

# BroadcastEngineering®

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# HD

at any

# given latitude

BY THOMAS STRODEL

In March 2005, development began on a new high-definition travel show that would combine culture, adventure and a bit of luxury. My team and I at 24fps Productions created "Any Given Latitude" for FINE LIVING TV NETWORK, which broadcasts to more than 30 million homes in the United States.

We created 13 episodes, traveling across the globe, in a little more than 10 months. Because I was on location for all of the shoots, it was important from the beginning to develop systems and workflows that allowed for remote reviewing of program roughs and for the efficient ongoing maintenance of the production process. We also needed the technology to be rock solid, as it was important to travel with a limited crew and equipment.

Steve Miller used a Sony HVR-Z1 and Amphibico Phenom housing to capture coral underwater in Curaçao. Photo by Markye Kolenousky.

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During the course of the series, we traveled to Austria, Belize, Croatia, Curaçao, the Czech Republic, the Dominican Republic, Iceland, Portugal, Puerto Rico, St. Vincent and the Grenadines,



**Cameraman Jon Fordham worked with Mike Ryan (left) to shoot a nighttime scene of show host Joanne Colan in Prague, Czech Republic.**

Singapore, Thailand and Vietnam. We explored an awe-inspiring variety of places, including rural farmlands, bustling cities and underwater landscapes. We tried all kinds of local recipes. Most importantly, we met wonderful people who let us into their homes and lives.

## Pre-production

Although the network broadcasts its signal in SD, we shot and mastered in HD for future network use. Cameraman Steve Miller and I chose Sony's HDCAM format, shooting at 60i, because its imaging capabilities were ideal for the travel genre. Our primary camera was the Sony HDW-700A HDCAM, using the Canon HJ 15X8 HD lens and, occasionally, the Fujinon HA13x4.5 BERM/BERD — all rented as a package from Liman Video Rental (LVR) in New York. When possible, I monitored the action using a Panasonic BT LH900P 8.4in LCD HD/SD monitor.

I also wanted to integrate the new Sony HVR-Z1 HDV camera into the show. We used it for low-light conditions and as a second camera in cooking demonstrations. I was most excited about using it for shooting our underwater segments. In the past, shooting HDCAM underwater meant shipping and transporting the large Amphibico

Amphibicam housing. It produces amazing images, but its size was prohibitive for our shooting style and schedule. At the time, Amphibico had just released the prototype of its Phenom housing, made specifically for the Z1 and FX1 cameras. This was a great opportunity to test both the HDV format and the new underwater housing.

## Production

Shooting remotely, sometimes thousands of miles from home, can be rife with challenges. It can also be incredibly rewarding. With few exceptions, the equipment performed flawlessly and made the shoot even more enjoy-



**Steve Miller, the main cameraman on "Any Given Latitude," used the Sony HDW-700A HDCAM to capture Old San Juan, Puerto Rico.**

able. We had the occasional humidity warnings (especially when shooting in Southeast Asia in late summer), but we always made it work.

The Z1 performed well. The only drawback was that because it was much smaller than the 700A, handheld shots weren't as steady. We're looking into steadying systems for future productions.

Near the end of the series, we introduced the use of the Ambient SMPTE time-code clapper for situations where we used both cameras at the same time. To synch the two cameras, we simply pointed the HDV at it from time to time. This provided the neces-

sary visual time-code reference back in the edit. On average, we shot 12 40-minute HDCAM tapes and four 63-minute HDV tapes per episode shooting schedule.

## Post-production

Back in New York, the crew worked on prepping the HDCAM masters for the editors who would be working in Final Cut Pro 5 (FCP). This required converting the two different acquisition formats (HDCAM and HDV) into either DV or a similar resolution. We chose DV because one of the deliverables — a 20-second promo of each show — would never need to be conformed or converted back to HD. By using DV, the promo could be easily output directly from the SD edit.

We dubbed each 40-minute HDCAM master to a 40-minute DVCAM tape. It's always easier having a one-to-one relationship between the masters and dubs. To make these, we connected the firewire out on the Sony JH-3 HDCAM deck (with firewire interface) into the Sony DSR-25 DVCAM deck using the onboard letterbox conversion from HD to SD. The DSR-25, like most lower-priced Sony decks, allows the time-code signal carried on the firewire to transfer correctly onto the dubs. For added confidence and to allow for a visual



**The travel show took the crew from the warm waters of Curaçao up to the Vatnajökull Glacier in Iceland.**

reference, we set the JH-3 to export superimposed visual time code into the bottom letterbox area. This placement is important, as it allows you to later use the visual content in the DVCAM dubs.

