



Details of the Games:

NBC Relies on Sony HD Technologies



Clearing the HD Hurdle

Sony Helps NBC Take Beijing Gold

Since before the Sydney Games in 2000 NBC has turned to Sony in a technology relationship that evolved through Salt Lake, Athens and Torino.

A primary thrust of the early relationship was how the Sony gear could help NBC's workflows in a high volume production environment. From RFID-based Tele-File® tape labels that helped the network track the thousands of tapes it was producing to the ability of Sony recording decks to browse copies of ingested content to a PetaSite® data tape storage system, NBC asked and Sony delivered.

"Sony and NBC work closely on issues, we go directly to the factory and give them our feedback on what we'd like to see in the products and maintain a dialogue on equipment development," said David Mazza, senior vice president of engineering for NBC Olympics. "The Sony-NBC relationship has definitely evolved."

Through the last four Games, a weather eye was trained on the HD challenges building on the horizon, a storm the network substantially reached in Torino and fully navigated through in Beijing.

The HD Hurdle

The Beijing Games saw Sony and NBC's technical relationship clear the HD hurdle. Although HD was a significant part of NBC's IBC in Torino, where an HD layer was built on top of the network's established SD infrastructure, Beijing can truly be called the first HD Summer Games—all events were recorded by NBC in HD, from the beauty cams trained on the Great Wall to the robotic cams in the middle of the action.

Picture quality is the fundamental virtue of HD, and Sony's capture and recording equipment did not disappoint.



Barry Sprague at his MVS 8000G in one of NBC's master control rooms

From 14-bit HDC-1400 studio cameras to the latest 4:2:2 PDW-700 XDCAM® HD camcorders and PDW-HD1500 XDCAM HD record decks to the use of professional grade LCD monitors, image quality was

a key aspect of all the equipment used in NBC's Beijing effort.

And capturing those fine images didn't consume excessive amounts of bandwidth. "The pictures are great," said Mazza, referring specifically to shots captured on Sony's latest generation of recording equipment. "The XDCAM HD picture now rivals HDCAM at one-third the bit rate."

And NBC's decision to use the latest dual-layer 50GB version of Sony's optical Professional Disc™ media as its house recording format also didn't break the bank.

"The thought of the little discs recording 100 minutes of HD with eight channels of audio, in a format that won't age like videotape—that's huge for us," said Mazza.

The Tapeless Target

While pristine HD pictures and money-saving media are a big part of the NBC production story in Beijing, the fact that the Games were also produced substantially in a "tapeless" workflow using browse copies created at ingest remained critical. Indeed, the two themes are intricately intertwined.

"Back before Athens we saw HD coming, and knew proxies were the way we would need to go to handle a full HD production," Mazza said.

Sony provided key pieces for NBC's Advanced Video Processing System starting in Athens, a system also comprised of a Blue Order enterprise media management platform, Cyradis control system, and NBC's legacy OPIS tape library management and logging database.

In Beijing, the XDCAM equipment flowed perfectly into the system, recording high- and low-res copies, the latter in the Sony proxy format used since Athens. When the disc gets back to the library the proxy is dragged directly into the Blue Order asset management system.

The proxy helped make the lives of NBC's editors and producers easier in the hectic Games production environment. It contains a 1.5 Mbps shot of everything on the disc, married up with the stats and the logs on the Blue Order system, and it contains the bar code number of the disc where the high-resolution content is saved.

Mazza added that the nature of the full-res 4:2:2 XDCAM format—the quality it achieves at low bit rates—will allow NBC's Games production format to be the same as its archive format moving forward.

"That's kind of a shocker," said Mazza. "I never would have predicted that. ... It looks as if we may standardize on this format going into our PetaSite system, to make it our archive format, and at the same time it was the workhorse format here in Beijing."



