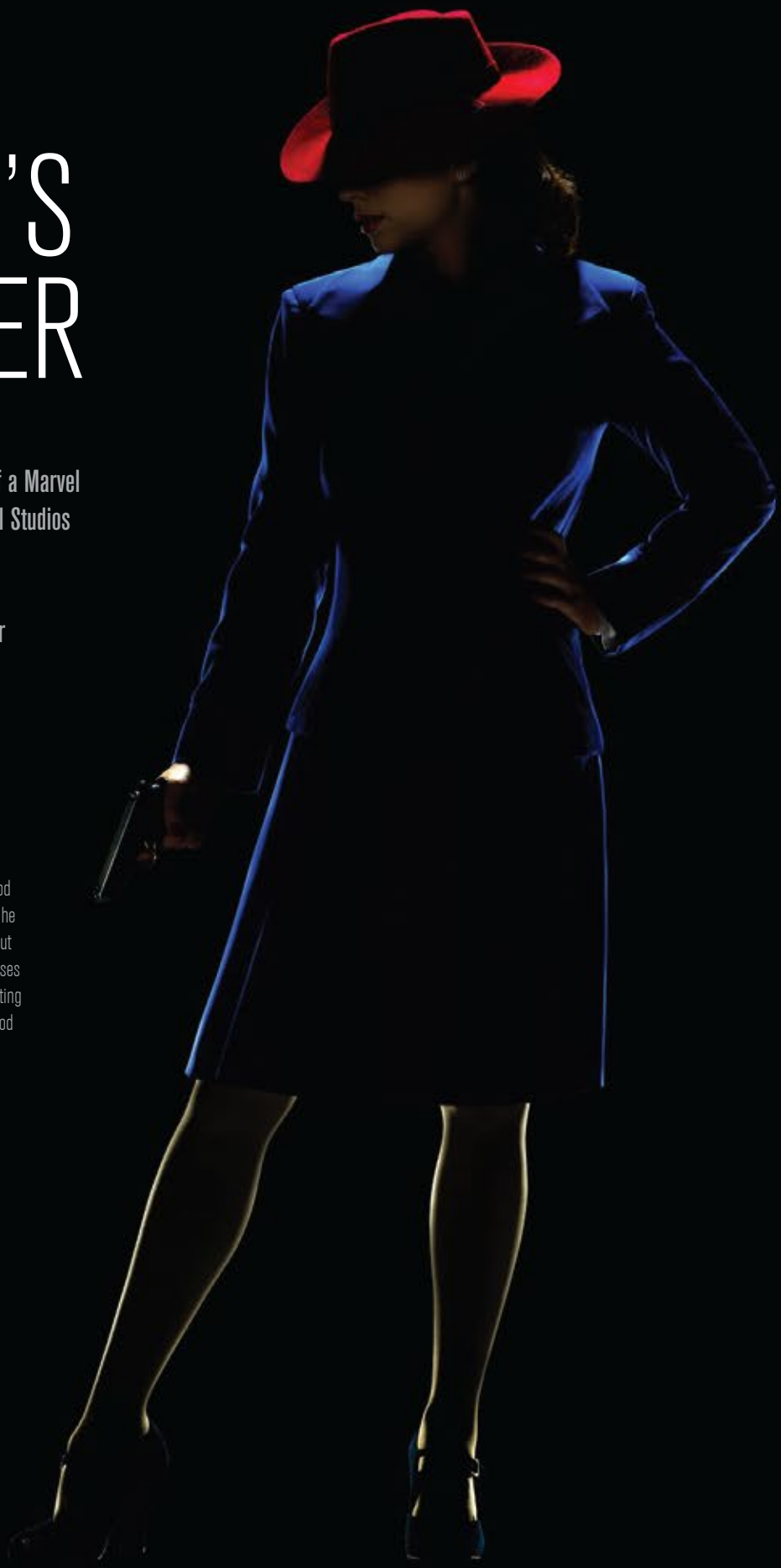
So along with extending Codex support to a host of new cameras, and even launching our own Codex Action Cam package, you'll find Codex introducing revolutionary new products like Codex Review Live and Codex Media Vault, all connected via Codex Backbone, enabling media and metadata management throughout the lifecycle of a production – from capture to archive. End-to-end consistency delivers certainty and new creative story-telling opportunities.

Let it flow with Codex.

Marc Dando, managing director, Codex



NET VISION FOR MARVEL'S AGENT CARTER



The ABC television series Marvel's *Agent Carter* grew out of a Marvel One-Shot, part of a series of short films produced by Marvel Studios and designed as brief, self-contained stories that provide additional background for feature films that take place in the Marvel Cinematic Universe. The project brought together director Louis D'Esposito, star Hayley Atwell, director of photography Gabriel Beristain ASC BSC and visual effects supervisor Sheena Duggal, a quartet that would eventually reunite when the series was greenlit.

Beristain saw a project he could sink his teeth into. Set in the 1940s, with a strong woman at the centre of the drama, the show offers a rich tapestry for period production design and photography. Beristain considered using vintage lenses, as he had on the visually distinctive series *Magic City,* which was set in 1950s Miami. But for a series with more action, he chose the flexibility and consistency of Leica lenses softened with nets made of Dior silk stockings. Combined with classic beauty lighting techniques, the result is a striking look that hearkens back to the elegant Hollywood cinema of the 1940s, while simultaneously packing a punch. The same might be said of the Agent Carter character, who often chafes against the chauvinistic attitudes of the period and is quick with her fists.

"WHAT CODEX HAS GIVEN US IS THE DEPENDABILITY THAT WE HAD WITH FILM MAGAZINES."

Gabriel Beristain ASC BSC

SUCCESS STORY: AGENT CARTER
CINEMATOGRAPHER: GABRIEL BERISTAIN, ASC, BSC
RELEASE: 2015

"I CONSULTED WITH CODEX AND WE CAME UP WITH CAMERA GRATICULES AND A VFX WORKFLOW FOR THE IMAGE EXTRACTION." Sheena Duggal, VFX Supervisor

"We wanted a look that would be completely separate from *Captain America,*" says Beristain. "It's a very serious look, and the nets bring a period feel to very modern lenses on a very modern camera, the ARRI ALEXA XT. Even though I am shooting ARRIRAW, we are not shooting 4K. The image is downrezzed to 2K. Codex recording technology provides us with the technology to capture everything, and get the best possible image."

The groundbreaking use of ARRIRAW on a television series is typical of Beristain, who was also among the first to pair vintage glass and digital cameras for a television series. He is also using the latest in lighting technology, including LED units from ARRI and Cinemills. He says that the combination of LED light and digital sensors allows him to recreate a more direct light similar to what golden-era Hollywood cinematographers achieved with slower, less contrasty film stocks and tremendous amounts of hard light from arc and Fresnel lamps.

"It's direct lighting for the characteristics of the digital era," says Beristain. "Now you have an image for which you can decide to use direct light or go all the way to the softest, most diffused light, and anything between," he says. "That's why I appreciate it."

Beristain works without a DIT. "I needed to be in control with the cameras, and more involved with the actors," he says. "I set my basic LUT, not too far from Rec 709, and control the stops for each camera with a dedicated Preston remote. I read the light meter, and I've learned to interpret that LUT on an HD monitor. It's like a mobile Polaroid. I don't have to be in a tent, trying to create LUTs for every shot. We are not colourists. It's analogous to the film system in some ways, where I know how my negative is going to behave. It's going back to a system that always worked really well for us, and we're getting phenomenal results."

Colour is an important aspect of the convincing period feel. Beristain endeavours to shoot nearly everything at 4000 degrees Kelvin. "I wanted to go away from this very specific warmth in *Captain America,*" he says. "That gives me an interesting texture different from what a 3200-balanced stock with normal gels would deliver. With the LEDs you can precisely control the colour of each source. By manipulating the colour temperature in the camera and on the LEDs, it's like having my own custom-made film stock for every project."

CAPTURED ON
CODEX

An episode is produced over the course of eight days, with roughly half shot on stages and half at L.A. locations that work for the show's '40s New York setting.

Beristain is happy to report that he doesn't even think about the built-in Codex recording during a shoot day, whether he's on stage or on location. "Codex recording is impeccable," he says. "Dependability – what a wonderful thing! You never hear 'Sorry, we didn't get it recorded. It's corrupted.' What Codex has given us is the dependability that we had with film magazines. We haven't had a single glitch – every single frame has been there, perfectly done."

Another key contributor is visual effects supervisor Sheena Duggal. The pilot episodes included effects that were in harmony with the period design and perfectly folded into Beristain's cinematography. ILM and Base FX handle the majority of the effects on the show.

"It was always our intention that the VFX should look photorealistic and seamless, and since we had already done the One-Shot short, the bar was already set to a high standard," says Duggal. "The challenge was how to create large volumes of photorealistic VFX shots at Marvel feature quality on a network TV post schedule, which ranges from 16 to 20 days, once the picture is locked."

Over the course of the eight-episode season, an estimated 1,000 visual effects shots were accomplished. Double Negative was brought on to help meet air-date delivery. Duggal was prepping, shooting and posting all at once for various episodes. Her involvement even extends to working with the writers in order to use effects to the show's advantage.

"Our success relies heavily on how we prep and shoot so that we can give ILM the best possible shots, elements and plates to work with," she says. "We have been previsualizing shots before a script or director is on board so that we have more time to make bigger CG shots. We work together with ILM's supervisor Richard Bluff, producer Marissa Gomes and art director Cody Gramstad to design achievable shots that enhance the production design value and tell the story."

Green screen set extensions help create seamless period environments, and matte paintings help sell establishing and other shots. Explosion/implosion shots are common. Shots of a truck going over a cliff and hitting water were fully CG. The sets, vehicles and locations were all LIDAR'd to create geometry for use in VFX. ILM's extensive asset library is also being "plundered," according to Duggal.

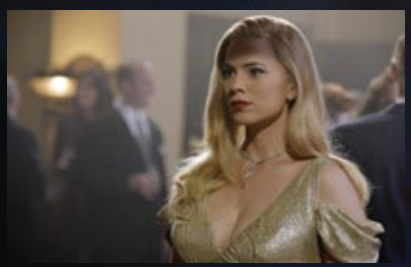
Duggal consults closely with Beristain. "Gabby decided that we wanted to shoot ARRIRAW to capture the best quality images, something that had not been done for network TV before, to my knowledge," says Duggal. "And when it came to camera shooting formats, we decided together that we would like to shoot open gate for the VFX plates and 16:9 for the non-VFX shots. I consulted with Codex and we came up with camera graticules and a VFX workflow for the image extraction. I had also been working on a lens mapping initiative with Codex and Otto Nemenz to map the lenses for VFX, and I'm happy to say that we implemented this for the first time on Marvel's *Agent Carter*."

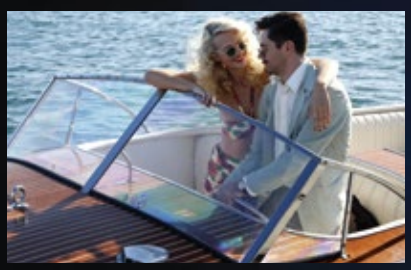
Duggal also needed a way to work with Beristain's Dior stocking nets. "I asked Gabby to pull the net out of the camera when shooting VFX green screens, as it causes diffusion on the edges," she says. "We have to recreate the look of the net on all of the VFX, and this applies to set extensions and even a gun muzzle flash. The net has a very specific look in terms of the way it blooms the highlights, and we had to create a filter that we adjust shot by shot to get a perfect match to what is photographed."

Duggal and Beristain both refer to the shorthand and mutual understanding that has developed.

"Gabby and I rely on each other to be the keepers of the vision," says Duggal. "We are great friends, we share a vision, we are able to negotiate and compromise when we need to. If he has a better shot that makes it hard for VFX, we will figure out a way to do it that keeps us both happy. With our limited time schedule there is no room to fix it in post, and Gabby, being such a master, is constantly figuring out ways to shoot things to avoid or help VFX. I endeavour in post to match and enhance his look. We sit down and do live-streamed colour-timing sessions together to make sure we have parity between the cinematography and VFX.

