HDTV NEWS Online

Interviews With Industry Leaders

Dr. Robert Hopkins

Sony High-Definition Facility, Culver City

By Dale Cripps

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It is fitting that on the same day when Sony introduces their new 24 frame per second HDCAM that we bring you Sony's Dr. Robert Hopkins, an expert on how to best use this new tool of production. See the Sony press release in our press release section for more information on this very versatile camera. __ Dale Cripps

Dr. Robert Hopkins served as the Executive Director of the Advanced Television Systems Committee during the time when the ACATS/ATSC standard was being formed and codified. Dr. Hopkins represented the HDTV initiative in various forums throughout the world, including the ITU and CCIR on behalf of the United States. He joined Sony High Definition facility in Culver City three years ago and in a short time has become a highly-respected and leading figure in the Hollywood production community.

What is the current state of the art and what are you doing with it?

Twenty years ago TV shows were made using 35 mm film. The post production was performed like a movie — cut film. That cut negative would be transferred to video. That was the show.

In the early 80s, practices of cutting film stopped for several reasons. First, there was considerable pressure on cost. It became cheaper to post-produce the show in NTSC. The producer would do a daily transfer to NTSC. They would then cut the show on a non-linear system. After that they went back to an on-line editing suite in NTSC. They didn't cut film at all.

Different studios, of course, had different policies. If a one hour drama was in its second year, they typically cut film after the fact. That would give them their archival copy.

One problem with editing using NTSC-only is the PAL market. When film was cut, that could be transferred to PAL. But, with the NTSC-finished program, you needed to do standards conversion.

The conversion from NTSC to PAL is complicated. It also looks bad. The original 24 frame film must be converted to a 60 Hz format for editing. That often left the final program with bad 3/2 (pull down) edits. With the combination of 60 Hz edits of 24 Hz film transferred to 50 Hz, a lot of motion artifacts resulted. There were complaints aplenty from abroad about transfers from NTSC.

Twenty-four frame digital HD solves a great many of these problems today. The producer can do his dailies in HD, as several shows are doing this year. You can shoot in film as well, then transfer the film to HD. A down conversion for all the off-line editing is done before moving back to HD to conform it at 24 frames.

In this way a producer can do all of the off-line — just as is done with film movies today. It is all 24 frame. With that taken to on-line conforming in HD, you are left with a 24 fame per second HD copy of the 35 mm program. You don't need to cut film — even if the show is hugely successful. You might want to hold on to that film, but the master is now a digital HD version of it.

To get an NTSC copy, of course, a down conversion is made from the 1080 X 1920 / 24 fps with 3/2 pull down to a 480 X 720 format. If a digital SDTV that recognizes 24 frames is required by the customer, you leave it at 24 fps. If doing HD broadcasting you, of course, leave it in HD, which is broadcast at 24 frames — something the ATSC standard can handle. For a PAL market you down convert from the 1080 X 1920 HD to the PAL 576 X 720 format. In this case the tape is run a little bit faster — 25 frames per second. You interlace it by taking every

other line. One begins to see the flexibility offered by the 24 fps HD production system.

In doing a TV show in HD, an equivalent of 35 mm cut film is created. It is like the pre-80s era, when a higher quality (cut film) was produced for the international markets. It would not surprise me to find some TV shows slated for Europe produced using these digital 24 fps HD cameras. Why? Because it is continuing to do the digital equivalent of 35 mm film.

If the production is lensed digitally (HD), the same resolution is achieved as if a transfer of 35 film were made to HD. The difference is your time. One need not spend their nights doing dailies and down conversions. The cost will also be lower.

Has there been a cost analysis to this approach?

It is still more expensive today due to the cost of the HD production equipment. There is a delta-capital cost to the industry in making a conversion. There remains a great deal of NTSC equipment in facilities. But, we all know the (HD) equipment will come down in price.

What I have already outlined, of course, is for television production. There are also movies being produced right now using HD cameras. These are 60 Hz cameras. I am sure producers of these movies would have preferred 24 fps cameras, but they were not available when they set forth.

