



HPA Tech Retreat U.K.

A Review of Some of the Key Sessions from the First HPA Tech Retreat Staged in the U.K.

By George Jarrett

Taking the HPA Tech Retreat concept to remote Oxfordshire in the U.K. was a no-brainer. SMPTE has more than 500 members within the U.K. region; American Cinema Editors (ACE) had already successfully presented its Editfest in Soho, and the U.K. is a major player in the global film and television markets.

The retreat displayed a great combination of technology with high-quality craft skills. The sessions over two days featured the main part of the program, with a preliminary day featuring a Digital Production Partnership (DPP) plug-fest and an “aspects of HDR” session, where Peter Wilson shared duties with John Watkinson. What was the key point offered? “Fundamentally, that you cannot break the laws of physics,” Watkinson said. “There are certain

givens. If you go to higher resolution in terms of photo sites in a camera, they are smaller, and that reduces sensitivity. If you go to higher frame rates you have less integration time, which reduces sensitivity. There are very few cameras on the market that get anywhere near filling up the energy envelope of the 4K raster.”

Epic Battle Opens Proceedings *Game of Thrones*

The audience were treated to a look behind the scenes of what it takes to put together one of the battle sequences that call out “Game of Thrones” as the leading show of its genre. The session presented a high-quality discussion between the team at HBO that oversees the post-production pipeline and the creative voices of lead producers and editors from the show. For those few who may have been unfamiliar with the series, the audience got a no-holds-barred and uncensored

beginners guide to the entirety of the show through to the current season from Samuel L. Jackson who narrated a trailer. Coincidentally, a YouTube video (https://www.youtube.com/watch?v=6N4gEJ_ED98) was released the morning of the session, which provided the Tech Retreat audience with a taste of the complex storyline and key characters that underpin HBO’s smash hit. Through a spectacular set of breakdown videos, we learned how complex high-end visual effects come together with the live action to deliver the GoT spectacular. This includes the use of a robotic flamethrower that, with the magic of compositing, became those pesky dragons in the final sequences.

Attendees were treated to a finale of full ten minutes of battle, shown on the Christie dual projection system, with a full Dolby Atmos sound mix (installed especially for this event) that shook the manor house. “Game of Thrones” was one



of the very first television series to use Dolby Atmos for home and theatrical audio, and the audience learned about the extra dimension this brought to the experience.

240 Million Render Hours *Jungle Book*

This brilliant discourse from MPC visual effects (VFX) supervisor Adam Valdez was centered on how he had interpreted the VFX for the overall project. In the end, MPC produced 1200 shots, amounting to 2,000 Tbytes. This work required 240 million rendering hours, which equates to 3,000 years on a single processor. Fifty eight master sets and 238 unique sets were created.

It would have been conceited to plan all the shots as blue screen. However, the child actor playing the character of Mowgli could shoot only two hours a day (due to U.S. child labor laws). And melding the live actors with the animated cast could have resulted in something that looked like a talking animal movie. “The trick was how do you do it on blue screen and make it look real outdoors,” Valdez said. “There was an issue as to dynamic range, stereo, 48 frames/sec, etc. And we only had about 18 months originally to do the whole thing.”

Script finalization time extended the deadline to 22 months, and content creation had to be fast. “We ended up with over 800 people on our portion of the film. They were not all on at the same time creating animals and sets. Our set supervisor said we created the equivalent area one-third of Paris—a pretty big chunk to take on and construct,” Valdez continued.

He had 500 artists at peak, and although he showed some brilliant movie clips, Valdez had points to make. “I want to talk about post-production from the aspect of VFX in films like this. What’s the actual spend per week? Just imagine 500 VFX people and the whole crew working on your movie. What does it cost? There is a great keenness to track progress at the post-facility and the filming. This is an interconnected process,” he said.

“These lines are getting blurred. This was a movie we were involved in at the very beginning, but [people know that] while VFX budgets can be very big, it is a business struggling to keep its place in the market. The dynamics of the film industry are squeezing down,” he added.

Big houses are expected to have at hand thousands of terabytes, billions of render hours, and many hundreds of employees, and this brought

Valdez to joint responsibility. “It is really important for us to be partnered with studios, productions and stand up for ourselves,” he said.

He presented a work-in-progress initiative designed to garner feedback. As part of this initiative, he sent a crew to Los Angeles to explore ways to improve MPC. The effort was strengthened by pairing key sector managers with Disney staff, and he teamed up the director and VFX supervisors.

Valdez showed an example of prelighting, how the movie was actually made. There is previsualization and then a sense of design. “What you need to do is make your plan, and sometimes it is very technical, or it’s very loose,” Valdez said. “We invested in our DP by setting up a lighting package of sun, sky dome, and soft box.”