"It was a passion project for all us to tell the story of Marvel's *Agent Carter*," says Duggal. "I'm thrilled to have a lead female character in the Marvel universe, as I think it is a good role model for younger girls. I especially like that Peggy's super power is that men underestimate her. I was very excited to work with Louis and Gabby on this, as the short that we all did together is what got the TV show greenlit. It's a bit of a dream team!"





ALEXA 65

65 mm Reborn

VAULTLAB 65

"I cannot express how enthusiastic I am about the ALEXA 65 – I am currently working with 65mm film and if the quality is anywhere near that of film we will all benefit from the increased information and quality of image."

Robert Richardson ASC

The ALEXA 65 was launched to great excitement at the end of 2014. It is a large-format solution for today's moviemakers with a sensor larger than a 5-perf 65mm film frame. And most importantly, it's a complete system, with recording, media and workflow designed by ARRI's trusted partner, Codex.

The ALEXA 65 sensor has the same design as the ARRI ALEXA, aside from being much larger. Just like the ALEXA, the individual photosites are of an optimal size, carefully balancing the various different parameters involved in maximising image quality. It's a ARRIRAW-only camera because ARRIRAW maintains the best colour rendition and dynamic range, which are as important as the resolution. Just like 65mm film, ALEXA 65 produces images with stunning resolution and image detail, making it ideal for wide vistas, VFX shots and even faces.

Some might be intimidated by the amount of data generated by this camera – after all, the files are uncompressed for the highest image quality possible so each frame is 31MB. A robust recording format and a cost-effective, production-proven workflow are critical and Codex is providing both, based on the existing technology of Codex Vault along with a new Capture Drive, the Capture Drive 2.0, up to 2TB of high performance solid-state storage, delivering up to 20Gb/s bandwidth.

For a reliable, secure on-set/near-set workflow, Codex has worked 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.

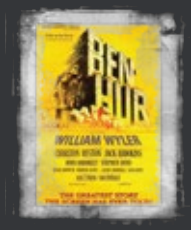
THE65MMINTERVIEW

Recently we sat down with Codex managing director Marc Dando and Bob Richardson ASC to talk about the 65mm film format and how it relates to ARRI's ALEXA 65 camera.

Bob Richardson ASC

Marc Dando

"THE INCREASED RESOLUTION GIVES YOU SO MUCH IMAGE INFORMATION" Robert Richardson ASC



Have you always been interested in the 65mm format and what films would you encourage readers to see to appreciate it?

Marc: I am a big movie enthusiast and some of the most iconic movies of all time that happen to also be my favourite movies – *2001: A Space Odyssey* – for example, have been captured with this format. The classic choices are *2001*, *Lawrence of Arabia* and *Ben-Hur.* I'd also encourage people to see Bertolucci's *Little Buddha,* shot by Vittorio Storaro ASC. It wasn't all shot with 65mm but I think the format was used to great effect for certain scenes. And then of course recently there's been Paul Thomas Anderson's *The Master.* Over time it almost disappeared but then thankfully came back as a specialty format.

Bob: From the very beginning I found the experience of the large screen to be magical - both *2001* and *Lawrence of Arabia* were immense childhood experiences. At the time I did not think of 70mm as being fundamental but the intense beauty of the image due to its size does relate to the viewing experience. So needless to say i would recommend both of the films listed above as well as *Ben Hur, Battle of the Bulge, It's a Mad, Mad, Mad, Mad World, West Side Story, Grand Prix, Ice Station Zebra, Patton, Baraka, Samsara,* and *The Master.*

Bob: I am currently shooting *The Hateful Eight* for Quentin on 65mm. Quentin is passionate about film and has taken the step to shoot this film in 65mm as opposed to 35. The images we are creating have deeply influenced me. There is a richness that feels as if the film carries a soul - analogue in influence. A return to vinyl. The lenses we are using are ULTRA PANAVISION lenses and light has not passed through some of these lenses in 40 to 50 years. The quality they provide I cannot describe - it needs to be experienced. The film will be distributed as a roadshow - the first release will be only shown in 70mm with a chemical finish - no digital intermediate. Quentin wants people to have a unique movie-going experience that can't be replicated in their living room or on their iPad and I completely agree with him.

Bob, what are the particular qualities about 65mm film that you appreciate?

Bob: The increased resolution gives greater image information – it's incredible. Not just for the wide vistas but also the detail you get in the human face. There is a softness to the skin in this format with these lenses that is sublime.

Marc, what about the ARRI ALEXA 65? How does that relate to what's gone before with 65MM film?

Marc: As I've observed the transition from film to digital up-close, I've hoped that digital capture would aim to match the image quality of this amazing film format. It was a shame that technical and budget reasons stopped this format being used more often. The ALEXA 65 system will change that. To me, it's about choice – film or digital, what camera you use and what lenses work in combination with the format – it's just an expansion of the aesthetic choices available to filmmakers and that is as it should be.

A digital 65mm format is appealing because as the film infrastructure goes away, it sets the bar high for digital capture. It's not going to be used on every movie but it gives directors and DPs the option. Chivo is already testing it on his latest project *The Revenant.* And in the UK, it's been used in an underwater housing for *Mission Impossible 5,* which is primarily being shot on film. The issues are immense and we need to calibrate the lenses and the capture system to bring a pleasant image to the increase in data. An exciting future for us all.

CODEX+ALEXA SXT

The relationship between Codex and ARRI continues to thrive.
Codex is excited to be working with ARRI on these two great new additions to the ALEXA family.
ARRI is continuing to raise the bar for image quality as Codex continues to set new standards for secure, efficient pipelines to support these cameras.

The next step in the evolution of the ARRI ALEXA camera family, the ARRI ALEXA SXT (Super Extended Technology) range of cameras feature ProRes 4K output, improved image quality, frame rates up to 120FPS 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 their 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.

Based on new, high-performance electronics, ALEXA SXT cameras include an improved image processing chain with advanced defect pixel correction and optional noise reduction. This improves ALEXA's already renowned low-light performance, with the ability to shoot at 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.

The new range of cameras will comprise ALEXA SXT EV, SXT Plus and SXT Studio models, replacing the current ALEXA XT cameras.

Because it's important for our customers for our products to have longevity, Codex has worked together with ARRI to provide the maximum flexibility and extend the life of existing media with the ALEXA SXT.

The camera can be used with four different adaptors – the SXR, XR, SxS, and the CFast 2.0 Adaptor. This means the ALEXA SXT can be used with all these media types – Codex SXR and XR Capture Drives, SxS cards, and CFast 2.0 cards.

Efficient Workflow

Codex Capture Drives are just the first step in a Codex workflow that securely moves your media from production to post and VFX in all the formats that you need via Codex's Vault Platform, Media Vault and Backbone.

For those who want the power of Codex integrated with Apple hardware, Vault Platform is now available on Mac Pro and MacBook Pro.

CODEX+ALEXA MINI

The ALEXA Mini is a brand-new addition to the ALEXA family, combining a compact, lightweight form factor with the ALEXA's renowned image quality. To achieve the small size whilst maintaining the quality that the ALEXA is known for, ARRI has come up with some unique solutions including a lightweight carbon housing and a solid titanium PL mount. The ALEXA Mini has a 4:3 sensor and an automatic de-squeeze mode for anamorphic productions. It can shoot at frame rates of 0.75 - 200 FPS.

ALEXA MINI

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 2TB 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 Vault Platform.

Codex Multi-Camera Recorder

This new Codex Recorder is a rugged, reliable multi-camera recorder. It features 8 channels of HD-SDI input plus metadata and embedded audio, which means it can record ARRIRAW from 4 ARRI ALEXA Minis simultaneously.

This makes it ideal for TV, commercials, music videos and stunts. Its unique design incorporates a versatile cheeseplate system for the mounting of accessories.

CAPTURED ON CODEX

A SUBTLE APPROACH TO COLOUR FOR WOMAN IN GOLD

The true story of Maria Altmann, a Jewish woman whose family escaped Austria in 1936, is the basis for *Woman in Gold*. Some of the possessions Altmann left behind became quite valuable over time, especially a stunning and influential portrait of Adele Bloch-Bauer by Gustav Klimt – the "woman in gold" of the title. Altmann's late-in-life attempts to reclaim these objects form the heart of the film. The cast includes Helen Mirren, Ryan Reynolds and Daniel Brühl.

The script for *Woman in Gold* fell naturally into three distinct time periods, giving cinematographer Ross Emery ACS a rich array of visual opportunities. The tale is set in contemporary Los Angeles and Vienna, with other scenes set in Vienna in the 1920s and '30s.

"It's a story that was obviously going to be very, very emotionally charged," says Emery. "With these fantastic actors and the characters and visual treatments, we had the opportunity to do some really interesting things. We wanted to keep a delicate touch that would give the actors maximum freedom to explore and bring these characters to life."

Emery says his first conversation with any director concerns format. He felt that this story required a cinematic telling, and to him that meant a 2.39:1 frame.

"My last four films were shot anamorphic and I've been finding that the perspective of anamorphic lenses and the widescreen format gives you a wonderful canvas to tell stories on," he says. "I think people automatically, subconsciously, put themselves in a slightly different headspace when they see widescreen images or anamorphic images. It's distinctly different to watching television. So my approach is to give them something more, a real visual and cinematic experience."

Director Simon Curtis brings a background in theatre and BBC television to his work in features, and he didn't restrict Emery in any way.

"Simon really wanted someone who would bring a larger visual style to the film," says Emery. "He was happy with the ideas I had about camera movement, framing and lighting. We seemed to be very much in sync, and it became quite a positive experience shooting the film. The wonderful actors were always bringing something interesting to the screen. The crew gelled very well together.

"When you get to a point in a production where everybody is comfortable, you can really start trying things and pushing things a little bit further, doing things that maybe you wouldn't normally do under the pressure of the budget and the schedule and people's expectations. But on this one, we got ourselves into a very, very good place."

The look the filmmakers designed for 1920s Vienna was bold. For the 1930s portions, Emery referenced early Agfa colour films, which were particularly responsive to reds, with sepia notes.

"That essentially came from the German propaganda and newsreel films from that time," says Emery. "It was interesting – memories flash back so often in films, and are often represented in a positive way, remembering a happier time. That wasn't necessarily the case in this film. This is her memory of a time when her family's life was completely torn apart. We envisioned her memories with a sort of immediacy, and the Agfa look was an attempt to echo that time. The images felt a bit more 'real world,' and I think that approach worked very well."

The 1920s look referenced French art nouveau, with a very black and gold palette. These images portray the family's life when it was very affluent and comfortable. The '20s scenes were further characterised through the use of older spherical Cooke lenses, which made a subtle distinction between that time and the '30s period, which was shot using contemporary Hawk Anamorphic glass from Vantage.

"For the '20s, I sent the ARRI Media camera prep techs off to find the oldest, scrappiest lenses they could find, basically with a mission to find something no-one's shot on for about 20 years," says Emery. "They came back with the Cookes, and quite honestly, they looked a little better than I thought they would. I still went with them, along with some image disturbing media to put between the lens and the subject to kind of give them an even more sort of faded and broken look."

The "image disturbing media" was clear film with holes punched through it, hung in front of the lens.

"As everybody knows, lenses are coming into their own in a digital sense," he says. "Digital tends to see things differently. Because of the sharpness and the resolution of the new cameras, older lenses are being used to bring a certain difference back, the way we used to use film stock. For example, we used to use high speed film stock, forced two stops, for a certain look. Now we're using digital cameras, but we're looking to the old lenses to do a similar chore of breaking down the image slightly to underline an emotion.

"I'm glad we've moved on from the early days of digital to embrace it," he says. "Now we have stable digital platforms in terms of capture and record, so we can get back to the business of making the image appropriate to the story. I'm really pleased with the way some of the companies really stepped up. I'm particularly a fan of the ARRI ALEXA and Codex, especially the XT that has made it so much more comfortable on set. Those systems worked incredibly well. You're not worried about the technicalities.

"The technology has really grown," he says. "You don't have to keep an eye on it all the time to make sure things are happening properly. You can get dailies quickly, and the DIT stations mean that you can have the option of on-set colour grading that can then follow the post straight through."

Emery says that another benefit is that conversations with producers are less often about a piece of equipment.