David Mazza, senior vice president of engineering for NBC Olympics

NBC used hundreds of LUMA® LCD monitors in its facility, in sizes from 4-inch all the way to 42-inch (viewable area measured diagonally). New in Beijing were several BVM-L230 (pictured) reference monitors, used in critical applications in edit suites, Broadcast Operations Control (BOC) and elsewhere.



Good on the Shoulder

XDCAM acquisition fits in for Beijing features shooting

It's been said that for an acquisition format to succeed, it has to win over the cameramen and crew using the camcorders out in the field. By that standard, the PDW-700 XDCAM HD camcorder—of which 30 were deployed in Beijing by NBC mainly for ENG and features shooting—has a bright future.

"Bright" is an appropriate adjective, as NBC's XDCAM crews consistently mentioned "stunning" or "amazing" low-light ability when asked for comment on the pictures captured by the PDW-700s 2/3-inch imagers in the hazy Beijing air.

"It's excellent in low-light situations," said Robert Stookey, a freelance cameraman shooting the Games for NBC. "I've been in arenas that were not overly lit, and yet I still had full control of the camera with a very small amount of light available."

Chris Phillips, also a freelance shooter using the XDCAM system for the first time, has shot every one of the Games for NBC since Salt Lake. In Beijing he shot a range of news and cultural features, and even captured some competition footage at road and track cycling and whitewater rafting.



Chris Phillips

Telemundo, loved some of the features made possible by the non-linear and file-based nature of the Professional Disc media. "I like the fact that you can go to thumbnails to search your video," said Huazano. "You can quickly delete unwanted shots."

Phillips loved the camera's cache recording feature, which he said was especially important for Games shooting.

"If you're on a hill waiting for a specific cyclist to crest the top, you just use the 30-second loop recording feature, and then when your rider comes through, hit the button and that last 30 seconds is saved. It's a great way to avoid filling up your disc with unne-

Robert Stookey shoots while Don Hale handles sounds



Carlos Huazano

cessary pictures," he said.

Features aside, the cameras also managed to survive the rough life a field camera must expect. "It seems to have taken a beating with no issues related to dropouts," said cameraman Chas Isenhart.

"I think it's the Betacam camcorder of today," said freelance shooter Ken Cavelli. "It feels like a Betacam on the shoulder, it's easy to use like a Betacam, but it has so many other functions."

Freelance shooter Wally Hawkins put it simply: "It just feels good on the shoulder."

NBC deployed several PMW-EX1 XDCAM EX™ flash-memory camcorders in Beijing as second cameras on some features shoots, and also as primary acquisition devices for feature content created for its NBCOlympics.com initiative.

Scott Phelps worked in Beijing as a cameraman and editor for the online coverage, although some of his feature work was also used on air. He said the EX1 camcorder's small size helped make shoots easier, both in terms of simply being easier to carry and also for staying "under the radar" in situations where a large camera would have attracted crowds and too much attention.



Scott Phelps shoots in the stands

But it was the nature of the recording media that set the camera apart for his applications. "With the SxS™ PRO memory cards my laptop-based editing was fast and easy," said Phelps. "We could avoid the digitizing process; I could pop a card directly into my laptop and have an hour of footage ready to edit in six minutes."

And the quality of the pictures? "Unbelievable," Phelps said.

Ken Cavalli used an EX1 as a third camera in a shoot with two XDCAM optical camcorders, and said the little camera worked well for this application. "Matching the cameras was easy; they matched up beautifully with the color quality popping out."

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XDCAM Tapeless Ingest

Low Maintenance, Small Size of Latest XDCAM HD Decks Loom Large

There's so much functionality packed into a PDW-HD1500 XDCAM HD record unit—170 of which were used in NBC's facility—that it amazed tape room supervisor Mike Boland that the little units take up half the space of a traditional VTR.