4000 Articulation Points *Finding Dory*

This is the 17th release from a company that typically follows 3- to 4-year production timelines, and until the HPA Tech Retreat U.K., had not been seen on a high brightness screen. Cynthia Slavens, director of studio mastering and operations, related the story of the movie, and of the casting of the voices, stopping to





make relevant asides, starting with “Hank” the seven-tentacled octopus.

“Hank provided some of the greatest technical challenges that Pixar has ever seen in the course of character development and creation,” she said. “Take Woody for example, from *Toy Story*, he has about 700 articulation points in his model, but Hank has 4,000. So between that, and the camouflaging abilities of an octopus, our animation effects, and shading teams had their work cut out.”

The movie is full of landmark animation work, with many scenes benefitting from depth choices in 3D space and increased brightness. A pool sequence stands out: “This is another staggering achievement on Pixar’s part, simply because the full capacity of the ocean exhibit, houses something in the order of 16,000 fish, so a lot of crowd and individual animation,” Slavens said.

Slavens noted that Pixar enjoys “luxurious timelines” for finishing its projects, but changes have come at the consumer end. “We have hungry consumers who know they can get something at the push of a button. We are in the midst of simplifying some of our process and pipelines around new deliveries,” she said.

On HDR, Slavens explained that you cannot work values that are not yet there, stating that extendable or high dynamic range for theatrical does not necessarily translate in the same way as HDR for the home.

Pixar has been parking its directors of photography in front of HDR and 4K images, so it does not miss any adoption timings. On foreign language, Slavens added: “The scripts for international versions are created with such care that we don’t have to adjust animation lip-sync. It is a huge win for us. But for foreign language versions, we will update picture content.”

Golden Ticket *Emerging Media Technology*

Richard Nockles of Sky VR Studios began this session, which encompassed the issues and possible issues surrounding virtual and augmented reality (VR/AR).

“VR never really caught on. It was a website interactive thing and suddenly bang, the gaming industry got involved, Facebook acquired Oculus, and suddenly we could see that it is a genuinely different way of engaging with an audience,” Nockles said. “As VR producers, we are not saying it is going to replace traditional content. This is another way of engaging. For Sky, we are very focused on the experimental side of VR content and we are trying to hide the cameras as much as possible. A lot of Sky Sports’ content is obviously a no-brainer.”

Nockles showed championship boxing in 360, and Tour de France winner Chris Froome “floating around in Monaco.” He also discussed the stitching software he deploys. “You can adjust the cameras and adjust the horizon. The obvious key is having a straight horizon with the content. Otherwise, it can make you feel sick,” he said. “The software allows you to grade and color correct. The most exciting thing about VR is there are no rules. This is the chance to forge a new genre.”

New cameras and rigs are flying out; The Foundry has produced new Nuke apps: over the next year it is just going to get easier to create VR content. Jeremy Lanier, chief executive officer of LiveLike VR, introduced a live sports streaming application: “We can do more than

putting you inside 360-degree video. We use a 180-degree view, and we combine this with a 3D environment. This gives the viewer a more authentic stadium experience. You have what we call the golden ticket,” he said.

LiveLike is working to adapt to the cultures of different sports, and when producers see that 360-degree is ideal for goal replay and that it can be made to look natural, it will pass for live.

Callum Rex-Reid, head of M-Voice—a digital creative agency, offered an answer to the naming question—free viewpoint media. “We are able to change the viewpoint in any shape or form. And then you have 360-video, which is about rotational freedom. You can move your head around and up and down, and it is brilliant for sharing,” he said. “The absolute cutting

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— Rex-Reid

edge of VR is more than just rotational experiences. You can move forward, back, left, right, and move underneath, and you get a real sense of experience. Free viewpoint is all about being able to capture and translate and deliver that absolute freedom of movement.

“The [creative] world has known the flat image. If we are going to portray the world of reality, let’s try and use the right tools,” Rex-Reid added.

Steve Schklair, CEO of 3ality, interrupted the VR love fest. One question hanging in the air was: “Is the VR industry trying to shoehorn the content industry we have today into that medium?”

“We lived through the whole 3D revolution and were the backbone to all the Sky 3D. So we have seen multiple technologies come to the market, some good, some bad, so I come at VR with a little bit of



skepticism,” Schklair said. “We have issues with what we call this. A lot of the HPA sessions have been talking about HDR, P3, Rec. 2020 and Academy Color Encoding System (ACES), and those technologies don’t get close to what’s happening in the 360-degree video world.”

Imagine VR producers thinking image quality and shooting in the ACES for future proofing. “I like movies. I like a good director to tell me a story, and I don’t know if I am going to get that in VR, but we found unbelievably great applications in the commercial markets and in training. In this situation, there are so many places it can go where it works,” Schklair said. “We are just striving for better technologies, better post-technologies, real pipelines, and real images that look beautiful like the ones we are used to seeing in cinemas.”