"Previously, you'd have to always make the case to protect the quality of the image, whereas now it's just becoming pretty much a mainstream platform," he says. "The system works. So producers are very much accepting the workflow. Every film I do, it's anamorphic lenses, ARRI ALEXA XTs with Codex in-camera recording, and we record ARRIRAW. That's now not being questioned at all anymore."

Emery enjoys operating the camera and makes a point of being directly involved with the actors and the story. As a result, he does very little on-set colour. He did have specific LUTs for the various time periods, as well as day and night variations. He would work with the DIT to make some subtle tweaks when necessary.

The DI required only minor alterations.

"Sometimes you're thinking that you're going to have to assist in some way in introducing emotion and drama, but when you see the performance and you hear the music and you see the editing, you don't have to," says Emery. "Sometimes it's just all there, and all you've got to do is figure out a way of keeping out of the way a little. Other times we were sort of able to increase the drama or the emotion, and that helps the whole film. I think DI is fast moving away from being merely a technical exercise where you make sure everything matches. You can base your decisions on the emotional reactions you have."

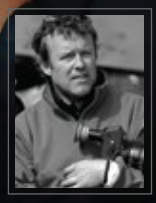
Emery's work in the DI went deep into the subtleties of colour theory, especially for the period scenes.

"It starts with the production design," says the cinematographer. "We were working very much in between primary colours, so that reds were not red. They were a little more crimson, and blues were not blue. They were more cyan and a little bit to aqua. The black levels would intrude quite substantially on underexposed areas. The latitude of Agfa film at that time was obviously quite low, and so shadows become deeper. We were conscious of those things on set, which meant that I did protect the shadows a little bit more."
The richness and range of the ARRIRAW files helped. "This is what's fabulous about shooting ARRIRAW," Emery says. "It's so much easier when you have that information available. That is why I'd always push for shooting ARRIRAW, because you're capturing as much luminance level and as much colour space as you can."

Woman in Gold premiered in February 2015 in the Berlinale Special Galas section of the 65th Berlin International Film Festival. It is scheduled for wider release in April 2015.

"I'M PARTICULARLY A FAN OF THE ARRI ALEXA AND CODEX, ESPECIALLY THE XT THAT HAS MADE IT SO MUCH MORE COMFORTABLE ON SET."

Ross Emery ACS



SUCCESS STORY: WOMAN IN GOLD
CINEMATOGRAPHER: ROSS EMERY ACS
RELEASE: 2015

POINTSHOOTPOST

Whether you're making commercials, TV or movies, sometimes your camera package is just too big for the situation or location you're trying to shoot in.

Enter Codex Action Cam...

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.

Codex Action Cam itself is a tiny remote head camera for shooting at up to 60fps.

It comes packaged with the Codex Camera Control Recorder that delivers full remote control of the camera, plus the proven workflow of the industry-standard Codex recorder.

Phedon Papamichael ASC GSC, Claudio Miranda ASC, Linus Sandgren FSF, Stijn Van Der Veken ASC SBC - these world-class cinematographers and more have already used Action Cam all over the world.

"We literally held the cameras with one hand and went free-driving with the actors."

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 60FPS
- WIDE DYNAMIC RANGE
- C-MOUNT WITH EF-MOUNT AND PL-MOUNT ADAPTORS
- RELIABLE AND ROBUST CODEX RECORDING AND WORKFLOW

Versatile Images

Among the first US customers for Codex Action Cam is Radiant Images in Los Angeles, which provides innovative digital cinema solutions, high-end cameras and equipment to the film and entertainment industry worldwide. The company's in-house engineering team has developed a new range of camera rigs with Codex Action Cam – fitting Codex Action Cam heads with a wide variety of miniature prime and zoom lenses, housing Codex Action Cam with a helmet to create the Freedom POV Camera, and customising different easy-carrying systems for the Camera Control Recorder, battery packs and lens/focal control systems. "We create simple, fast and efficient solutions that push projects forwards, and Codex Action Cam fits the bill," says Radiant Images co-founder Michael Mansouri.

Technical Specifications

Compact package – the Action Cam camera head measures just 45 x 42 x 53mm. The Codex Camera Control Recorder is only 83 x 139 x 188mm.

Flexible – A single co-ax cable (up to 180m) connects the Camera Control Recorder and Action Cam head, carrying video, control signals and power.

Image Quality – with a 12-bit RAW output and Codex's industry-leading debayering, Action Cam has 10.5 stops of dynamic range and performs well in most lighting conditions.

CCD Sensor Technology – Action Cam uses a 2/3" CCD sensor, providing great light sensitivity, signal-to-noise and temperature stability.

Global Shutter – No distortion of fast moving objects or other temporal artifacts.

Native S3D – For easy 3D production, connect two camera heads to the Codex Camera Control Recorder, and the signals undergo exactly the same image-processing.

Upgraded C-Mount – Easy and accurate back focus, making it possible to use C-Mount lenses for professional production.

"I tested it against other small cameras, but no other camera came close – in terms of image quality, size of the camera head and the workflow." Stijn Van Der Veken ASC SBC

ACTION CAMERA
WITNESS CAMERA
POV CAMERA

...the creative possibilities are endless.

POINTS OF VIEW

What would you do if you discovered that you could alter the past? That's the premise of Caviar Film's €2million sci-fi thriller, *The Sum Of Histories,* the first feature for director Lukas Bossuyt. In the movie, Viktor, a young and brilliant professor, discovers a way to send e-mail messages back in time. This means he can prevent the car crash that paralysed his wife more than 20 years before. However, Viktor soon learns that changing the past is not without risk, and the future does not turn out as expected.

"Theoretically time travel is possible, although in practice we know that it isn't," says the movie's cinematographer/operator Stijn Van der Veken ASC SBC. "It was this notion, the dilemma of the characters and the twists in the story that intrigued me and attracted me to the project. Within this, I had the interesting creative challenge of creating different looks, points of view, that would set the action in alternative periods of time."

The action takes place around the university campus in the Belgian town of Leuven. Established in 1452, the university has many elegant and imposing buildings dating back to the 16th and 17th centuries. It was Van der Veken's task to conjure up imagery that would use this backdrop for both the present day as well as 20 years into the future.

"NO OTHER SMALL CAMERA CAME CLOSE"

Stijn Van der Veken ASC SBC

SUCCESS STORY: THE SUM OF HISTORIES
CINEMATOGRAPHER: STIJN VAN DER VEKEN
RELEASE: 2015

Van der Veken, who lit the 2013 Oscar-nominated short *Death Of A Shadow*, has an accomplished eye when it comes to creating stylish looks. He has major period and modern drama series, including *The Emperor Of Taste* (2008), *Quiz Me Quick* (2012) and *In Flanders Fields* (2014) under his belt, along with many commercials for blue chip brands such as Lotus, Volkswagen, Mobistar Telecom, Emirates Steel and First Gulf Bank, plus many shorts. Connections matter too, and Van der Veken's name was put forward to Caviar for *The Sum Of Histories* by producer Frank Van Passel, with whom the cinematographer had worked on *The Emperor of Taste*.

"They liked my previous work, enthusiasm for the project – especially my creative approach to a really gripping action scene – as well as my willingness to support Lukas through his first movie project," says Van der Veken. "Belgium is a small country and, because of the small market, the movies tend to be low-budget. So my challenge was how to give this intelligent, thought-provoking script a big cinematic feel?"

He continues, "There is little celluloid infrastructure left in Belgium now. So, as I was already familiar with, and liked very much, the ARRI ALEXA XT and the CODEX/ARRIRAW workflow, from my commercials and shorts work, I opted for that. I wanted to use shadow details and knew that ARRIRAW would provide full dynamic range and good contrast, whilst the Codex workflow was a reliable plug-and-play system."

As it was Bossuyt's debut in features, Van der Veken says a lot rested on his ability, "to listen carefully to Lukas' instructions, and to translate these ideas, through my experience, into the pictures he wanted. Essentially, the future had to look powerful and brittle, whilst the present is warm and more secure. I did not want to do this in grading. Rather I wanted to achieve as much as possible on-set, in-camera – using the art direction, production design, lighting, lenses and subtle LUTs – to create these different styles."

Optically, Van Der Veken decided to use a set of 1950's spherical Cooke S3 Panchro lenses, rehoused by True Lens service in the UK, with a 1:2.39 aspect ratio for the present-day scenes. To frame the future, he went with the powerful look delivered by full Anamorphic ARRI Zeiss glass, shooting 4x3 for a 1:2.39 result. In pre-production he collaborated with his long-time DI colour grader, Peter Bernaers, at Flow in Antwerp, to design appropriate LUTs that would be non-destructively applied to selected takes on-set. This ensured the look was being defined during production, whilst also giving confidence to the producers.

Van der Veken pays tribute to his 1st AC/focus puller Didier Frateur in managing what he calls "the voodoo of the old lenses," and his DIT Boris De Vischer, "for giving me the confidence that what we shot on-set, was what we'd get in the DI grade. As this was a low-budget production, we did not have the luxury of on set-colouring tools, and there was no room for error. Boris used Codex, and its Virtual File System, to clone the ARRIRAW, transcode dailies for editorial, and create LTO archive copies. Every now and then he would bring me graded dailies, using the LUTs, which I viewed as MP4s on an iPad, so that I could double-check the looks were what I wanted."

"I have to say that those guys at Codex rock and roll. The Codex technology with the ARRI cameras, and the ARRIRAW capability, is a marriage made in heaven. It's just so reliable. I will never shoot a digital movie in the future without having that combination with me on-set."

But Codex's involvement in *The Sum Of Histories* didn't stop there. Van der Veken's other key challenge was to bring a fresh perspective to a thrilling night time stunt sequence, in which a trio of the protagonists hang a large protest banner on the side of a tall building. Enter the diminutive Codex Action Cam – point, shoot, and post package.

"Codex Action Cam came as a gift to me on the production," says Van der Veken. "I tested it against other small cameras, but no other camera came close – in terms of image quality, size of the camera head and the workflow."

Assisted by Frateur, the Codex Action Cam head was mounted on a helmet, skydiver style, rated at 400 ASA, and fitted with a C-Mount Kowa 5.5mm lens. The Camera Control Recorder, plus a Teradek wireless video transmitter, were neatly packaged inside a small backpack. Boldly donning the Action Cam kit, Van der Veken shot part of the stunt sequence himself, variously lensing the protagonist and antagonist points-of-view, whilst being suspended 30 metres above the ground.

"It was pretty scary stuff," he recalls. "Also, this was one of the most expensive days on the movie and we just had to get it right first time. Although the Action Cam and recorder package was in prototype at the time, it worked perfectly. The technical support from Codex was excellent too."

Back on terra firma, the RAW camera footage was transferred to a Mac laptop and converted to 10-bit DPX using the Codex Virtual File System. "The 12-bit RAW pictures were perfect for the look of the night time photography, and for invisible wire removal in post. Also, the Action Cam pictures intercut really well in context with the ARRIRAW of the overall movie."

Van der Veken notes: "When you are a cinematographer, you must have confidence in the tools you use, and for those tools to let you get on with your job undistracted. That's the way Codex think, and how they have arrived at their on-set products, and it's the same with Action Cam too. I am really pleased with the final result on *The Sum Of Histories*."

The Sum Of Histories is scheduled for release in autumn 2015, to coincide with start of the academic year at Leuven University, where it's bound to be popular.

"THE CODEX TECHNOLOGY WITH THE ARRI CAMERAS, AND THE ARRIRAW CAPABILITY, IS A MARRIAGE MADE IN HEAVEN. IT'S JUST SO RELIABLE.

Stijn Van der Veken ASC SBC

PANASONIC VARICAM 35 | CODEX V-RAW

"Codex has an impressive track record in designing and manufacturing robust digital media recorders which also streamline the workflow on feature and broadcast productions."

Kunihiko Miyagi, Director of Panasonic's Professional AV Business Unit

The Panasonic VariCam 35 is a 4K camera with a newly developed Super 35 image sensor and an innovative modular design. The VariCam 35 utilises a new Panasonic super 35mm MOS sensor. The sensor size is 4096 x 2160 (17:9) for 4K image capture and has around 14 stops of latitude.

