

Summary Meeting Notes

Event: Siggraph Birds of a Feather
Date: August 2, 2017
Topic: ACES and response to “ACES Retrospective and Enhancements” (RAE) paper from the VFX community
Notes by: Steve Tobenkin

Meeting started at 9:30am and lasted approximately 90 minutes including Q&A
Meeting was audio recorded to allow for accurate meeting summary notes, announcement was made that meeting was being recorded.

Joachim Zell (JZ), Vice Chair of ACES Project welcomed everyone to the meeting and acknowledged Jim Houston and Ray Feeney, previous Co-Chairmen of ACES Project who were in audience.

He described the current ACES Project Leadership team of Annie Chang (Chair of ACES Project and VP Technology, Marvel Studios) and Rod Bogart (Vice Chair of ACES Project Director of Production R&D HBO).

JZ then introduced the panel for today

Joachim Zell, Vice Chair of ACES Project (and VP Technology EFILM/Deluxe)

Alex Forsythe, Staff Technical Lead for ACES and Image Engineering Manager, Academy of Motion Picture Arts and Sciences

Thomas Mansencal Wingnut Films Production Ltd.

And co-author of RAE paper

Sean Cooper, Sony Pictures Imageworks and co-author of RAE paper

Panel discussed four topics from the ACES Retrospective and Enhancements (RAE) paper (paper and discussion available here: <http://acescentral.com/t/aces-retrospective-and-enhancements/884>) that were pre-chosen by Thomas and Sean on behalf of the group.

Topic 1 – ACES Openness/Academy rigor and documentation.

Thomas started off by saying there is a lack documentation in the records for the original ACES development efforts leading up to V1.0. in particular, developers and users would like to know about how features were chosen and how decisions were made as it's not clearly explained - he gave the dim surround adjustment as an example.

JZ commented that as he came on board the ACES project he noticed that some documentation was available but not that organized or understandable except to perhaps some 'insiders'.

Alex commented that there are aspects of the system that are better documented than others, in particular the core ACES 2065-1 transform is pretty well documented, both through Academy documentation and as the SMPTE standard: ST 2065-1. Other aspects of the system, the

documentation is a little more lacking. In particular, some of the transforms were difficult to document because there were so many iterations. He commented that detailed documentation makes a lot more sense to do now that we're at ACES 1.0 and moving forward as we revise based on feedback. Clear documentation of the transforms as they exist as well as documentation for how those transforms came to be is something he would like to do.

Jim Houston commented that there were times when the development teams disagreed on something, but a decision was made so the project could progress and that some of those things could not be fixed or advanced to another level.

Sean stated that It's not so much the pure documentation; it's also the philosophy of being open with regards to your motive. It's just being open about "we did that" instead of pretending that we did something rigorous and being able to separate, "this is based on science" with references we used to come to our conclusions, time was moving on and we just went with what worked. So that kind of specification is useful for the rest of us.

Thomas agreed with Sean.

Alex stated I think the point is very well taken, there is value in sharing that information with the community, and likewise providing examples of some of those experiments so that people can maybe test themselves and repeat the experiments.

JZ closed the topic with a statement that this project relies on the community and we are willing to be open.

SUMMARY (by author) It will be easier to document ACES development efforts now that there is a working system in production use. The ACES Team sees the value in documentation both in terms of explaining functionality as well as development options and intent. The ACES Team will support and encourage more transparency and documentation of the process going forward.

Topic 2: ACES and OpenColor IO

Sean gave a quick update on the OpenColor IO Birds of a Feather that happened the day prior. He commented on a proposal by Autodesk to port its SynColor functionality into OCIO. He also said ACES had been a big topic, particularly ACES transforms and needing to implement them more rigorously. Doug Walker from Autodesk confirmed the proposal to provide syncolor technology to OCIO and that they think an open source solution to color management is appropriate. Being able to see the same result and the same ACES reproduction across any application is a goal. There is a working group which has started to further this goal.

Alex said he's excited about this because he believes it will have a lot of benefits for ACES users - it's a little bit more natural, and there are some building blocks in OCIO 2 that are going to be really, really helpful for this adoption, particularly the CLF/CTF support that's built in.

JZ mentioned that in the upcoming ACES development structure, there will be an OCIO working group, lead by Thomas, and Michael Parsons from MPC. It was mentioned that this work might depend on the outcome of the SynColor discussions.

SUMMARY (by author) The combination of ACES and OCIO has been a positive force in the use and adoption of ACES. The ACES Team sees this collaboration and integration growing in the future.

Topic 3: ACES default look and parameterization.

JZ commented that the origins of ACES are in the motion picture business and that business has a desire to make things look filmic and pretty.

