

## Extron NAV Pro AVoIP and Control Systems Enable Large-Scale Health Sciences Instruction at TRU

“Design validation protects against using the client’s project as a testing platform, and Extron’s NAV Pro AVoIP and Pro Series control systems tested true, supporting the medical training scenarios seamlessly and reliably on the converged network with no noticeable latency or signal degradation.”

Marcel Schoenenberger  
Principal Consultant  
McSquared System Design Group, Inc.

### Challenges

When Thompson Rivers University – TRU determined that they needed more space for their expanding nursing program, they made plans to build and equip a new facility with state of the art teaching tools. They have recently finished the Chappell Family Building for Nursing and Population Health – NPH at their campus in Kamloops, British Columbia. This health sciences facility was designed to accommodate the needs of the current nursing program and support expansion of the outside post graduate paramedic and firefighter training programs.

In addition to an AV presentation system and wireless functionality in each instructional and meeting space, TRU required a comprehensive transport system that was capable of distributing HDMI and audio signals throughout the 49,000-square foot (4,552-square meter) multi-disciplinary building. A top priority was integration and seamless compatibility with current and future teaching modalities, equipment, and systems. The design would be tested over a year-long validation process.

### Solution

TRU worked with McSquared System Design Group, Inc. to create a fully functional proof of concept installation. The pilot installation, and the





**HDMI inputs on the lab station headboard and the wall provide AV connectivity for the human patient simulator, medical equipment, computers, and portable sources. The NAV E 101 encoders are powered over PoE+, freeing outlets for use by these standard station devices.**

deployed systems, included an Extron NAV® Pro AV over IP system for signal distribution and a Pro Series control system programmed using Global Scriptor®, Extron's Python-based development environment.

The POC design spanned multiple rooms and floors. It consisted of a dual-station simulation training lab, an adjacent dual-station control room, two overflow classrooms, and two debriefing rooms. Each room included between one and six professional displays, depending on room function.

The lab's two stations were fully functional and provided all of the specialized equipment used in modality-based medical training scenarios. Each station included a CAE® human patient simulator, which is a robotic manikin with built-in technologies to mimic illnesses and instructor-controlled realistic responses to medical procedures. One station was a high-fidelity unit, with multiple PTZ cameras, content inputs, professional displays, Shure® array microphones, a ceiling speaker, a learning management system, an in-ear monitoring system, and an augmented/mixed reality system. Sessions were archived using a dedicated medical lecture capture system, which was capable of recording and playing back content from up to five discrete channels. The station also provided audio capabilities needed for both standardized patient and confederate training functionalities. The second station was a medium/skills unit with similar but scaled-back functionality, such as a two-channel lecture capture system.



**The instructor is able to control each station's AV system using a tablet running the Extron Control app. The programmer used Extron's Global Scriptor® Python-based development environment to enable this functionality and much more.**

To prove the concept and various systems, training scenarios were designed to stress test the installation for performance competency. Scenarios employed each piece of medical and AV equipment to validate function, operation, and compatibility. As with all AVoIP solutions, appropriate network topology and professional active hardware were essential for system efficacy.

## AV Distribution

Each station was equipped with a NAV Pro AVoIP system, a ShareLink® Pro 500 wireless presentation gateway, and multiple HDMI inputs at the headboard and at the station's headwall. One of the





Control room operators use an Extron TLP Pro 1025T 10" TouchLink® Pro tabletop touchpanel to control any combination of devices at the instructor's direction.

wall-mount inputs was reserved for the instructor's laptop. The other inputs provided connectivity for the simulator, augmented/mixed reality headsets, computers for the patient's vital signs, anesthetics, and health records retrieval, and portable medical equipment such as a crash cart with a defibrillator. Content was presented on one or more of the wall-mounted displays. It was also captured and/or routed to the remote locations, including to an Extron DTP CrossPoint® 4K Series presentation matrix switcher in each debriefing room. The majority of the AV components were rack-mounted within the lab.

AV signal distribution within and between rooms was achieved with the Extron NAV Pro AVoIP system. The encoders and decoders facilitated extension of live content from the stations to any combination of rooms for overflow and analysis. NAV E 101 encoders streamed video and audio to the decoders over TRU's 1 Gbps Ethernet network. NAV SD 101 decoders scaled the video to the display's native resolution. Both NAV models include the integrated PURE3® codec, a wavelet-based compression technology that delivered the required HDMI 2.0-compatible video at resolutions up to 4K and ultra-low latency at an 18 Gbps video data rate. For audio, the encoder supports the AES67 standard that ensures interoperability of audio over IP.