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. RAW recording is the best way to capture this dynamic range without compromise and Panasonic naturally turned to the industry leader for RAW recording and workflow – Codex.

Colour management capabilities include an extended colour gamut, with support for an Academy Color Encoding System (ACES) workflow. ACES is also fully supported by Codex workflow products.

Panasonic Varicam 35 Specification

CMOS Sensor	4096 x 2160 Super 35mm
Dynamic Range	14 Stops
Compressed Recording	2 x expressP2 slots for 4K/UHD (AVC Ultra) 2 x microP2 slots for 2K/HD (AVC Ultra)
Uncompressed RAW Recording	Codex V-RAW Recorder
RAW Recording Media	Codex Capture Drive™ 2.0
RAW Recording Frame Rates	Up to 120 FPS
Mount	PL
Viewfinder	OLED with optical zoom
Monitoring	HD-SDI out
Audio	Two XLR inputs - 4 channels of 24-bit, 48KHz audio

Codex V-RAW Recorder

Although the VariCam 35 has several different recording modes, Panasonic has partnered exclusively with Codex to develop a dedicated recorder to capture uncompressed 4K VariCam RAW (V-RAW) at up to 120 FPS for the ultimate in image quality. Because the VariCam 35 is a modular camera, the Codex V-RAW recorder will directly attach to the 4K camera module, eliminating any need for cables and simplifying the use of the system.

The combination of this camera with Codex's RAW recording platform provides another great choice for feature films, commercials and television.

In order to meet the demanding requirements of the latest generation of digital cameras, including the Panasonic VariCam 35, Codex has designed the Capture Drive™ 2.0. Designed around PCIe-based flash to deliver the fastest solid-state media available for professional media applications, the Capture Drive™ 2.0 combines ultra-high performance solid-state storage with production reliability in a compact package.

CODEX CAPTURE DRIVE™ 2.0

The Codex Capture Drive™ 2.0 is the gateway to the production-proven Codex workflow through Codex's Vault Platform, which is now 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.

> UP TO 2TB OF MEMORY DELIVERING UP TO 20 Gb/s BANDWIDTH > ADVANCED THERMAL DESIGN

> ENGINEERED TO THE HIGHEST PERFORMANCE STANDARDS > RECORDS UNCOMPRESSED 4K RAW AT UP TO 120 FPS FROM THE PANASONIC VARICAM 35

Codex Complete Workflow

QC your images, clean your metadata and archive your RAW files, and then quickly transcode to whatever dailies formats you need for editorial, post-production and VFX. Depending on the project, these might include Avid DNxHD for editorial, Apple ProRes, DPX or H.264 for iPad executive dailies.

Each format can be generated with and without LUTs and burn-ins as required for your particular project, and with all the associated sidecar formats and metadata. Codex Review includes look management including ACES and CDL-based colour grading with full integration with Tangent Wave and audio sync.

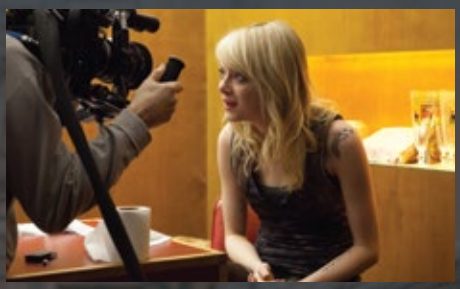
Add full integration with Codex Media Vault (page 38) via Codex Backbone and you don't need anything else to smoothly manage your production from the set into post and VFX.

Gregor Tavenner is the go-to first assistant cameraman for some of the best cinematographers in the world, including Chris Menges BSC *(Extremely Loud & Incredibly Close),* Robert Elswit ASC *(Syriana, Michael Clayton),* and Robert Richardson ASC *(Shutter Island, Hugo, Django Unchained).* In addition to more traditional first AC duties, Tavenner has helped these DPs navigate the changes in tools and techniques that came with the shift to digital. For example, in 2011, *Extremely Loud* was the first studio feature in the United States to use the ALEXA-CODEX-ARRIRAW workflow, which has since become the standard in the industry.

CAPTURED ON
CODEX

BIRDMAN'S UNIQUE APPROACH IS REWARDED

Last year, Tavenner worked shoulder to shoulder with Emmanuel "Chivo" Lubezki ASC AMC on *Birdman,* a feature film directed by Alejandro González Iñárritu and starring Michael Keaton, Zach Galifianakis, Emma Stone, and Edward Norton. Equal parts comedy and pathos, the quirky story follows a washed-up actor who was once well-known for playing an iconic superhero. Keaton stars as the man who, against the odds, tries to restore his faded star by organising a Broadway play.



Iñárritu asked Lubezki for a cinematographic approach that brings to mind Hitchcock's 1948 classic *Rope.* Cinematographers William Skall ASC and Joseph Valentine ASC shot the entire film in a series of very long shots. A handful of edits were hidden cleverly to give the appearance of a story unfolding in real-time, in a single, continuous take.

Lubezki says that at first, he was reluctant to take the project on, because very long shots often mean that the lighting suffers.

"But once I read the script with that approach in mind, it made complete sense," Lubezki says. "It's great to work with directors who don't want to cover everything like TV. They're not just illustrating dialogue. Shots can have meaning, just as the words or the expressions of the actors have meaning. For *Birdman,* we were trying to tell the story with very long shots that make you feel as though you are in there with the actors. And the equipment helped make it possible, because the shots are insanely long – much longer than what a film magazine could do."

Birdman is made up of about a dozen such takes.

"That was part of the decision to go digital," says Tavenner. "It was also about the nature of the practical locations and the lighting limitations they imposed. Also, I think Chivo had such positive experiences on his last film with Terrence Malick that he decided to continue with the ALEXA. And in the world that I work in, which is creating imagery for the cinema screen, if you're using ALEXA, there's no reason to use it at anything less than its highest quality, and that necessitates using Codex Recorders. If you're shooting for the highest image quality, it's obvious – you either choose film or ALEXA and ARRIRAW."

Fluid, delicate and responsive camera movement, both handheld and on Steadicam, was essential. The camera system had to be lightweight and ergonomic without sacrificing image quality. *Birdman* was one of the very first feature films to be shot with the new Codex XR module, which is built into the ARRI ALEXA XT.

"That was absolutely vital to the whole design of the film, which was made with six- and seven-minute-long Steadicam shots," says Tavenner. "Building the module into the camera facilitated that to a great extent. Leaving five or six pounds off the Steadicam rig significantly prolongs the stamina and enhances the agility and precision of the operator over a 14- or 15-hour day."

The camera gear included an ALEXA M model, which Lubezki could operate handheld with only a 20-pound burden. Tavenner followed him with a rucksack rig connected to the camera by fibre-optic cable.

Leica lenses were chosen for their dependability, quality and light weight. At very wide focal lengths where Leicas were not yet available, Master Primes were used.

Lubezki did only minor manipulation of the RAW image on set. From the recorders, the files went directly into the Codex Vault set up near the set, where three back up copies were made – one in Vault's internal archive, one on an external drive that was sent to a separate location, and one on an external hard drive that was sent to editorial, where Lubezki would do a quick colour correction pass for dailies. In studio situations, especially at the beginning of the shoot, DIT Abby Levine set up a projector and a full set of DI tools for Lubezki to use each day. Codex Vault is a scalable, end-to-end dailies and archiving system designed for on- or near-set use.

"Chivo and Bob Richardson both feel that set time is expensive, and that they'll have maximum efficiency in the timing suite," says Tavenner. "Vault makes everything quite simple. You're archiving and disseminating right there, throughout the day, so your time at night is minimised. To me, that's such a common sense approach that I'll employ it on every film I do in the future."

According to Tavenner, Lubezki's previous experience with the workflow made the job especially smooth. "Chivo knew exactly how to utilise the system," says Tavenner. "He was comfortable with the false colour system in the ALEXA, and once he had the correct exposure levels, he knew he was laying down a proper image that he could fool around with in the digital suite. He didn't need to see all the iterations on the set."

Tavenner has seen the first AC's job evolve – and expand – very quickly in recent years. "Before the digital age, you had two priorities – focus the camera, and manage the department," he says. "Now, with digital, there are more choices to make. The management aspect of the job – people management and equipment management – has grown. At the same time, focus is even more delicate. At its best, it's enjoyable. At its worst, it's been difficult.

"The equipment is constantly being reinvented," he says. "The number of options that are put to us – different post scenarios and different companies, not to mention different cinematographers – is amazing. Codex is so solid. They come out with new equipment, but the idea of the ARRIRAW workflow with Codex implementation has been one of the more stable examples of digital technology. CODEX-ARRIRAW has proven to be a durable workflow that doesn't ask cinematographers to subordinate their process to the equipment. The equipment subordinates itself to the cinematographer.

"Some companies operate in a different world, a world of disposable, proprietary equipment, where the company moves on to a completely new design every year or two," he says. "Competition is good, but when the post flows are so proprietary, that makes things more difficult than they need to be. With film, we had universal acceptance throughout the world. There were different manufacturers, but they used the same gauge, and it could be processed and printed.

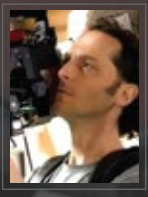
"Codex is helping in that regard," he says. "Often on these movies, we do shoot with different camera systems. Codex remains open to and interoperable with other technologies, and that is important to me. Vault can handle a wide array of cameras and file formats – it can ingest RED, it can ingest Sony cards.

"On *Birdman,* the Codex recorders and Vault made for a very efficient, very low maintenance system," says Tavenner. "We delivered the footage to editorial and to the lab using standard hard drives with no interoperability concerns. We used the most versatile, high quality lightweight cameras that you can get today, even lighter than we could have been with film, and that allowed us to make the film with all the finesse Chivo and Alejandro imagined."

Chivo and his crew's stunning work on *Birdman* has been rewarded with a historic trio of awards. For the second year running (after winning for *Gravity* in 2014), Chivo won the BAFTA, ASC and Academy Awards for Cinematography.

"ON BIRDMAN, THE CODEX RECORDERS AND VAULT MADE FOR A VERY EFFICIENT, VERY LOW MAINTENANCE SYSTEM..."

Gregor Tavenner



SUCCESS STORY: BIRDMAN
CINEMATOGRAPHER: EMMANUEL "CHIVO" LUBEZKI ASC AMC
RELEASE: 2014

CODEX REVIEW LIVE

Introducing Codex Review Live – manage colour and create looks on set.

Featuring an easy-to-use UI, Review Live allows you to work directly with the live camera feed over HD-SDI to create and preview looks and grades that can be used to communicate the creative intent on-set and as a starting point for dailies and post production. Looks can applied automatically when generating deliverables via Codex Vault Platform, or can be exported in various formats (ASC-CDL, 3D LUTs in various formats) so that they can be applied in other software.

Review Live is fully synchronised with Codex Backbone where the look-related metadata is securely managed in the "Look Library" for collaborative use in multiple downstream processing tasks.

Look Processing Hardware

In its first iteration Review Live will work with the Fujifilm IS-mini, but other similar hardware will also be supported.

The software can control and manage up to 32 IS-minis installed in-line with the HD-SDI outputs of the camera and supply the on-set monitors with the graded HD-SDI signals.

The Tangent Element panel series is fully integrated for primary colour correction.

Colour Grading

Review Live has controls to adjust:

> Offset/Power/Slope/Saturation > Printer lights > Custom Curves

Looks can be saved with a user-defined name in the Codex Look Library.

Review Live Compatibility

> Codex S-Series > Codex XL-Series > Codex OS X

Exchanging Looks

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).

Review Live app synchronises the saved looks with Codex Vault Platform:

> When the media is offloaded, Vault checks the timecode and EI of each clip. It then finds the look that was applied to the corresponding LUT box at that time and puts the look info in the clip's metadata.
> The look can then be applied automatically when playing back in Codex Review or when generating deliverables.
> Codex Review will also pick up the settings and allow further tweaking of the colour parameters 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.