Sean commented that obviously by the necessity of the ACES workflow and the ACES pipeline, there needs to be some ‘base look’ imparted to an image. What we’re talking about is that there’s a lot of ‘superfluous’ things in there. Like glow module red modifier...why exactly were those there? This actually goes back to the documentation...what were the actual design intents for the look that is currently there and as ACES becomes more widely adopted, and as it gets used on larger and various projects, his general feeling is that the look should be “averagely, average”. It shouldn’t impose a certain look and any of those looks and modifications that are in there currently, should in theory be a sidecar to the baseline look.

Jim Houston commented that there were color science reasons that caused the inclusion of the items Sean mentioned, in particular the fact that in rec2020 red is twice as chromatic as any other color so the ‘look’ was not being accepted by creatives without some modification.

Sean and **Thomas** said that that is the kind of info that would be helpful to be public.

JZ asked Alex about a question about the RRT and Alex replied that we’ve heard consistently from the community, particularly the VFX community, the lack of perfect invertability of the output transforms is problematic for certain workflows. This is something that we want to address. How exactly we’re going to address it we’re not quite sure yet, but it’s something that is clearly on our radar for whatever the next generation of ACES is.

Thomas commented that ACES is being embraced by the Gaming industry and UDN (Unreal Developers Network) has 3.5 million users, which means that there could be many new ACES users, if there was an RRT that was less aggressive, less contrasty.

Alex stated these are important issues and we need to start dialogue around those, so if anyone from the gaming community wants to bring those to our attention, please do it on ACESCentral. Please write and tell us what it is you’re facing, what problems, what you like, what you think is missing so we can begin to we have a dialogue around this because otherwise we just don’t know.

SUMMARY (by author) The upcoming development efforts will consider feedback on all the issues including invertability and the RRT, to try to balance the needs of the different constituent

groups. In the case of some of the elements, there is no obvious answer at the moment but the conversation should of course proceed to see how it can be optimized.

Topic 4: ACES becoming the global color standard

JZ commented that the previous topic touched on this. Besides motion pictures, there are OTT and other uses for ACES that the ACES Team recognizes are part of the community.

Thomas commented that it's not only video games, any kind of hardware device is a potential target for ACES. Even smartphone. He said it's a natural process to bring all your graphic assets into that real-time environment, so naturally ACES is flowing into that so it needs to be accounted for, it's already begun and so it would be good if that can be embraced.

Alex said we're heard about the medical community being interested in ACES as well. The major takeaway is that I think what we build is a very flexible color managed architecture which is based on solid principles and so there's a lot of applicability to a wide range of problems. That's a good thing. The Academy's primary focus is making sure the Motion Picture industry has a framework that works for the Motion Picture industry so that being said, we don't want to preclude anyone else from using it if there's not a very good reason to. We tend to only hear about the Motion Picture problems and the feedback from the motion picture industry so if there are people who have feedback from other directions we'd love to hear that feedback as well.

SUMMARY (by author) The development efforts on the next generation of ACES will take into account the needs of all the major stakeholders. Some more recent adopters like gaming will need to join the conversation and help explain their needs as part of the process.

Camera Test Presentation

JZ described an ACES camera test he conducted in early 2015, immediately after ACES 1.0 was released. He used 4 different cameras and 4 different color correctors (with common settings and the same lens) and got 16 different output results! He repeated the tests in 2017 and this time got results that were very closely matched, so close that he would like to make the footage available, (downloadable from the ACESCentral webpage) combined with the documentation to help the community verify their ACES color pipelines. He encouraged the community to do their own tests, and share it with us. He is particularly interested in a VFX software test because he doesn't have access to 3D animation software in his position at EFILM.

Alex commented that the big take-away from the first test (in 2015) was that nobody had the ACES implementation right. We figured out was that we needed to better communicate to the manufacturers how to go about implementing their ACES pipelines, how to check that their implementation was good. We also created a set of recommendations for user interface guidelines, not so much "this button is here and that is there", but how do we name things in a consistent fashion from system to system. So now, the differences we're looking at have nothing to do with ACES really, they have to do with cameras and camera design. ACES, as the great leveler in that test made it obvious that that was the case. There's ways to deal with it, it's not

necessarily an ACES problem per se, but it's something that becomes clear you need to deal with.

Ray Feeney added, overall the IDTs have gotten much, much, much better. It's really things that have often been points of contention between camera manufacturers, how you rate sensitivity, how you rate a bunch of these other things, that are really outside the scope of ACES entirely. So, it's not up to ACES to fix that part of the vocabulary.

VFX workstation Displays

JZ asked the audience what was the predominant type of monitor used on VFX workstations and how often were they calibrated.

The group answered that they typically use consumer grade sRGB displays, and that calibration (except for some mission critical displays) is inconsistent.