The NAV devices were powered using PoE+, which eliminated the need for a local power supply or injector at the lab station or display. This freed outlets for use by the medical equipment and AV sources. Additionally, the superior bandwidth management capability within

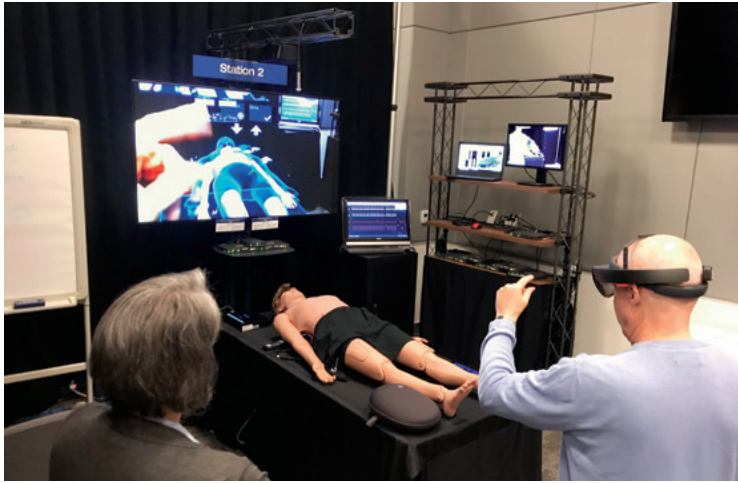


The pilot installation included a fully functional control room. The control room was mocked up at Extron headquarters in California and then tested by university staff.

the NAV system was advantageous for controlling the network infrastructure costs.

## Control

The AV control system played a key role during testing and validation of the overall usability, reliability, and operational sustainability of TRU's POC installation. Dedicated to each lab station were an Extron TLP Pro 1025T 10" Tabletop TouchLink® Pro Touchpanel, a wireless tablet loaded with the Extron Control app and an Extron IPCP Pro 360 IP Link® Pro Control Processor in the rack. The same touchpanel model was positioned at each control room station.

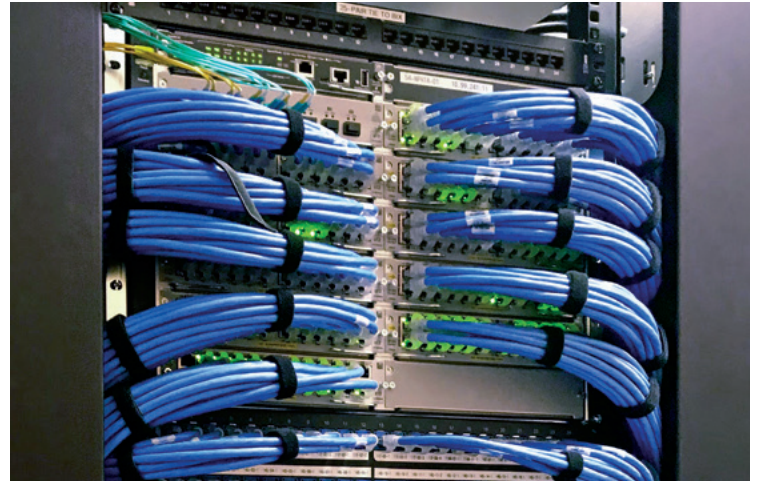


The augmented/mixed reality headsets system was a separate system with the pilot room, but the final installation has it fully integrated into the AV application.

For testing purposes, the touchpanel and tablet at each station provided the same GUI and functionality as the touchpanel located in the control room. The operator or instructor was able to start a recording and select the patient case and training scenario from the AV control panel. When the scenario did not include a control room operator, recordings could be created and managed and the systems operated from one control panel within the room or using a tablet.

The custom interface also offered signal routing with independent audio breakaway and level adjustment of master and program audio, as well as management of the wired and wireless microphones. The deployed control system facilitated management of the full system from the control room, including content presentation within the remote rooms.

The Pro Series control system was programmed using Extron Global Scripter – GS. The programmer found that using this Python-based development environment made the project dynamic and easy to modify as features were added and requirements changed. An example is the Overflow capability. High-quality source images had to be maintained on the touch screen when being repeatedly shown and hidden during distribution to remote locations. GS allowed him to create a “Box to Box communication” that facilitated the Overflow feature. The programming environment also made it easier to re-route or break the tie when the previous source was accepted.



Cabling of the equipment racks, such as this network rack that includes the Extron NAV Pro AVoIP system components, is dressed according to AV industry best practices.

Programming with GS resulted in a powerful and reliable, yet easy to use, control system that seamlessly integrated both medical equipment and AV sources from a wide variety of manufacturers into one cohesive and manageable system, meeting TRU's mandate for integration compatibility now and in the future.

## Results

The NAV Pro AVoIP-based AV routing system in conjunction with the Pro Series control system provided the required flexibility and durability to route content from any combination of inputs for source capture and distribution within the POC installation. The proven design was expertly deployed throughout the NPH building by AVI SPL®.

The commissioned installation includes multiple control modes of operation based on the user's credentials and location. These modes take into consideration user experience and the level of accessibility/automation for each type of operator. The NAV and control systems along with the additional Extron products successfully support the many labs and classrooms, as well as seminar, research, and collaborative study spaces, throughout TRU's state-of-the-art NPH health sciences building.

“We specified Extron NAV Pro AV over IP and Pro Series control systems as a viable solution for TRU's large-scale health sciences training application,” says Marcel Schoenenberger, Principal Consultant at M<sup>2</sup>Squared. “NAV proved to be robust and reliable, and, due to its specific low latency and low bitrate capabilities, provided enhanced streaming efficiency and performance.”

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