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PROCESSORS DOUBLE DOWN ON BITS.

ON THE CUTTING EDGE

By **Scott Lehane**

For more than 160 years, the New York University (NYU) Medical Center in the heart of mid-town Manhattan has maintained some of the best teaching hospitals in the country, pioneering new medical techniques and training surgeons in the latest practices. In recent years, NYU's Cardiology School has been using SD video as a tool to train heart surgeons, but the limitations of SD soon became apparent. The image quality just wasn't good enough.

HD: Quality But Costly

Meanwhile, the pristine resolution and color reproduction of HD video held a lot of promise for those types of demanding medical applications but, until recently, HD gear was just too expensive to be a viable teaching tool. However, NYU's Cardiology School recently saw a complete overhaul of its video systems and videoconferencing capabilities to support HD and to be better able to teach the delicate surgical procedures developed at the school.

When it came to the video capability of its operating rooms and conference rooms, the school's demands were stringent: It had to deliver the best possible image quality. The school opted for Sony HD cameras, an XPRI HD nonlinear editing system, as well as HD monitors and videoconferencing products.

Recently, three of the school's Operating Rooms were outfitted with HDC-X300K HD cameras, 32- and 42-inch LCD HD displays, 19-inch flat-

Flat screens show HD images of operation in progress.



panel VGA displays, as well as conferencing systems and additional remote cameras, all from Sony. The guest viewing areas were outfitted with 32-inch LCD HD displays, and the conference room got a new conferencing system and 50-inch HD plasma display. In addition, currently the hospital is in the process of upgrading a video editing suite and will soon add a Sony XPRI nonlinear editing system as well as HD VTRs.

"They always wanted the quality to be the best in the world. One of the things that they needed was 1080I," explained Allan Katz, president of VTS Medical, which served as systems integrator on the project. "We weren't going to do 720P. We wanted to go to as high a resolution as possible. In fact, we're eventually thinking of going to 1080P," he added.

Dr. Stephen Colvin, the school's chief of cardiothoracic surgery, who has pioneered methods of minimally invasive cardiac surgery that are now used by hospitals worldwide, has long been an advocate of high-definition video to enhance distance learning, teleconferencing and lecture methods. In the mid-'90s, the school was one of the first to up-link a live HD transmission of a medical procedure for distance learning—a signal that was fed live to a surgical convention in New Orleans.

And Colvin has been promoting the use of HD video ever since.

Equipment Is Better

"Since then, the equipment has gotten a lot better for things such as switching. We had a problem before in that we were trying to do HD, but

Scott Lehane is a Toronto, Canada-based journalist and documentary film producer.



The increased picture quality of HD is making it more of a viable option for teaching surgeons the latest surgical techniques.

no switchers were available yet that were affordable,” said Katz. “SDI switchers 10 years ago were way too much money for a hospital to buy. Now they’ve come down to the point where we have the ability to do three full ORs.”

Indeed, HD has come a long way since then, and now video systems at teaching hospitals are becoming more and more the norm. And the increased picture quality of HD is making it more of a viable option for teaching surgeons the latest surgical techniques.

Colvin explained that “The imaging and display products we have are very beneficial for several applications, including use as a teaching tool so the fellows, residents and visiting physicians who come here to learn can view our procedures in the best quality image.”

Dr. Colvin also has a Sony PCS-TL50 desktop conferencing system in his office so he can view procedures in progress from his desk, or display them during boardroom presentations. “I can even watch the preparations being done for surgery, so I

know when the team is ready for me to come down to the operating room,” he said.

“The clarity is so much better,” he explained. “It gives us the higher resolution needed to better delineate between tissue and fat, for example. Everything is much clearer: the precision, the accuracy, how beautiful things are, how much more realistic everything looks. The 3D effects are also really powerful.”

“They wanted picture quality to be as good as what

they see in the surgical telescopes they wear, and NTSC video just never did it for them; neither did SD,” said Katz. “And you can understand why, once you see the difference. There are different layers of tissue that they look at... If you look at it in HD, you can actually see those different layers in less than a ¼-inch of space; with regular video, you can’t even see them. On regular video, it all becomes one tissue; in HD, you can actually see the disease there, and you can teach on it. That fine detail is very important in surgery.”