Even so, people are constantly wowed by how wonderful 60 Hz HD footage converted to film looks. As many have read, “Phantom Menace” used shots from HD cameras. “Star Wars II” will be produced almost exclusively that way.

How many cameras will satisfy this market?

Very hard to say. Most (film) cameras are rented today from suppliers for the movies being made. I suspect that the HD camera business will follow such a model.

One of the points I would like to make strongly is that in no way am I saying we are going to stop 35 mm, and then start using digital HD cameras. I don’t expect that to happen.

The digital HD camera is different from a Panavision 35 mm camera. Because of those differences, there will be times when a 35 mm camera is the best one to use (slower or faster frame rates, for example). There will be times when a digital camera will be the better choice (live special effects, for example). There will be times when you can go either way. I see a co-existence. We are very happy to work in either.

The independent film maker often has an advantage when shooting digital. One of the feature movies we transferred here at Sony High Definition Facility was Michael Moore's "The Big One." He went out with his own camera. What he does is so much easier in digital. He just pops in another tape. He doesn't need to worry about film processing. He has longer loads than with film.

He used standard definition video. That is more equivalent to 16 mm film. There is no question that a standard definition camera is more convenient on the shoulder than a is 16 mm camera. You can also play the tape back immediately to see if you must redo something.

The typical technique used for film makers is to transfer their film footage to video for off-line editing. With Mr. Moore's project, he was already in video. Taking that as an example you might see how a low budget film maker can save money. HD is physically the same size as the Betacam. There are 40 minute loads in the HDTV camera. The down conversion is simple for off-line (down conversion is built into the tape machine). A low budget film maker can shoot in HD, then do off-line post production. At that point he can show someone his movie. He has done so while spending a relatively small amount of money. To finish the movie, the producer returns to HD for on-line conforming. At that juncture film is made from the HD master. The producer is going to spend more money finishing the film this way (over film in the first instance), but money is saved up front, where it is in shortest supply. He can sell his movie with a lower out-of-pocket expense than had he used film in the first place. The cost of producing in HD and transferring to film is not as much different than shooting film in the first place either. I am not trying to say it is cheaper, but there is an advantage for the low budget film maker since it changes the point where a big production cost occurs.

Shooting digitally for a big budget film will not likely save much money. "Phantom Menace" digitized nearly every frame of their production. By shooting the next prequel in HD, they bypass the need to digitize the film (for making special effect manipulations). Perhaps they will save a little in that step. On the other hand, they spend so much on other production values that it may be the savings (in HD origination) are pennies in comparison to the dollars it takes to put a movie like that together.

With regards to special effects, what new abilities can we expect to see from the new 24 fps camera and related equipment?

Special effects are often done with blue or green screen matting. Special effects are more and more done from within a computer. You are trying to get an overall image done using matting techniques.

When doing a blue or green screen, the cinematographer does his best to light the screen — the foreground and actors — in a certain way. He then shoots it. What is

on film is all there is. When you try to do effects with the film, it must be scanned in and, hopefully, the background can be extracted to do the effect you have in mind.

Having the matting equipment on the set is a big advantage when using digital capture. You can pull your matte live in real time. You can see if your screen is improperly lit and needs to be done differently. You see real time what you are getting.

I don't know how much of this Lucas will do in shooting the next "Star Wars." Certainly the distinct advantage of HD origination in such film making is real time evaluation of how your matting is. If you don't like it, do it differently. If done with film, you will not change it today by definition. Maybe you shot it yesterday, but perhaps it was long before that, and the talent is no longer available to you.

Will you be saying these things five years from now?

The presumption made with your question is that in the end, will you produce film to go to the theaters? If we had all-electronic exhibition, you could eliminate the film. You still have to do your HD on-line editing, which is more expensive due to the cost of the equipment.

Thank you Bob for bringing us up-to-date on the art of 24 frame per second HDTV production.

Dale Cripps

The 24 fps HD camera operates with 3 1080 X 1920 sensors, a full resolution RGB. The on-board recorder does some compression. The onboard can be bypassed to another recorder that does less compression or none. The options are the HD CAM format, the D5 format, the D6 that Philips is working on, and various hard discs are compatible.

The Sony High-definition Facility is division of Sony Pictures.