All the editor need do is mask off the letterbox to hide the visual time-code reference.

We also hooked-up the analog output from the DSR-25 into Pyro's A/V Link analog-to-DV video converter, which outputs through a standard firewire connector. The firewire output connected to an edit system set up to use FCP's capture now feature as a small 320 x 240 clip. This happened at the same time the DVCAM dubs were made. It was a bit of a challenge to get this all working, but in the end, it yielded not only the DVCAM dubs for the editors, but also the mini reference movies, which proved invaluable during post.

### HDV in post

The HDV tapes were another matter. We wanted to provide these to the



**In Ha Long Bay, Vietnam, cameraman Steve Miller and his Sony 700A went aboard a pod boat to capture a scene for "Any Given Latitude."**

editors in an easy-to-use format that didn't require rendering for simple cuts. Because the main footage was now in DV format, it made sense to develop a solution to convert the HDV footage to DV as well. Unlike HDCAM, none of the HDV cameras or decks allowed for the transfer of

matching time code to the DVCAM dubs. There's probably a high-end solution out there, and you can certainly make nice looking DVCAM dubs right from the onboard downconverter on the Z1. But without time-code reference back to the HDCAM masters, they can't be used in the edit.

Over the course of the project, we devised two solutions to handle the HDV footage. The first involved digitizing each HDV tape into one of our FCP systems (making sure to turn off the default "make new clip with each shot" in the capture settings of FCP.) When you digitize HDV footage into FCP it does, as one would expect, retain matching time code. Once the tapes were digitized, we laid them out in a new FCP sequence and applied a time code

reader filter visually overlaying the accurate time code from the HDV masters. Next, we exported the large HDV files into more manageable QuickTime-based DV files. Unfortunately, these exported files did not include matching time code, so the editors needed to manually change the time code to match the visual reference. Sounds simple. It wasn't. There were many errors and issues along the way, mostly that the time code often did not match up once the conform started. We needed another solution.

After looking into several options, we decided to give the editors the raw digitized HDV footage. This meant that they would need to render every frame of HDV footage they used, because the base edit was in DV. The simplest solution turned out the best in this case.



**Cameraman Steve Miller consulted with these curious monkeys during a shoot on the Krabi Islands in Southern Thailand.**

My wish is that manufacturers would offer HDV cameras and decks with firewire output that includes matching time code. My ancient GV-D300 Mini-DV deck can record time-code matched output from our DSR-20 DVCAM deck. Why can't the HDV camera do the same?

### **Rough edits**

Once the DVCAM dubs were made, we logged the tapes using our TimeCodeLogger database program, which allows for deck control of the logging process and the generation of thumbnail pictures of the in-point of each log entry (a very good thing). Every shot corresponded to a separate record in the database. Each had an automatically generated filename. The database permitted us to search using a wide range of criteria. Time-

CodeLogger also allowed us to generate a batch import list for FCP, which greatly decreased the time it took for the editors to load in the footage.

With the logs and the mini video reference movies, our writer Bill Kearney and I completed script coverage, integrating into the script time-code

reference marks, filenames and notes, and generating a batch capture list. The editors then took these materials and other media elements (photographs, map graphics, etc.) and worked toward a rough cut. We usually received the rough cut within two weeks delivered via FTP as small, visually time-code-referenced 320 x 240

QuickTime movies. Initially, the movies were super compressed with a low frame rate (15fps). This proved problematic, as dissolves and cuts looked too short. So the editors exported the mini movies as 29.97fps. The entire 20-minute show was around a 100MB file — somewhat big, but small enough to download remotely.



**Steve Miller's underwater work proved an excellent testing ground for the new Sony HVR-Z1 HDV and the prototype for Amphibico's Phenom housing. Photo by Markye Kolenousky.**

## **Review**

Kearney and I reviewed these roughs and entered comments into a customized FileMaker Pro database. This database, hosted from our server, allowed everyone on the production team to access and respond to each issue.