Most of the units were deployed in Central Videotape, where Boland was one of two tape room supervisors, along with Thomas Barrett. It was Boland's fifth Games with NBC, dating back to Sydney, and although he had retired after Torino in 2006, he said his curiosity and a desire to remain abreast of recording technology helped lure him back to Beijing to be a part of NBC's first Games recorded on a tapeless format.



Mike Boland

And what was the verdict of this 33-year tape room veteran after a few weeks of watching the disc recorders in action?

"It's an impressive piece of gear," said Boland. "I'm a supervisor, but I like getting my hands on the equipment,

and these 1500s are good machines." He said they fit into his tape room mindset, with VTR-like features such as a jog/shuttle knob, and the learning curve was not bad at all. "It's been an easy transition for the operator and the supervisors," he said.

In Central Videotape, NBC used the machines as record devices for its ingest wall, where the 50 Mbps 4:2:2 MPEG-2 HD recording and eight channels of audio met NBC's quality needs on the hi-res side while capturing the low-res proxies and metadata so crucial to NBC's production workflow.

But Boland said the units also have a variety of capabilities attributable to the format's non-linear nature that NBC staffers

outside the tape room were exploring, too.

One such feature used by the graphics department and other production personnel was the deck's ability to do file transfers via FTP at three times faster than real time. "It's very quick, and the dub is an exact duplicate copy," said Henry Rubin, edit supervisor for NBC in Beijing.



Workhorses

The machines also met the durability test, keeping up with NBC's demanding ingest schedule, a schedule that saw feeds coming in from 8 a.m. 'til late at night. This would require a regular schedule of head cleanings for VTRs, but the no-contact nature of the disc media meant this was eliminated. "Zero maintenance," said Jay Chaney of Sony Professional Services.

But the simple issue of size also loomed large for a broadcaster looking to keep its shipping costs and real estate footprint down. According to NBC, it managed to eliminate an entire RIB (portable Rack-in-a-Box) from its facility design based on the smaller size of its ingest wall.

Size also mattered in the Multi-Format Dub Room, located just off Central Videotape. Anthony Stasi, videotape engineer for NBC Olympics, was thrilled that he could fit four of the little decks in the space formerly occupied by two traditional VTRs.

"We're able to fit more equipment in the same space, and we've had no maintenance at all on our machines," said Stasi. "We all came into these Games with most of us never having operated an XDCAM HD deck, but Sony was very good about training us and it's really very user friendly."

Professional Disc Takes Its Turn

Size, Cost, Shelf Life Cited

For Beijing, NBC adopted Sony's optical Professional Disc media as its house format, citing the format's space-saving size, low cost, and long shelf life. It was a Games debut for the dual-layer 50GB version of the media, the PFD50DLA.

NBC acknowledged that the size of the media meant different things to different departments: the slender 5-inch disc takes up less shelf space than professional tape formats in the on-site library. For shooters, more hours of recording media could be carried in pockets.



For Glenn Morris, director of Olympic Archives for NBC Olympics, the simple space savings associated with using the discs rather than larger tapes that

hold less video matters a lot moving forward. "Space really is a big deal for us in terms of storage and shipping," said Morris.

XDCAM shooter Chris Phillips said that from his perspective the 50 GB disc was ideal. "It can hold a lot of material. ... It's great if you're in the middle of an interview and you don't have to change a 30 minute tape," said Phillips.

The cost of the media was also a factor. With more than 3,600 hours of programming to produce, a \$60 U.S. street price disc that could record 100 minutes of HD with eight channels of audio was very appealing.

The abundance of audio channels was crucial in a 5.1 environment. The only other way to get that many audio channels would have been to go all the way to a more expensive mastering format, like HDCAM SR™. However, the HDCAM SR format did still have a place in the NBC Games recording world—the top-end format was used for laying-off reference records of the network broadcasts.



Sony's Personnel Touch

Jay Chaney, Sony's NBC Olympics Support Manager, has spent the Sydney, Salt Lake, Athens, Torino and now Beijing Games on site with NBC. His staff of 15, deployed to Beijing in staggered fashion from well before the Opening Ceremony through to the post-Games wrap-up, has decades of experience between them.