Another Advantage

Another key advantage in switching to HD is the improved color definition of the new HD monitors, which deliver a much better delineation between shades of reds. Red is often very difficult to capture on video, but these monitors flatten the reds to make accurate reproduction easier. “Before, we’d have to spend more time playing with lighting and moving things around just to get a good picture,” said Dr. Colvin.

According to Katz, another advan-

tage of HD is that its image size gives you more room for subtitles. “Before, when you wanted to talk about a patient on the video and have titles below, you had to make your fonts really big just so people could make out the letters,” he explained. “Now, when you do it in HD, you can fit so much more over the video and under the video; you can still see the picture in the background, but have the whole wording down below in a lot smaller font.”

Within the hospital, video is delivered as MPEG-2 HD over the web, but the operating rooms are also equipped with scan converters to bring the signal down to SD for remote teleconference applications.

NYU is in the process of installing a large bandwidth pipe that will be able to accommodate HD feeds to anywhere in the world. But for now, when the school wants to transmit HD, it relies on a microwave link to the Empire State Building, where the signal can be fed to Waterfront Communications, the largest fiberoptic video switching facility in the New York metropolitan area. “Right now, there’s not a direct pipe out of the hospital, but that will be happening in about three months,” said Katz. “NYU will have a large bandwidth pipe and we will be able to go out on high bandwidth.”

VTS Medical handled the complete design and implementation of the system, and Katz reported that working in an OR is probably one of the most challenging environments for a systems contractor. “Facility coordination was really hard. Hospitals don’t like people just walking into their ORs and hanging stuff. So you have to go through the planning stage with facility management, and go over

what you're going to do and how you plan to do it, and produce documents for them. There's a lot of drawings and a lot of changes going back and forth. The problem is, they don't shut down ORs, so it's not like every chance you get you can go in there and work on it."

As a result, the system took about two months to install, and more than a year in preplanning.

Katz pointed out that the equipment that goes into an operating room has to be meticulously sourced. "Operating rooms are always challenging because you're in a hospital environment and you can't have little pieces up on the ceiling that could fall off if you have an open patient underneath," he said. "So, even though we use Sony products, we'll take the product apart and put Loktite on the little screws and things like that."

Katz added, "We have special sterile handles built on to the arms. We have cabling systems that don't collect dust so when you move them stuff isn't falling down. So it's a little different than a broadcast situation where you have cameras on heavy mounts and things that are really cumbersome. In an OR, there's not a lot of room to start out with, so you need everything as lightweight and small as possible."

Studies Ergonomics, Functionality

In addition, Katz has to spend a lot of time studying the ergonomics and functionality of the gear. "There are many little things you think about when you're doing an installation, such as, how the doctor would grab it, how he would function, because he's sterile and he can't just touch the camera and move it," he explained.

In terms of the hospital's editing suite, Katz reported that those upgrades are still ongoing. "For now, we do everything captured through a

standard computer system, but we are switching over to the Sony XPRI and that will give us full capability," he explained. "So the editing suite used to be all D2 and D1 machines, but that's all being ripped out. We'll have an XPRI, a couple of HD decks and probably four or five monitors. We're also going to be using the Anycast system to do some of the postproduction for the medical school, so we actually can switch live surgeries out to the medical school over the web."

Katz reported that Sony engineers have been extremely helpful over the years. "They jump when we ask them to and they really help us," he said. "Sony has always been the type of company which, if I needed something, I could fly over to Japan (which I've done many times) and talk to the engineers. And they would help us design something. We bring a ton of their executives, all the way up and down the food chain, into NYU to see surgery and to actually see what we do, and see the limitations of what they build, and how we can make it better for surgery. I've never had an offer like that from another company. None of them care; they'll send you a box but that's about it."

VTS Medical has a long relationship with the NYU Medical Center. In addition to systems integration, the company also manufactures a range of custom electronic devices for the medical field, including high-quality medical grade LCD displays, 3CCD cameras, head light cameras and surgical light cameras. "We do a lot of OEM-type devices, where we'll make something for a company but it will have its name on it," Katz explained.

He reported that a lot of these highly specialized medical cameras are also starting to move in the direction of HD. "All the endoscopic companies are now starting to try to make HD endoscopic cameras," he said. "So, soon, everything will be in HD."

And over the next couple years, NYU wants to stay on the leading edge of that curve. "There are 28 operating rooms, and over time we're going to be changing them all out for large screen HD units. They want to hit every OR and make it all HD, and so that work will be ongoing," he said. "Everybody is thrilled. They want to do more cameras in HD." 