This review process worked great in the field for the first half of the episodes. However, as shows started stacking up back in New York, it became problematic. One of the requirements of producing a travel show in the field is being able to respond to all the unforeseen situations that arise. There simply wasn't the time necessary in the field to give thorough reviews (which often required reviewing the camera master mini movies, music selections, the script and the TimeCodeLogger database). What might take several hours over a few days to do in the field takes usually only one long day back home. Somewhere near the eighth episode, I decided that all future reviews would be in-house, in person. Once the roughs were ready, we posted them as mini QuickTime movies on the FINE LIVING FTP server and on a special page of our Web site for online review.

## **Conform**

After making any requested changes, we started the conform process.

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Conforming an SD show to HD can be a complicated process, with more than 100 steps. It is so detail-specific that we wrote an HD conform bible that we'll use on future HD projects. The basic procedure for our show:

- Finalize the show in the SD edit so it is cut to time. (Ours was 19:50.)
- Run Media Manager in FCP, targeting it toward the appropriate HD capture card (AJA Video's Kona 2 10-bit, 1920 x 1080, 29.97fps).
- Move the new HD file (with any necessary photos or music) to the HD edit system (a Mac G5 with Apple's Xserve 5.6TB RAID and Kona 2 card).
- Open the HD file and start batch-capturing the tapes.

The keys to a successful conform are having a systematic approach for each of the main steps and a constant and repetitive quality assurance plan to confirm that those steps were implemented correctly. For the most part, the load-in process worked fine. At least once though, in every edit, a few clips needed to be reloaded. We also had some issues with clips that had speed modifications assigned to them in the SD edit. Many times, they ended up in the HD media managed file as a one-frame clip. These were easily fixed.

Each of the HDV clips (which were brought in using the Z1), needed to be modified, because HDV is 1440 x

1080 and we were conforming in 1920 x 1080. We normally upped the resolution by 133 percent, sometimes as much as 144 percent (in the case where we needed to remove the vignetting from the underwater housing.) It's important to also adjust the aspect ratio as well as the scale. We set ours to -33.33 in the motion tab of FCP.

The Kona 2 does a great job with the HDV upconvert. However, on our HD monitor, the HDV is not quite as sharp as the HDCAM material. This difference is less noticeable on an SD monitor. In the beginning, we were concerned that meshing these two formats would create a jarring difference in looks. This was not the case.



**Cameraman Jeffrey Fisher captured Iceland's Golden Circle for the new travel show "Any Given Latitude."**



**In the past, underwater shots required shipping and transporting a large Amphibico Amphibicam housing. To avoid this, the crew used Amphibico's Phenom, a new, smaller housing, with a Sony HVR-Z1 HDV camera.**

The HDV was good enough not to call attention to itself as a different format or shooting style. With the underwater segments, it performed well. Because the underwater environment is inherently in slow motion, the difference in

resolution was not a factor.

After all the media was brought in and the show graphics were relinked (from a shared folder on the RAID drive), we recorded and integrated the VO and uploaded the OMF and video reference files to Mike Ryan, our on-location and mix-down sound engineer. He used ProTools to mix down the shows, and then we sent the final audio mixes to us via FTP. We laid them into the edit and were then ready for the layoff. As mentioned before, every step along this process also included a complete review session. The more eyes and ears that you have reviewing something, the better.

### **Delivery**

The delivery requirements were texted and textless HDCAM and D-Beta masters. We layed off the HDCAM masters using the complex Sony HDW-F500 HDCAM deck. It was a struggle for non-engineers (like most

of our editors and myself) to figure out all of the settings and to troubleshoot problems that kept coming up. By the 13th episode, we had mastered the deck's operation deck, as well as documented and photographed the proper setups for the conform bible. The D-Beta deliverables were made by simply dubbing the HDCAM masters using the standard letterbox downconvert.

Throughout this whole project, we continually tuned and tweaked the production process. It's important to have a foundation for your process but to also stay flexible with it. We certainly know a lot more about the HD workflow than we did before. And we'll use this knowledge to great advantage on our other productions. To see "Any Given Latitude," tune in to FINE LIVING, Saturdays at 10 a.m. EST. **BE**

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*Thomas Strodel is an independent producer and director, as well as the owner of 24fps Productions.*