



Photo Courtesy of Kellogg Community College, April 2013

Simulating a Crisis Crestron technology helps Michigan college train first responders

Challenge

To create the best possible training for emergency medical technicians (EMTs), paramedics and nurses, by putting them through a variety of crisis situations without compromising safety.

Solution

A medical simulation lab using multi-camera video systems, updated with Crestron DigitalMedia™ and Crestron controls.

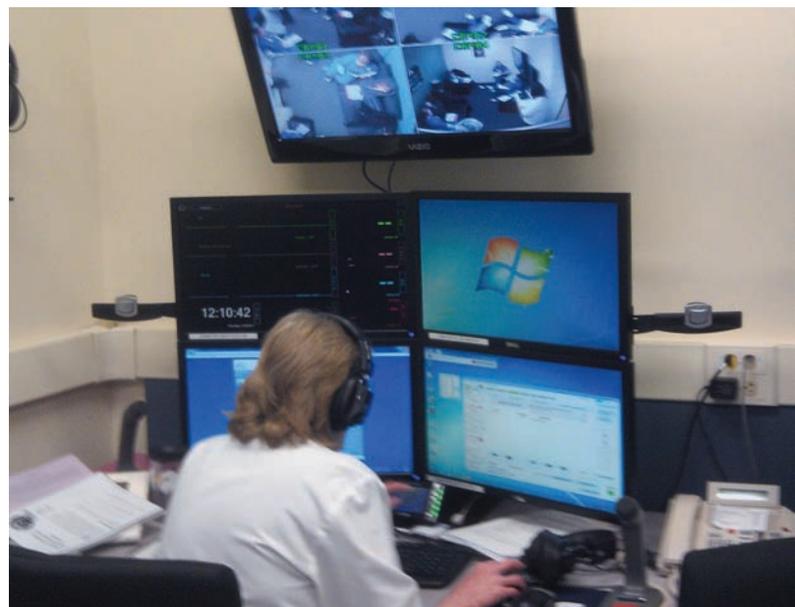
“We staged a forklift accident the other day. An industrial worker had his leg crushed and he was losing a lot of blood. Our EMT students had to act quickly to assess the situation then resolve it,” says Brad Fuller, Manager, Network

Infrastructure at Kellogg Community College in Battle Creek, Michigan (KCC). He was describing an exercise using the school’s newly remodeled simulation lab for EMT, paramedic and nurse training. Of course, the patient was not a real person, but a manikin built to provide realistic emergency experiences for students. “The simulations give our students the chance to learn how best to react in a crisis, and of course to make mistakes without serious consequences.”

Fuller says KCC uses a number of manikin simulators to stage various types of emergencies, including car accidents, heart attacks, asthma attacks, and childbirths. When the crisis is over, students can watch the actions they took and discuss them with instructors and colleagues. “Sometimes they’ll say, ‘Oh, man, I should have done that differently,’ but other times the instructors will tell them, ‘That was really good.’ The combination of the exercise and the feedback makes it a really great learning experience.”



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There are thirteen simulation areas at KCC, each of which can be set up with one or more patient manikins. There's a home with a living room and bathroom, an automobile mockup, a stationary ambulance for indoor use, a real ambulance that can be set up for outdoor exercises, a hospital emergency room, a pediatric ward, and outdoor and multi-purpose spaces that can be set up for a wide variety of scenarios. Each can be equipped with four or more video cameras and associated microphones, so instructors can see and hear what's going on as well as record the exercise for later review.

For EMT simulations, students arrive at the scene, assess the situation, provide emergency treatment, wheel the patient out to the ambulance and then into the emergency room. For nursing simulations, students work in a hospital environment.

Students practice a variety of skills, from setting IVs to CPR, and they learn strategies for dealing with an unfolding crisis. Instructors control the manikins and their vital signs and can throw extra trauma into an otherwise routine situation, causing a patient's blood pressure to drop precipitously or turn a child birth into a breech presentation.

Remodeling the simulation labs

Fuller says KCC introduced its simulation program years ago, but the first iteration used a manual switching process that was more than a little awkward. "We renovated the building

that houses the simulation lab last year and saw an opportunity to integrate better controls," he explains. The updated system uses Crestron touch screens and a DigitalMedia switcher to greatly simplify several complex processes.

"We were able to create a highly visual and automated interface which makes it easy for instructors to control these systems."

Brad Fuller, Manager of Network Infrastructure, KCC

KCC can now run four simulation exercises at one time. Instructors can set up indoors or out and have a great deal of flexibility in how they position manikins, props and cameras. "I have an outdoor area where the drivable ambulance parks," Fuller explains. "It has four camera hookups. There's a multi-purpose room inside with eight hookups." In these areas instructors use quick-connect cameras equipped with clamps, so they can attach them to furniture, light poles and almost anything handy.

Fuller and his IT staff equipped each of the control stations with four rack-mounted computers. One controls the simulator manikin. Another sends vital signs to monitors in the ambulance mockup and hospital rooms. A third is a DVR used

for recording the exercise. The fourth allows the instructor to take notes during the exercise, send PowerPoint® slides to the simulation area (most often at the beginning of an exercise) and control the DVR. The instructor, who works in the control room during an exercise, has a video preview monitor, four computer monitors, a keyboard, a mouse and a four-inch Crestron touch screen to control the cameras, signal routing and DVR.

An older composite switcher handles all of the routing of camera and microphone signals from the simulation areas. This analog switcher sends each feed into a control station multiplexer, which in turn duplicates it for a preview monitor, the DVR and the feed that goes to the classroom AV systems. A new Crestron DM16X16 digital switcher routes live or recorded images from the control stations into the classrooms, and vital signs and any instructional screens back into the simulation areas.

Instructors watch the output from the various cameras and listen to the audio and decide which camera feed will go to the DVR and/or the classrooms. Added complexity comes from the fact that, while the preview monitor can handle just four cameras at a time, there can be five to eight cameras in each simulation zone.

“We were able to create a highly visual and automated interface which makes it easy for instructors to control these systems,” Fuller says. Instructors choose the cameras they want using the touch screen, and if they choose a pan/tilt/zoom camera, its controls automatically appear on that screen. Routing screens make signal flow intuitive. Touch the simulation area, camera or computer where you want the video to come from, and then touch the DVR, classroom or simulation area where you want it to go.

Fuller says he decided to add a Crestron DigitalMedia switcher onto an otherwise all-analog system for three reasons.

First, the DM® switcher handles analog signals seamlessly, converting the various video and audio feeds to a digital format in real-time, without loss of quality.

Second, it is far easier and more economical to install a single twisted-pair Crestron 8G network cable than bulky and

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expensive copper video and audio cables. For that reason, the higher-quality DM system was less costly than expanding the older analog setup.

Third, when the school eventually converts to a high-definition, all-digital camera system, there will be no need to replace the new components or cabling. “We know this is a transitional solution,” Fuller says. “We replaced about 50 percent of our older system, but it was fiscally responsible to reuse what we could.” The new parts of the system will, in fact, handle much higher resolutions than today’s high-definition standards, so Fuller expects to use them for many years to come.

In the meantime, he adds, the new controls are making life easier for instructors and letting them focus on creating the best possible simulations. “Our instructors are passionate about these classes and about making the emergencies as real as possible. All of them are EMTs or nurses or formerly worked in those fields. They want to make sure their students are prepared for anything and everything they will see in real life.”

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