ARRI ALEXA XT/SXT/65


ARRI AMIRA


ARRI ALEXA Mini

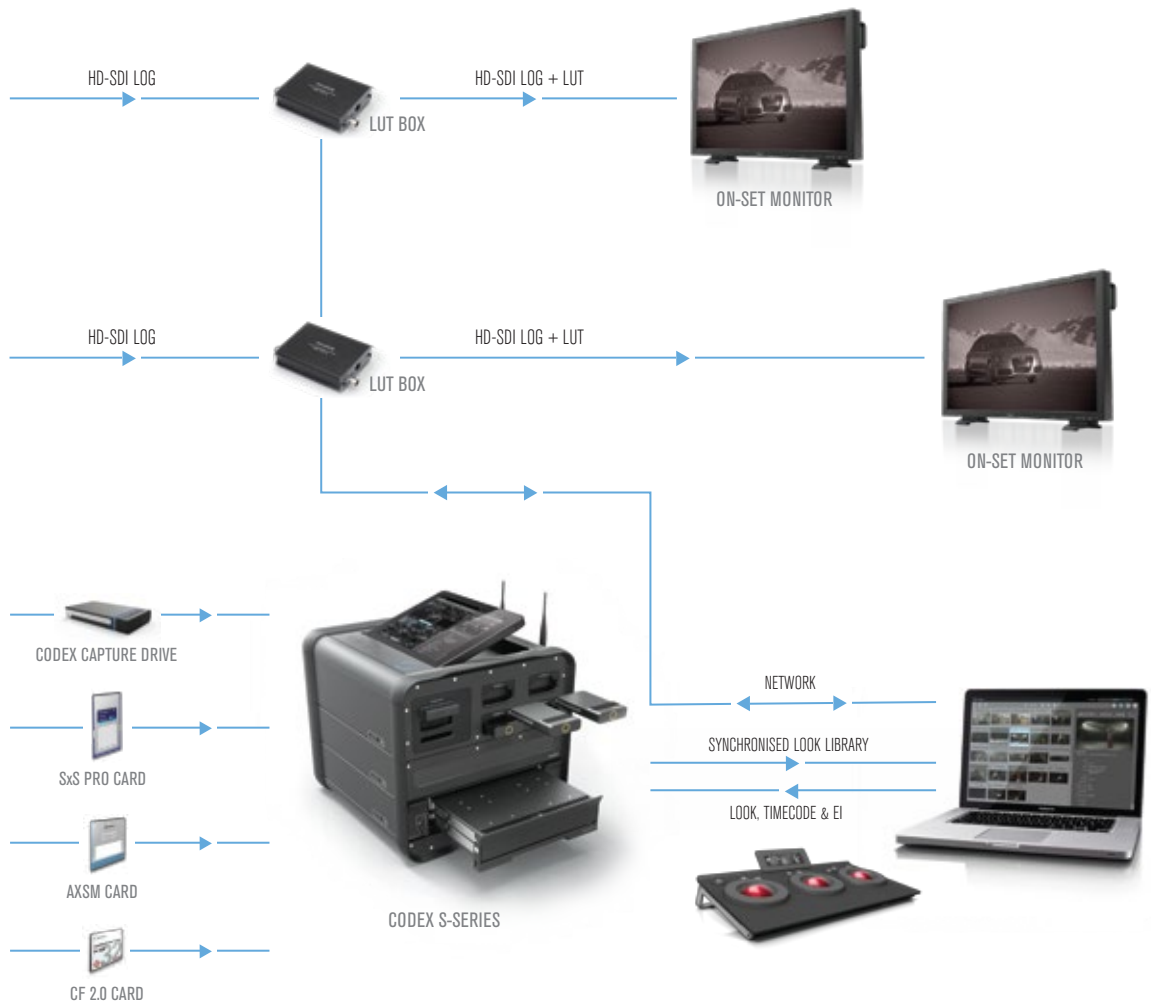

Codex Action Cam


Canon C300 MkII/500


Panasonic Varicam 35


Sony F5, F55, F65

Codex On-set Review Live Look Management



CAPTURED ON
CODEX

THE EYE OF THE STORM

In their vision for *Into the Storm,* director Steven Quale and cinematographer Brian Pearson ASC needed to balance two ideas. The feature film was devised as a "found footage" movie – a depiction of a monster storm as captured by storm chasers, thrill-seekers and ordinary citizens. At the same time, the filmmakers didn't want imagery that was too shaky, unsettling or uncomfortable for the viewer.

"We had seen some found footage films where, in our opinion, the camerawork felt too heavy-handed or too nauseating to watch," says Pearson. "So we aspired to make our film very smooth and watchable, but with a sense of immediacy and a feeling that the characters were involved in photographing the events they were witnessing. We did take some liberties with the found footage concept, as there were points in the movie where we felt it was imperative to show the actors' reactions without the need to justify who exactly was shooting at that moment. It was most important that we captured the performances and their emotional content. And we did do our best to deliver the found footage feeling in a smooth and watchable way."

SUCCESS STORY: INTO THE STORM
CINEMATOGRAPHER: BRIAN PEARSON ASC
RELEASE: 2014

Pearson and Quale had previously made *Final Destination 5* together. The budget for *Into the Storm* was reported to be around $50 million.

Choosing the right camera and workflow would be crucial to success. Pearson says he tested more than 25 cameras, ranging from Contour and GoPro to DSLRs, RED, and ARRI ALEXA models. In the end, the majority of the film was shot on ARRI ALEXAs with Codex recorders, supplied by Fletcher Chicago (now Cineverse). Tom Fletcher was happy to recommend Codex, saying "the reliability of Codex recorders made them ideal for this demanding shoot. They worked seamlessly with both the ALEXA M and ALEXA PLUS cameras and we didn't have any problems. Codex also provides a rock-solid workflow for handling the large amounts of data generated by a production like *Into the Storm*."

"We chose ALEXA with Codex because we wanted, first of all, dynamic range, and secondly, resolution," Pearson says. "We wanted a camera that would allow the visual effects company to do the work they needed to do effectively. Dynamic range became the most important factor for us because we had to shoot the film in Michigan in the summer, where the average is 25 days of sun in July and August."

Of course the story unfolds mostly under overcast skies. And the visual effects aspect of the project was extensive, including many sky replacements and many practical tornado effects like blowing rain and debris as elements in the foreground. An important part of Pearson's approach was covering the actors with giant silks. Most of the time, he used Black Lite Grid for this purpose, with as many as three 40 x 60ft frames held overhead by construction cranes in exterior situations.

"They gave the reflections a dark sky quality," he says. "We knew that visual effects would eventually erase the background elements with sun on them and add stormy skies, and we knew that sometimes the backgrounds would be back-lit, side-lit or even front-lit by the sun. Dynamic range and the ability to hold enough detail and resolution in those areas was very important and so using a camera that had only 10 or 12 stops of dynamic range just didn't make sense. The ALEXA gave us 14-plus stops, and with Codex and ARRIRAW, it gave us plenty of resolution to roto the actor's hair against these bright backgrounds as well as the debris and rain in the foreground. The effects company felt very comfortable with the level of detail."

A-camera/Steadicam operator Peter Rosenfeld played a key role in communicating the found footage feel without making the audience uncomfortable. "He did a fantastic job," says Pearson. "There were shots that began in a second floor hotel room. He'd have to run out of the room, down the hall, down two sets of stairs, across a pool deck, hop into a van, and then land the frame. In other scenes, we relied on his excellent instincts to find the moments the actors were giving us. We did a lot of rehearsals during which Peter worked with an earpiece so he could hear the actors, and then he let his natural curiosity guide him. Steve liked Peter's fluid, long takes and used them without editing as much as possible."

Quale and Pearson scheduled the bigger 360-degree masters for dusk, which allowed for shooting in any direction with no trace of sun. Pearson would remotely adjust exposure during the shot. Master Prime lenses provided an extra stop. Opening up to T1.3 gave them an extra 10 to 15 minutes of shoot time at dusk."

"By this time, Peter had been working with the cast on a scene all day, and we could do four or sometimes five takes of an entire roaming master between the time the sun left the set and the time it was too dark to record a usable image," says Pearson. "That became an exciting way to get coverage with more freedom for the camera and with fewer visual effects."

The camera package included two ALEXA M models and two ALEXA Plus models. For handheld shots, the Codex recorders rode in backpacks worn by a grip who followed behind Rosenfeld. Lens metadata from the ARRI Master Primes and Fujinon Alura lenses was recorded and delivered to visual effects. DIT Dane Brehm also created a lens data archive system that could record lens data from the Optimo zooms, which were not lens-data enabled. The lens data was important for visual effects, especially in shots that included zooms, so that the visual effects company could track in the tornado effects with much less guesswork. The Codex Capture Drives were cloned using a Codex Transfer Station (SAS). On set colour was achieved with Fotokem's nextLAB Live system and the monitors were Sony BVM-F250 OLED models.

Making it all come together in the digital intermediate was essential for Pearson.

"I've always been very lucky in my collaborations with Steve that we've had a good amount of time in the DI to really polish the look and get it as close as possible to our original vision," he says. "We had nearly four weeks in the DI suite. We did an entire pass of the film in about a week and then spent the next two weeks going over it, massaging and refining the colour and contrast shot by shot as visual effects shots were dropped in. Sometimes images we'd shot in the middle of the day were cut against shots done at dusk. In these instances there are going to be subtle changes in the feeling and quality of the light, so it's a matter of balancing and blending and then refining as much as possible among all these various shots to make the sequence play seamlessly."

Pearson says that in spite of the heat and humidity – not to mention the artificial wind and rain – the equipment performed dependably.

"We wanted to immerse the audience in the most realistic, docu-drama kind of setting as we could, so they really feel that they are with the characters and in the situations, with the tornadoes all around them," he says. "And hopefully the combination of the handheld camera and finding those moments in a very naturalistic way, along with the sound effects, visual effects and all the surrounding elements in the film, gives people a sense of what it's like to be inside a tornado."

"WE CHOSE ALEXA WITH CODEX BECAUSE WE WANTED, FIRST OF ALL, DYNAMIC RANGE, AND SECONDLY, RESOLUTION"

Brian Pearson ASC

CODEXBACKBONE

Productions need to automate and put control of all digital files and metadata into the hands of production where it can be accessed and utilised quickly and efficiently. Codex Backbone integrates Codex's production-proven Vault technology with the new Codex S-Series Server and adds an easy-to-use UI, providing access to whoever is authorised. With Backbone, data is omnipresent and available immediately to those who have access.

Codex Backbone can be used for any type of production. It is an integrated end-to-end pipeline that can deliver the time and money savings that have been expected from digital productions but often not achieved. Codex Backbone and all parts of Backbone are scalable allowing studios to expand when needed and reduce the amount of usage to save money when needed. Studios and individuals alike will be able to track and re-use their information across shows, streamlining the production process.

CODEX BACKBONE SYSTEM

Codex Vault Platform

Codex Vault Platform has proven itself as a reliable image management and storage system. When a show gets to the shooting stage, Vault will do the heavy lifting in getting the shots cloned, archived, and transcoded as necessary. Codex Vault is scalable to accommodate single camera and multi-camera productions and supports many different camera and media types. Files can be uploaded to the cloud or archived to LTO tape.

Codex S-Series Server

Codex S-Series Server is the front-end hub for the digital files and metadata generated during principal photography. Files can be uploaded to Codex Cloud or archived to LTO tape. Codex S-Series Server uses the same expansion modules as Codex Vault. This gives you the most flexibility and scalability for the least amount of cost. Information from multiple Vaults can be easily transferred to the S-Series Server for long-term image and data access. Data can be transferred at any time by simply moving the Transfer Drive from Vault and inserting it into the S-Series Server.

"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

Codex Backbone is the central repository for images and metadata from beginning to end.

As bandwidth gets faster and faster and is expanding into even remote production locations, tracking your production in the cloud is becoming a reality, wherever you are. 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 crew in multiple locations to easily collaborate, saving time and money. Codex Backbone allows a production to store project information on the Internet. Using Backbone, users can access production information from anywhere using a web browser, tablet or smart phone.

Codex Backbone can be run on public cloud-based servers such as Amazon Web Services, private cloud services like Sohonet's Media Network, or locally using a Codex S-Series Server. This flexibility allows Codex Backbone to fit the varying needs of production.