Alex responded that this is one we get a lot of feedback on, especially from the VFX community. People will call us and say "the sRGB ODT doesn't look like it's working right, it looks really crunchy," and then, as we dig into it we find that really it's improper calibration of the display. There are 2 ways you can approach that: 1) you can calibrate your display to the standard, or you can choose another standard and we could build an ODT for that. We just want to be sure we're doing the right thing, that's consistent with the practice in VFX. One thing we know, and the industry has learned, certainly in the past 3 or 4 years is that calibration is really important when you have color-managed workflows. It doesn't work if you're trying to hit a moving target.

Virtual Work Group conversation

Alex presented a proposed methodology for the next generation of ACES development and asked for feedback. Instead of the more meeting-intensive method used in ACES v1.0, he proposed a Virtual Work Group system so that people around the globe could contribute and also, hopefully the work will be streamlined and faster. A chart of the proposed methodology is posted here <http://acescentral.com/t/virtual-working-group-flowchart-v0-1-draft-for-comment/1201/6> This is early stage and we want and need feedback from the community.

Parameterized ODTs

JZ mentioned that there is an HDR ODT virtual work group that took an early look at some of issues on that topic

Alex mentioned that on the proposed VWG chart this group was approximately in box 3 in terms of its progression.

Alex showed a proof of concept wireframe of a program that would create individualized ODTs based on user input parameters. The idea is to clean up the current ODTs that are not uniform in their code and provide a way for users to create ODTs beyond what is available in the standard ACES package. The Academy is hoping for feedback if people think this looks like a good path to go down.

Q&A

From the audience: Can you say something about ACESClip?

JZ We need to be able to transfer ACES settings over time. ACESClip will be an important standard for transferring ACES settings. The spec needs additional work and this is on the work list.

From the audience: Have you considered using something like ICC profiles as an input to ACES. It might be interesting to look at some automatic ICC to ODT construction that could be part of OCIO so you could get baseline good performance. Also, right now we have an issue that if you just plug in a Dell monitor, it automatically installs some custom, factory-ICC profile, so someone actually has to go and, uninstall that profile, and put something standard on there.

Alex It's sort of been on our radar, but to be honest, we need help with what the use case is and what the potential solutions are.

Doug Walker: It's a great point and it's also part of the OCIO v2 proposal, so please check that out.

Question from Alex: One thing we know needs more attention is this clipping issue with things like blue headlights on police cars and things like that. It's probably the biggest thing we get complaints about. We need help on this. We need examples and we need to talk about it more.

Question from the audience: Is the Academy planning to certify and start checking IDT in the camera vendor space or is it going to be the free-for-all that we have right now?

Alex: We currently do have a program for verifying IDTs, we give the camera manufacturers some guidance about how they should check their IDTs, but as part of the ACES Logo Program. The camera manufacturers have been really great actually about it, so the IDTs that are usually built into their SDK or that they have provided generally are pretty good. In the Logo Program, there are specifications for both mean, maximum mean and maximum Delta E that they can have to obtain the ACES Logo. But it's true that there's lots of stuff 'running around in the wild'. We do have a section on ACESCentral for people to submit IDTs so they can be vetted, too.

Question from the audience: In VFX, footage from DSLR is probably one of the most prominent source of material we get. That space needs to be recognized, it's not just the Motion Picture cameras.

Alex: we've created a piece of software based on libraw called "RawtoACES", Mio Zhu from the Academy is here, he wrote this for us. It's public now on our github page and what it does is it takes raw still camera formats and either creates an IDT using spectral sensitivity information if we have that available, and we're trying to build a database of those and build good IDTs. Or, it utilizes what information is available either in libraw or the file metadata, to be able to convert those files to ACES. We get people asking us all the time...I have a (*example*) Fuji XT2 can you please convert those files to ACES for us?

Comment from Jim Houston: There's one other thing I wanted to clarify in terms of cameras. We set an idealized scene referred production as the perfect ideal. So, you've got lenses, and cameras with unique spectral sensitivities, and they're all different and those things aren't changing. So, if someone wants to work hard, they can make their own for every lens, for every camera sensitivity but we certainly haven't worked the system required to do that accurately. So, we're trying to do the production level "close enough", and DPs like this or that camera because it has a better red and this camera has nice skin tones,

Audience response: I totally get that, that's a very good comment to make because for visual effects, I care about getting as close to the ground truth, scene linear representation of what that environment was. So, with those ISO and other setting differences, what we have seen is a marked difference between the 'close enough' approach of the DP that makes things pretty vs. the exact science where we can add up the numbers in our space. So, I understand both sides of this issue.

Thomas requested that the ACES Team post a response to each of the questions brought up in the RAE paper as well as a summary of this Birds of a Feather. The ACES team agreed.

JZ thanked everyone and encouraged them to sign up and participate on ACESCentral.com

Meeting ends.