Beijing was different for NBC's Sony team. Typically, the thousands of hours of ingest would require Sony staff to be on site to maintain a regular schedule of VTR cleanings, but the PDW-HD1500 record decks completely eliminated such routine maintenance.

"A lot of what we did here was set up the machines to function within the NBC workflow, making sure that menus are set correctly and that operators are trained, and then wait for maintenance issues, which just haven't

happened," Chaney said.

The instructional role was key, as most of NBC's staff had never used Professional Disc equipment before.

"Because the workflow is different, we've taken on a training role," said Chaney. "It's not about 'what's going to break,' it's about 'how are we going to put this into the workflow.'"

The role of NBC's Sony team's role also goes beyond traditional support in other ways. "We're not looked at as just another vendor that comes in and supports the products and then leaves," said Chaney.

Dave Mazza, Senior Vice President of Engineering for NBC Olympics, explained the relationship succinctly: "They are fabulous, and a huge part of the team."



Jay Chaney, Sony's NBC Olympics support manager



Studio Ops Switch to HD

Sony cameras and switchers helped NBC capture and produce world-class HD images from Beijing. At the tip of the spear were Sony HDC-1400 cameras used in NBC's two studios and selected venues. "The images are great, the features are great, the reliability is great," said Terry Adams, director of IBC engineering for NBC Olympics. "These are state-of-the-art cameras as far as image quality is concerned."

In the control rooms, the TDs were using the latest MVS switcher from Sony, the MVS-8000G. According to NBC, the product is a good example of the relationship that has developed between broadcaster and vendor over the past decade.

"We've worked with Sony over the years to refine the MVS Series," said David Mazza, senior vice president of engineering for NBC Olympics. "The late Steve Laxton, longtime primetime show TD, gave substantial feedback to Sony on the switcher products over the years, and Sony listened."

Barry Sprague, TD of the primetime show in Beijing, has used every version of the switcher since the Sydney Games in 2000. "It's nice to see the switcher grow up; it's become a very mature product."

Sprague said one new feature that became a workhorse for him in Beijing was the switcher's clipstore transition, which

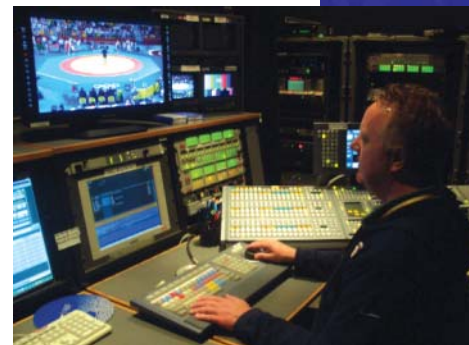
allowed him to do auto transitions using the clipstore as a keyover in the AV bus.

"Essentially I have a transition that will do a background channel that is 'snapshotable,' which will do two different clips with each snapshot, right off the switcher."

MVS-8000Gs—along with a few smaller MFS-2000s—were also used in several of NBC's linear edit rooms. Jim Bell spent his Games editing fast turnaround pieces in one of NBC's linear edit suites, and said the MVS-8000G's menu structure was very well laid out.

One of these rooms used Sony's venerable 9100 edit controller, but Bell's suite saw the Games debut of Sony's Plug-in-Editor, dubbed "the PIE" by NBC staffers.

"It has worked flawlessly and was easy to learn," said Bell. "It interacts very well with the switcher, all the software is in the switcher and you gain switcher functionality such as remembering color correction, remembering frame memory setups, total switcher recall ... this package, the PIE and the MVS-8000G, works great."



Jim Bell works on the MVS-8000G with PIE



Off the set, NBC deployed HDC-1400s and the new high-speed HDC-3300 camera at venues to supplement the host broadcaster feeds of the competitions.



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