Codex Backbone allows production information and pipeline stages to be securely viewed and edited anyplace, any time, by approved crew members, using any desktop or mobile device with an internet connection and is also designed to communicate with any other 3rd party system. Because it's a layered system, productions take advantage of the scalability of the system. Users, Vaults, and Codex S-Series Servers can be added and removed as necessary.

"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, Co-founder, Shotgun

CODEX BACKBONE AWARE

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

BRADFORD YOUNG ONE CAMERA TWO LOOKS

Bradford Young's emergence as a cinematographer is usually traced to the 2013 indie hit, *Ain't Them Bodies Saints.* That film, along with *Mother of George* and *Pariah*, brought Young best cinematography honours at the Sundance Film Fest. But Young's background includes more than 50 projects, including dozens of shorts and documentaries in addition to his narrative work. Like Ernest Dickerson ASC, Malik Sayeed and Arthur Jafa, Young is a graduate of Howard University's graduate programme in film.

This year, with *Selma* and *A Most Violent Year* in theatres, Young's work is garnering even more attention. Both films have earned praise on the festival and awards circuit – *Selma* was Oscar-nominated for best picture – but the similarities end there.

A Most Violent Year is a crime drama written and directed by J.C. Chandor *(Margin Call, All Is Lost)* and set in a dingy and dangerous New York City circa 1981. A married couple played by Oscar Isaac and Jessica Chastain run a heating oil company on the up-and-up in a corrupt world, and try to maintain a safe and welcoming home for their children. Young says that the imagery required a level of elegance. He initially wanted to shoot on film, as he had done on *Ain't Them Bodies Saints.*

CAPTURED ON CODEX

SUCCESS STORY: SELMA & A MOST VIOLENT YEAR
CINEMATOGRAPHER: BRADFORD YOUNG
RELEASE: 2014

"I approached the project with a certain cautiousness," he says. "The characters have a lot of precision in their lives, surrounded by a city that is so bleak. Once I knew film wasn't a possibility, I knew immediately that it was going to be ALEXA, and I was comfortable with that because I knew it was a tool that would allow me to capture the nuance. I wanted something flattering, and digital also gave the images a certain level of resolve."

The format was anamorphic, for a 2.40:1 frame. "It's a film about characters, but it's also about space," says Young. "Any opportunity to get that juxtaposition between space as a vista and the human body as a vista was desirable."

In keeping with the controlled aesthetic, the entire film was done on three lenses – a 35 mm, a 50 mm, and a 75 mm, all ARRI Master Anamorphics. Young estimates that 90% of the film was done on the 50 mm. "I would never shoot a film that wide if I were to shoot film, but with ALEXA it was great," he says. "You could get really close, where it gets flatter, and when you back off, you get an amazing wide shot. They're really good lenses, and partnered with the ALEXA, it's just a great combination."

The ARRIRAW file format was essential, says the cinematographer. "I wanted my blacks to be a very particular kind of black, and I knew if I underexposed at a particular level, that the ARRIRAW would really capture it the way I wanted it," he says. "For me, if I'm not shooting film, I'm not interested in shooting anything other than RAW. I'm just so used to working with the negative that it's really intimidating to do some of the stuff I want to do with darkness and underexposure with smaller files.

"The XT camera had arrived, with Codex recording built in, and that allowed me to do the handheld work I wanted to do – to keep everything tight and small, but capturing it RAW with all the resolution and no compression," says Young. "It's almost like there was no other choice. Even when I'm shooting commercials, I shoot RAW just because it's so familiar for me. When I look at an ARRIRAW file, I get it. I know what's in there. I know what's not in there."

Three weeks after *A Most Violent Year* wrapped, Young moved on to *Selma*, which chronicles the events in that Alabama town in 1965 leading up to Martin Luther King's march to Montgomery to demand equal voting rights. The director was Ava DuVernay. Young says that switch required him to become another person, in a way.

"*A Most Violent Year* was about precision, and we were empowered with the time and structure to achieve that in the frames," says Young. "*Selma* was about instinct. I'm always working under instinct to some extent, but when you're working with it as a grammar, as a tool, as the language of your film, precision is your enemy. On *Selma,* I was really hoping for imperfection. We thought that would bear an authenticity to the film that we were afraid most biopics don't have.

Director Ava DuVernay and DP Bradford Young

"The films had very different things to say, and they required two completely different approaches," he says. "*For A Most Violent Year*, I was a painter or a sculptor; on *Selma,* I was a photojournalist – a war photographer."

For *Selma,* Young chose Hawk V-Lite Anamorphic lenses from Vantage Film. An older Angenieux HR zoom that had been converted to anamorphic by ARRI Rental was often used on B camera, allowing for quick reframing.

"IF I'M NOT SHOOTING FILM, I'M NOT INTERESTED IN SHOOTING ANYTHING OTHER THAN RAW" Bradford Young

In both films, the lenses squeezed the image to fit the 4:3 sensor in the ALEXA and resulted in a widescreen image. Again, ARRIRAW captured on Codex was crucial to Young's shooting aesthetic and mindset.

"On *Selma*, ARRIRAW gave me the confidence to be a lot more loose, a lot more instinctual, and it allowed me to be more physically engaged, without worrying about a highlight here or a shadow there," he says. "We wanted each of the different spaces to have a different energy and vibration. I wanted it to pulsate. It can be hard to work that way when you're shooting, but the integrity of our RAW files helped us out later. It fell right into place. It was clear that we had the right sort of tapestry and look. It's a way of working where you're not concerned about everything falling right into place, because you want to just move and feel it – and it's interesting how it still falls into place anyway.

"ALEXA is allowing us to go back to the essence of photography, where once you learn the technical stuff, you can throw it away and not be bogged down by technique but be empowered by feeling," says Young. "I feel like I'm back where I was when I was in film school, when we were shooting on film and trying to create a feeling. Before the XT came, and the ability to shoot RAW, I felt like I was spending a lot of time trying to figure out what the hell the camera was. You spend so much time doing that, and you don't get enough time to figure out what the story is. You're always questioning whether what you see on the monitor is what you'll have at the end of the day."

"Now I feel very confident that the exposure on the camera is going to get me exactly what I want," he says. "I feel empowered. I don't get crazy about the technical stuff. It feels really great."

CODEX DELIVERS ON CANARY ISLANDS SHOOT

Matias Boucard, a veteran of hundreds of commercials and many television productions, only recently turned his well-honed eye to feature filmmaking, first with *Goal of the Dead,* followed by *L'affaire SK1.* Most recently, Boucard photographed *Don't Grow Up,* a mystery/thriller directed by Thierry Poiraud. The film was produced over the course of 26 days on location in the Canary Islands, the picturesque Spanish archipelago in the Atlantic Ocean west of Morocco.

Boucard shoots on a range of cameras depending on the needs of the project, but he owns an ALEXA 4:3 Plus with the XR module, which he has put to use on more than 20 commercials, as well as on *L'affaire SK1* and *Don't Grow Up.*

CAPTURED ON CODEX

ARRI ALEXA 4:3 Plus with the Codex XR module

"I don't like to focus too much on the technical," says Boucard. "I prefer to be focused on the story, characters and imagery instead of the latest camera or lens. Of course, I do my tests and determine the proper equipment for the project. It's important that the director works with me to make these choices to achieve the right look. Thierry wanted to work with ALEXA – he comes from film, and for us, ALEXA is the only camera that is close enough to film. I felt that the camera would give us the right texture and colours, and I knew the sensitivity would allow us to work faster and lighter without adding too much noise."

Goal of the Dead was shot spherical. *Don't Grow Up* called for a more "epic and classic cinema look," Boucard says. That led to the use of ARRI Master Anamorphic lenses. A few shots were also done with older KOWA anamorphics, which delivered more flares and a milky feeling that Boucard deemed perfect for a dream sequence.

The classic look had to be achieved on interior locations that were sometimes tight, and on exterior locations that were sometimes rugged and remote.

"I like to work in the old way," says Boucard. "If I want something warm, I put a gel on. Maybe it's because I was a gaffer. But I like to play on sets, and offer the director 80% of the look right there on the monitor. Having the contrast, brightness and saturation dialled in helps me be decisive and fast on the set with lighting.

"A big production with big lights would have been difficult," he says. "We didn't have ten generators and a crane. I was interested in using lights that I could buy at Home Depot – very useful lights that can be found anywhere. Many scenes in *Don't Grow Up* are lit with very basic lights, like the kind you might use in your garden. I play with tissue and gels. I want really sophisticated pictures – colourful pictures – with really nice contrast, but I always try to find a natural way to get to that sophistication. That's my philosophy, especially when I work without a lot of money and time."

The desire for simplicity extended to the camera and the workflow. "To make things easy on the set, I need perfect tools," he says. "I need to have 100% of the capacity of the camera. That's why I trust and use ARRIRAW and Codex recorders. My feeling was, 'OK, let's be rock'n'roll, but let's have the better guitar!'"

Boucard and his crew worked five nights with the camera set to record at 1600 ASA. "I love the texture of those images," he says. "We switched off most of the sodium vapour lamps to help create a mysterious and colder environment. We lit the city with only my gaffer and a crew of three. Each night we had three hours to prep, and in the morning, we had to take everything down, because the city went back to work. 1600 really helped me feel safe and stay within the budget."

Colour was a major concern on *Don't Grow Up*. The filmmakers took inspiration from the still photographer Todd Hido, who is known for large, highly detailed colour photographs that communicate a sense of loneliness. Poiraud brings artistic training to his work as a director.

"Thierry studied at Beaux-Arts School in Paris, and he is very precise about colour," says Boucard. "He likes blue, but not all blues – he likes a certain blue, with a touch of green or a touch of pink. For me, it's really cool that I can talk with him about that. But at the same moment, if I don't have precise tools, it's very hard to deliver accurate results at the end.

"When you mix colours, you must maintain control over your skin tones," Boucard says. "My tests showed me that ARRIRAW gave me the maximum precision in terms of colour. If you really like a certain type of pink or this type of blue, you can have it. I never had any surprises. And if I made any bad decisions, ARRIRAW gave me the range to bring it back."

The additional exposure range that comes with Codex and ARRIRAW freed Boucard to concentrate on other aspects. "I worked without a light meter 95% of the time," Boucard says. "I have a small monitor with my waveform, and I know exactly the latitude. I can be wrong by two stops, over or under, and it's not a problem – in the end I will have the image I want. I can trust the ARRIRAW. I dedicated two or three minutes on exposure while we were prepping the shot, and then I didn't think about it anymore – I just thought about the actors, the blocking and the camera movement."

Post was smooth. Due to the remote nature of the shoot, Boucard invested in a Codex Capture Drive Dock (SAS). A ProRes backup was made before the hard drives left the set. At night, Boucard saw frame grabs, and in the morning he'd speak by phone with the colour grader at the post house in Paris.

Rafael Rodriguez Llamas' DIT station consisted of two Mac laptops, the Codex Capture Drive Dual Dock (SAS), an ATTO Technology 680 SAS, a Sonnet Thunderbolt expansion chassis, and a 3 TB Toshiba hard drive. Software included DaVinci Resolve, Adobe Premiere CC, ARRIRAW Converter, Codex UI and Codex VFS Encoder. The rig had to withstand the rigours of location shoots in the full range of exterior environments.

Standard procedure included a check of the raw files with the Codex software and the Dual Dock; processing the raw files with Adobe Premiere; making the 2X squeeze with the correct aspect ratio; application of a Rec 709 LUT with DaVinci Resolve; on set transcoding to MXFs; rushes in .mp4 and .mov files; screen grabs with ARRIRAW Converter software; and backup to the 3 TB drive.

Looking back on the experience, Boucard is pleased. "It's not just marketing when they say it's about quality, not quantity! We shot on boats, in lakes in a splash bag, on beaches, in a forest and in the desert. We had four Codex drives, and we never had a problem. We shot ARRIRAW, far from a big post facility, and we never had a problem. When you're shooting on islands in the middle of the ocean, it's important to feel secure, and we never had to worry."

"LET'S BE ROCK'N'ROLL, BUT LET'S HAVE THE BETTER GUITAR!"