Commenting on 360-degree demos that people may have seen, Schklair imparted that the medium has been confused with the content. “You put a headphone on somebody and after a minute they remove the headset and say it was the coolest thing they have ever seen. But if it was that great, why not watch the full demo, which ran five minutes?” he questioned.

“They are confusing how great the ability to look around you in this experimental medium is, with the content. That tells me that the content did not hold their attention long enough to keep the headset on,” he added. “Are people going to watch this, or is it the experience of the novelty? There are so many tools needed to make this end-of-the-world work, and those will come because there is so much money flowing into VR and so many talented people working on techniques for that world.”

Bugged by “Versionitus” *Netflix Originals*

This session was presented by Mike Whipple, production engineer, originals, and engineer Sean Durkin. It provided incredible insight into a brand that dominates 35% of evening-time Internet traffic in the U.S. Netflix has 81 million members who watch 105 million hours of content daily.

Everything is in startling numbers. “Every asset that gets sent to us undergoes a number of automated inspections, and we have over 80. Every file goes through those QC inspections before we start recording streams,” Whipple stated.

Some 12% of files were rejected last year, and Whipple confessed that “versionitus” is a challenge. On format issues, he added that most formats are closed and proprietary or decades old, and they can be limiting to innovation.

Netflix scores on so many fronts: There are no secondary languages, and it hits everywhere bar Syria, North Korea, and China. Whipple is a big fan of IMF, which enabled Netflix to make big changes to an episode of “House of Cards” rapidly. Implanting differential frames opens up future proofing values.

Durkin covered post and cameras, stating that their post-production work occurs at hundreds of facilities in many countries, so they had to come up with some firm methodologies and ideal workflows. “When we deliver 4K content, we require that it is captured on a 4K or higher sensor. We test cameras

to make sure they are capable of capturing more than 12 stops, and 14 stops is now common,” he said.

On the issue of a working resolution, he added: “We work in a common container and do not have to throw away any information at any point. We work from the camera raw files as much as possible, work uncompressed, maintain as much of the capture resolution and bit depth as possible.”

Defining the color pipeline is vital, as it manages the different color spaces involved in a project, and a managed color pipeline maintains the director’s and DP’s creative look throughout an entire production and also yields a high-quality archive. Durkin ended by leading camera originals, VFX and titles into the ACES realm. He had experience using ACES as a master format with the project “The Ridiculous Six.” His advice to all content makers was to “capture everything, do not harm it, main-

tain as much information as possible, and find your working space and work in it.”

The EBU has created a small prototype and plans to run an IMF plugfest: From the codec aspect, versioning requires working practices with composition playlist lists output program lists and the support of the vendor community.

Prejudice Against MXF *Broadcast Prospects for IMF*

Hans Hoffmann, senior manager with the European Broadcast Union (EBU), made a solid case for putting in the work so that broadcasters can enjoy the same easy versioning of master formats that the film studios enjoy.

“At this time IMF is pretty much locked into a particular codec, and we need much more flexibility,” Hoffmann said. “You don’t find JPEG 2000 accepted much in the



Scenes from the HPA Retreat





broadcast community. There are other mainstream codecs, but a codec for a master format application has to attain certain quality levels. It is much more important to have an open system where the master format can carry different types of codecs as they improve.”

The other big issue is the metadata, he stated. “You will never find a single metadata scheme accepted for the broadcast community. There are different business requirements so here again we will need to ask that we have a kind of plug-in mechanism that gives the possibility of carrying different types of metadata schemes, plus archive aspects. This will not require big rocket science.”

The EBU has created a small prototype and plans to run an IMF plug-fest: From the codec aspect, versioning requires working practices with composition playlist lists output program lists and the support of the vendor community. Other issues will be transcoding requirements, quality control, and the automation level.

Highlighting a negative, Hoffmann stated that IMF suffers from a prejudice because it uses MXF as the underlying layer. “The broadcasters have had some poor experiences with MXF over the last 10 years, where different versions were used, and prevented interoperability. But we can overcome that,” he said.

Summary

This first European event by HPA attracted both a high-quality executive attendance and strong corporate support in the Innovation Zone. In a heady cocktail mix of technology leaders and top craft skill exponents, the creative people made it plain to the technologists that they cannot work with values and formats that are not proven.

However, the relationship is immensely strong between the

engineer and the artist, as witnessed by the brilliant production values in both *The Jungle Book* and *Finding Dory*.

Many times, the word “standards” was tossed into the air, and

it was interesting to hear SMPTE/HPA Executive Director Barbara Lange announce that SMPTE is working on developing metrics in measuring the process of how long it takes to publish a given standard. One significant move is the commencement of a rigorous training

program for technical committee chairs, so they understand the processes better and save some time.

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