Matias Boucard

SUCCESS STORY: DON'T GROW UP
CINEMATOGRAPHER: MATIAS BOUCARD
RELEASE: 2015

CODEXVAULTPLATFORM

The frenetic pace of television production, the quick turnaround of a commercial, the longer production cycle of a feature film… today's productions demand a simplified, streamlined workflow. Codex Vault Platform is the gateway to the next evolution in production and will save you time and money. And most importantly, Codex protects your valuable asset, your digital negative, in the most secure way possible.

Projects today need a pipeline that securely delivers camera original data, metadata, editorial media, visual effects deliverables and production reports to whoever needs access to them. The combination of Codex Vault Platform, the new Codex Media Vault systems (page 38) and Codex Backbone (page 26) makes it easy for any production to manage their assets so that all departments can efficiently access whatever they need.

With world-class image science, high quality image processing and the power of GPU processing, Codex Vault is a fully-featured dailies and archiving system, providing a unified workflow for many different cameras commonly used today. Codex Vault Platform 4.0 and Codex Review feature 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, deliver faster than real-time, even with an input LUT, CDL, and a 3D LUT.

Vault has more than enough horsepower so you can meet the toughest deadline with time to spare. And a new Production Apertures tool automatically scales the deliverables based on the framing for a particular camera type.

Codex Vault Library

Codex Review Audio Sync

Codex Vault Platform is now Backbone-aware – sync your shot metadata to Codex Backbone wherever you are, so that authorised users have access to all the information they need to be creative and manage a show efficiently.

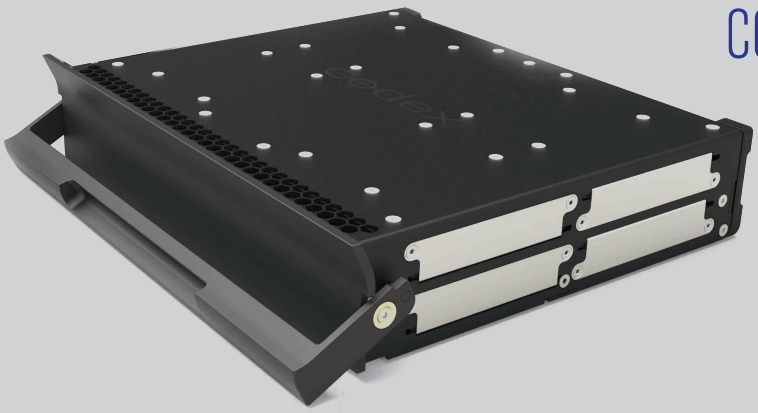
Flexibility and adaptability are critical today so Codex Vault Platform is now available not only on Codex hardware – Codex S-Series and Codex XL-Series – but also on Mac Pro and MacBook Pro.

Battle-tested all over the world and ready to go wherever you need it.

CODEX S-SERIES

The Codex S-Series is a modular, rugged device with super-fast transfer and processing times. Supporting multiple camera formats with a simple, task-based interface, the S-Series incorporates Transfer Drives for securely moving data from set and LTO-6 tape drives to archive your negative and satisfy your bond company.

- > Clone to Codex Transfer Drives
- > QC and check metadata
- > Archive to dual LTO-6 with LTFS
- > Sync with Review Live for look management
- > Add Review for QC, colour and audio sync
- > Battery-powered for remote locations



CODEX TRANSFER DRIVE

- > Proprietary – safe and secure transport between on-set, near-set and post
- > Save money on hard drives
- > Eliminates redundant copies of the digital negative

"CODEX REPRESENTS A SIMPLE, ELEGANT, ALL-IN-ONE SOLUTION FOR THE DIGITAL CAMERA WORKFLOW. I CONSIDER IT TO BE A ROCK SOLID PLATFORM."

Bruce Markoe, Senior VP, Post Production, Marvel Studios

CODEX XL-SERIES

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

Combine the power of the Codex Virtual 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.

> Powerful CPU and GPU processing for dailies with Codex Review
> Gateway to Codex Media Vault
> Easy integration with existing SAN environment
> Rack-mounted for adaptability

CODEX OS X

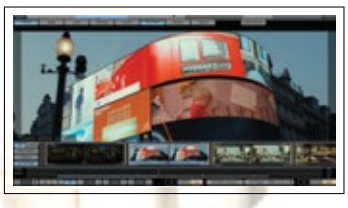
For a fully-featured dailies system, Codex Vault Platform is now available to integrate on your Mac Pro or MacBook Pro. For reliably archiving your valuable digital negative to LTO tape, add a Codex Thunderbolt LTO Drive and Vault Archive software.

> Integrate into your existing dailies pipeline or use standalone to create all your deliverables
> Add Tangent panels for interactive colour grading
> Vault Archive for LTO back-up

Codex LTO-6 Drive

Codex
Capture Drive 2.0 Dock

CODEXVAULTREVIEW



Review UI - Clip Palette

Review UI - QC

Review UI - Viewport Controls

Play – play back your camera original material at the highest resolution and at the correct frame rate. Review your footage with and without CDL values and LUTs applied.

Colour – Codex Vault Review contains a full colour pipeline, including support for ACES. Dailies can be viewed as the cinematographer intended them to be seen. Add a pre-LUT, CDL and a post-LUT. Collaborate and communicate using primary grading tools to generate CDL data that is tied to each shot and is carried forward to the next stage of your workflow.

QC – an intuitive user interface with a sophisticated timeline enables issues to be flagged. Generate a detailed QC report, with or without thumbnails.

CODEX VAULT WORKFLOWS

No matter what camera you shoot with or what media you record onto, simplify and safeguard your workflow with the compact, production-proven Codex Vault. From production to post with no fuss.

HD-SDI LOG + LUT

ON-SET MONITOR
CALIBRATED

HD-SDI LOG + LUT

ON-SET MONITOR
CALIBRATED

BACKBONE
AWARE

LUT + TC WIFI

IPAD

SYNCHRONISED LUT LIBRARY

LOOK, TIMECODE & EI

CODEX COLOUR CART

CAMERA ORIGINALS
& METADATA

ON-SET CLONE & ARCHIVE

CODEX TRANSFER DRIVE

NEAR-SET/PRODUCTION

CODEXMEDIAVAULT

Building upon Codex's solid track record for uncompressed RAW capture and streamlined workflows, productions can now manage and track not only the original camera files, but all of the associated metadata, editorial media and VFX shots using Codex's Media Vault Library, Production Drives, Media Vault Storage and our production asset management solution, Codex Backbone.

Codex Media Vault Library

Codex's Production Drive storage solution is the first of its type, providing productions with a true organic archive solution for production, marketing and content library management.

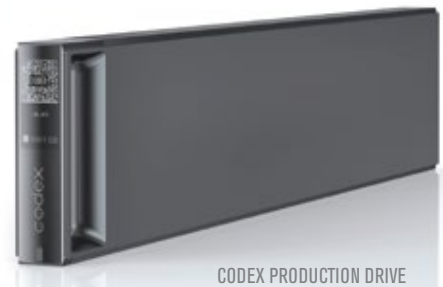
It is designed with productions' critical tasks in mind. It provides cost-effective linear drive storage that connects production with downstream production services and post and VFX vendors with no compromise in security, scalability, or performance. And like all Codex products, it's backed up by Codex's world-class support.

Augmenting the LTO archive tape already created on-set using Codex Vault Platform, Codex Production Drives provide an additional back-up of the original data files. Randomised, sequential I/O optimisation of the data enables efficient access across all production service applications and workflow environments. This allows all users to expect reliable and predictable near-line access to the data.

Each Production Drive provides 24TB storage. The Codex Production Drive storage solution comes in a package that smartly scales into any location providing hundreds of terabytes to multiple petabytes.

Media Vault Library Key Benefits

- Controlled, secure access via Codex Backbone
- The instant access of spinning disk with the long-term storage performance of LTO media
- Human readable digital ink labels with a QR code, linking directly to Backbone
- Easy to install with endless storage expansion
- Continuous auditing means drives have a data protection level exceeding that of LTO tape
- AES-256 encryption option
- Highly energy efficient



CODEX PRODUCTION DRIVE

At Codex we strongly recommend the creation of an LTO tape archive on-set, however, if the production environment or schedule does not permit this back-up while still on location, Codex Production Drives provide a secure way to transport your data to a controlled environment.

Continued on Page 40

CODEX ON-SET/NEAR-SET

FILM UNIT


ARRI ALEXA XT/SXT/65


ARRI AMIRA


ARRI ALEXA Mini


Codex Action Cam


Canon C300 MkII/500


Panasonic Varicam 35


Sony F5, F55, F65

HD-SDI LOG


LUT BOX

HD-SDI LOG + LUT


ON-SET MONITOR

BACKBONE AWARE


CODEX CAPTURE DRIVE


SxS PRO CARD


AXSM CARD


CF CARD

BACKBONE AWARE


CODEX S-SERIES

SYNCHRONISED LOOK LIBRARY

LOOK, TIMECODE & EI

CAMERA ORIGINALS & METADATA


LTO-6 ARCHIVE

DAILIES

EDITORIAL

AVID DNS, H264, BURN-INS

ON-SET
CODEX S-SERIES


CODEX TRANSFER DRIVE

NEAR-SET
CODEX XL-SERIES

CAMERA ORIGINALS & METADATA

BACKBONE AWARE


CODEX PRODUCTION DRIVE

PRORES, AVID DNX, H264, BURN-INS

EDITORIAL

DAILIES

REVIEW - QC - SOUNDSYNC AND LOOK MANAGEMENT


QC MONITOR


CODEX PRODUCTION DRIVE

PRODUCTION

CAMERA ORIGINALS & METADATA (CAMERA, CDL, LENS)
BACK-UP TO CODEX PRODUCTION DRIVES FOR VFX, MARKETING, FINISH

CODEXMEDIAVAULT

Storage

The Codex Media Vault Library complements the Codex Transfer Drive and Production Drive storage solutions used on set and near set and offers extremely scalable storage using a Codex managed system. From purchase and set-up, to production operation, Codex storage offers unmatched performance, reliability, security, and value.

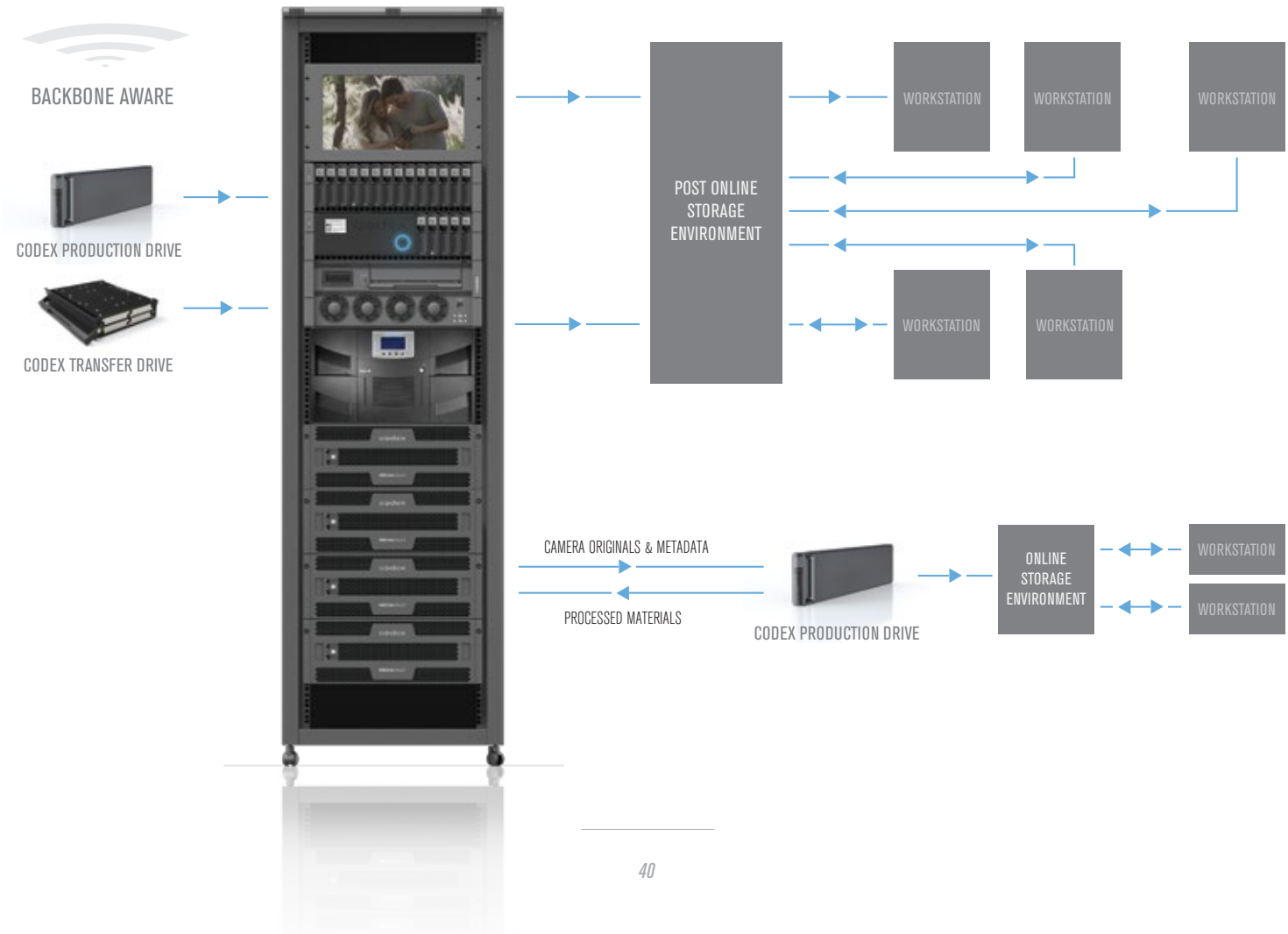
The new generation of digital cameras require significant bandwidth to support the higher resolutions of up to 8K. These data requirements will continue to grow as higher performance technologies emerge in modern production.

Codex Media Vault Library provides cost-effective storage for all of your production assets in a high-availability, secure environment, with no compromise in scalability or performance.

Integrated with Codex Backbone, tracking the production assets of each Codex Capture Drive, from the very first day of production, all the way through to the director's cut, Codex Media Vault Library allows assets to be easily searched for and recalled using a digital ink and QR code system built into each Codex Production Drive stored within the Codex Media Vault Library.

Media Vault Storage Key Benefits

- Controlled, secure access via Codex Backbone
- High Performance and High Capacity
- Integrated metadata controllers
- JBODs can be added dynamically to increase the storage space
- Fibre Channel Interface
- Enterprise Level Storage
- RAID Supports RAID 0, 1, 5, 6, 10, 50, 60
- Excellent Power Efficiency



CODEXMEDIAVAULT

Editorial

As editorial increasingly becomes the hub, productions can quickly and affordably scale using Codex Media Vault and Codex Production Drives.

The editorial team can quickly, securely and efficiently request files and feed material to whomever needs it – VFX, marketing, production etc. – without having to request it from a post facility to recover it from LTO tape.

For VFX pulls and final conform, the system provides far faster access to content than LTO tape, and can be managed directly from within the editorial suite. VFX Shots and files can be pulled and copied to other Codex Production Drives.

These Production Drives can then be sent back and forth to VFX facilities, for example, so VFX shots can be easily accessed from a local Codex Media Vault placed in the vendor's location by production rentals.

To expand storage in editorial or on location, you just load and slide in another Codex Production Drive and it mounts itself in seconds - nothing more. Additional expansion chassis can be provided to allow easy scalability throughout the production life-cycle.

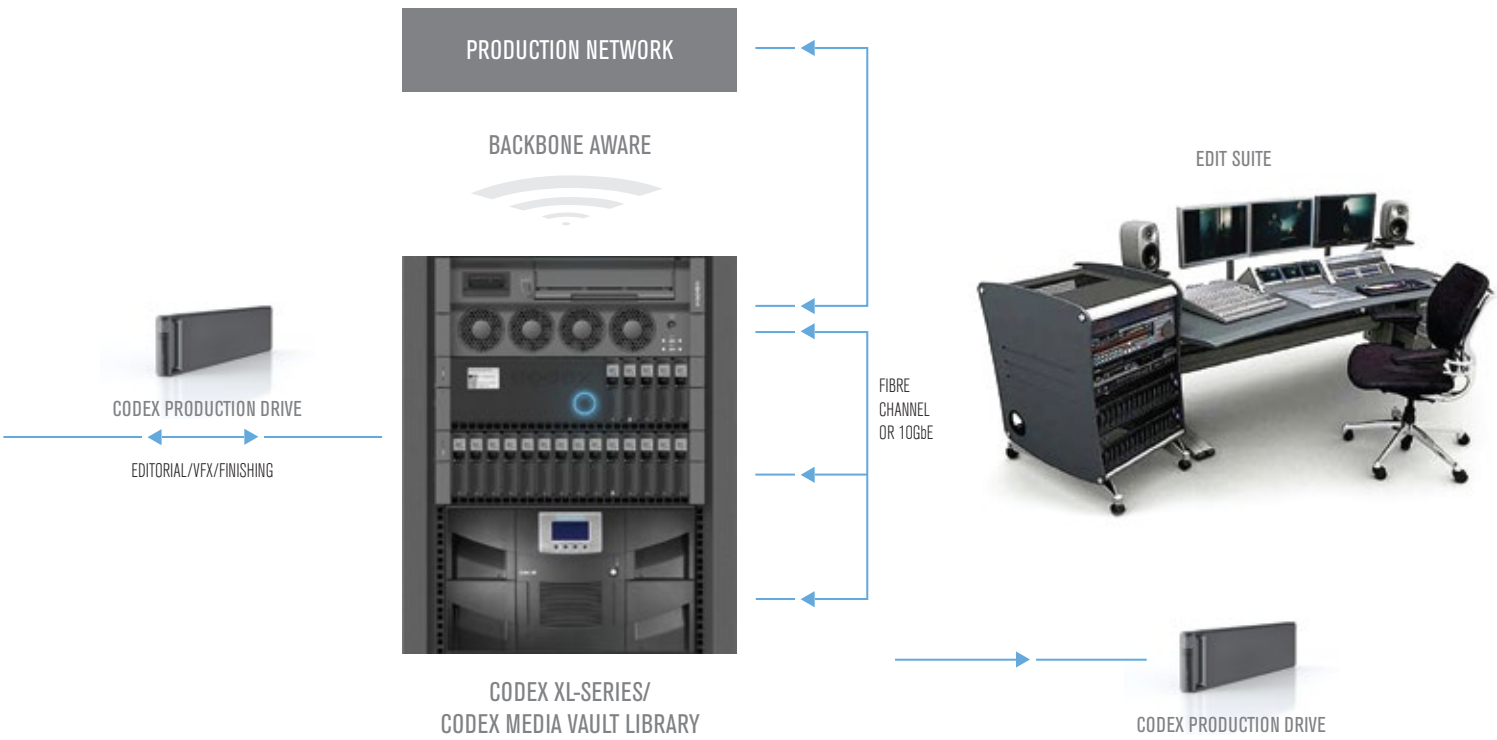
Codex Vault Backbone

With Codex Backbone and Media Vault, any production services or post production partner simply needs to install a controller which can hold five Production Drives to immediately connect to Backbone and access the needed files.

Codex Production Drives are under constant audit - the intelligent controller does this automatically and constantly reports the status – all in the background while not affecting performance. All information required for a recovery is stored on the individual Production Drives, not hidden in a separate file system or backup database.

This means that all Codex Production Drives are self-contained, are easily transportable, and will always be fully savable and rebuildable in any other enclosure. For even more capacity, multiple Codex Media Vault Expansion Chassis can be added.

Codex Media Vault connects to any network via 10GbE, or Fibre Channel, or i-SCSI using standard tape library protocols. Production partners can easily connect directly to their existing online storage environments, eliminating redundant copy times and charges for this additional copy.



ON SEPTEMBER 20TH 2015, AT 07.16 GMT, SPACEX LAUNCHED CRS-4, A COMMERCIAL RESUPPLY SERVICES FLIGHT FROM CAPE CANAVERAL AIR FORCE STATION IN FLORIDA. TRAVELLING TO THE INTERNATIONAL SPACE STATION (ISS), CRS-4 CARRIED NOT ONLY CREW SUPPLIES, CARGO AND THE ISS-RAPIDSCAT INSTRUMENT, A REPLACEMENT FOR NASA'S QUIKSCAT EARTH SATELLITE, USED TO MONITOR OCEAN WINDS FOR CLIMATE RESEARCH, WEATHER PREDICTIONS AND HURRICANE MONITORING, BUT ALSO A CODEX 4K RECORDING SYSTEM AS USED ON HOLLYWOOD BLOCKBUSTER MOVIES SUCH AS *NEED FOR SPEED* (DREAMWORKS SKG).

45,256,000 MILES AND COUNTING

DP JAMES NEIHOUSE AND ASTRONAUT SCOTT KELLY

Paired with a Canon Cinema EOS C500 camera, the Codex recording system is being used by the astronauts onboard the International Space Station to capture a set of pre-determined shots at 4K resolution for an upcoming IMAX production, tentatively titled *A Perfect Planet.*

It seems unimaginable, but by January 8th 2015 the Codex Onboard S Recorder, along with Canon cameras, had travelled more than 45,256,000 miles aboard the International Space Station. Capture Drives with raw footage from the shoot on the ISS return to earth via the SpaceX Dragon, the first commercial spacecraft to deliver cargo to the International Space Station, and currently the only cargo spacecraft flying capable of returning significant amounts of cargo to Earth.

Before the launch the Codex recording system was put through several months of rigorous testing, including radiation testing, by cinematographer James Neihouse and a team of engineers at NASA and IMAX. Codex worked closely with all parties to ensure that the recording system was bulletproof.

James has worked on many IMAX movies, including several space-themed ones such as *Hubble 3D, Space Station 3D* and *Mission To Mir.* Although different recording systems were evaluated, he commented, "Along with its ability to capture all the required frame rates at 4K from the Canon EOS C500, it became clear that Codex is a rock-solid platform and workflow, backed by world-class support. It was the obvious choice for this project."

Several astronauts will rotate through the ISS and shoot footage for this movie, including Scott Kelly, pictured here with James Neihouse, who will spend a year aboard the ISS starting in Spring 2015. With years of experience in space, Scott is currently the International Space Station operations branch chief and has previously served as commander of the station in 2010/2011.

SNAPSHOTS FROMSPACE...

CODEX ONBOARD S CONTROL PANEL

CODEX 4K RECORDING IN THE INTERNATIONAL SPACE STATION

CODEX+CANON C300 MKII

Following on from the immense success of the Canon EOS C300, Canon is launching the C300 MkII.

This evolution of the C300 has a Super 35 equivalent sensor providing a dynamic range of 14 stops, high sensitivity and low noise.

Codex fully supports the new XF-AVC format, with an efficient workflow, ideal for productions of every size and budget. Codex Vault Platform on a MacBook Pro is a fully-featured dailies and archiving system in a small footprint that can travel wherever you need to be.

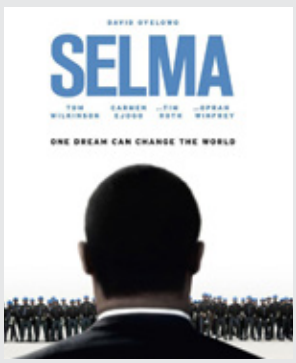
"Codex is a rock-solid platform and workflow, backed by world-class support."

James Neihouse

CFast 2.0 Workflow

With CDL-based colour grading, metadata tools, QC and audio sync, Codex Vault Platform and Review has everything you need to produce a full range of deliverables on-set or near-set.

For archiving, add a Codex Thunderbolt LTO-6 drive. And it connects seamlessly to Codex Backbone.



北京办公室 **Beijing Office**
地址:北京新华联家园北区25-211
电话:+86 10 5166 7108

London Office
60 Poland Street, London, W1F 7NT, UK
Tel: +44 20 7292 6918

Los Angeles Office
3450 Cahuenga Boulevard West, Unit 103, Los Angeles, CA 90068
Tel: +1 323 969 9980

CAPTURED ON
CODEX


codex
01
9 771234 567003