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North Carolina State University*

Extron AV Solutions Create Engaging Study Venues at Renovated North Carolina State University Hill Library

“Our 15 years of experience with Extron gave us confidence that their products were right for the Hill Library applications. No matter the circumstance, we know we can depend on Extron's support.”

Ryan C. Hunter, CTS, EAVA, ECP
Lead AV Professional for Advanced Technology Spaces
North Carolina State University

North Carolina State University's D. H. Hill Jr. Library, housing over one million volumes, is named for Daniel Harvey Hill, Jr., an English professor who was one of the first five NCSU faculty members. He was the university's president for several years in the early 1900's. The library was constructed in phases spanning decades and the building saw a major renovation in 2021.

Challenges

The renovation involved extensive remodels to the structure, and many high-tech additions and upgrades, including cutting-edge audiovisual amenities. These make the Hill Library a one-stop hub for learning, teaching, research, collaboration, and experimentation. AV-enabled spaces added during the 2021 upgrade include the Innovation Studio, a venue to display virtual reality and other emerging technologies; the Visualization Studio, with immersive 360-degree projection; and the Data Experience Lab, a collaborative space for data science, visualization, and analytics. Also included in the renovation are more group study rooms, more learning labs, and more presentation spaces to augment the library's existing complement of such spaces. Extron AV switching, distribution and control is crucial to the operation of all these spaces.



The Visualization Studio interior with 360-degree projection. The exterior of the Visualization Studio is featured in the lead image at the top of this article.

Design Solution

The in-house AV technology team at NCSU made a strategic decision to implement Extron AV switching, distribution, and control in the Hill Library partly because they were already using Extron's GlobalViewer Enterprise software to manage their extensive deployment of Extron systems in many of the school's other learning venues. Of equal importance according to Ryan Hunter, NCSU's Lead AV Professional for Advanced Technology Spaces, was "the support level that Extron offers coupled with the proximity of Extron's major regional facility here in Raleigh."

Visualization Studio Puts Viewers in the Center of the Action

The Visualization Studio is an immersive theater-in-the-round experience, designed to showcase engaging content produced by faculty and students all across the campus. Eight projectors and twelve speakers deliver seamless 360-degree video and enveloping Dolby Atmos® surround sound for compelling teaching and learning, research talks, special projects, and events.

A 16x16 XTP II CrossPoint 1600 matrix switcher is used to select and distribute program content and control signals over shielded twisted pair cables to the projectors. An XTP receiver at each projector provides HDMI video and RS-232 control signals to the projectors.

The audio system includes XPA U 1002-70V and NetPA 1001-70V AT amplifiers that deliver audio from analog and Dante sources to an extensive wall and ceiling speaker system that includes seven SM 28T surface mount speakers on the circular wall surrounding the audience and four SF 26PT pendant speakers suspended from the ceiling.

AV functions and lighting in the room are operated through a touchpanel interface on an iPad mini running the Extron Control App. Responding to the touchpanel selections, an IPCP Pro 555 control processor controls all AV system components, while an IPCP Pro 250 controls room lighting.



The Innovation Studio. [Click on the photo](#) to watch a video clip showing how visitors interact with the table displays. Video courtesy of Relative Scale LLC.

Innovation Studio Allows Guests to Interact with Exhibits in 3D Space

The Innovation Studio is a learning space that showcases work of students and faculty using a novel interactive projection experience. 10' x 5' projection surfaces appear on four tables in each of the studio's quadrants. A 4K laser projector in the ceiling above each table points down, delivering content onto each tabletop. A depth camera senses users' hand motions in 3D space above the tabletops as they interact with what's projected, emulating a touchscreen — but without the "touch". The experience is driven by software from Relative Scale LLC, a Raleigh-based firm with multiple NCSU alumni on its staff.

The venue can be reconfigured to present workshops and events by turning off the exhibits and moving the wheeled tables. Three standard projectors with drop-down screens are then used for presentations.

Here again, an XTP II CrossPoint 1600 matrix switcher and XTP SR HD 4K HDMI receivers handle AV switching and distribution to the projectors and sound system. Content for the four exhibit tables comes from four PCs. Content for standard presentations comes from three XTP T HWP 101 4K HDMI wallplate transmitters. Five MPA 601 mono amplifiers drive ten ceiling-mounted speakers above the tables and in the presentation areas. Operation of the AV system is controlled from a TLP Pro 1220MG 12" Wall Mount TouchLink Pro touchpanel via an IPCP Pro 555 control processor.

AV Enhances Data Visualization In the Data Experience Lab and South Learning Lab

The Data Experience Lab and the nearby South Learning Lab offer tools to help students and faculty build expertise in data science and digital scholarship. Here, library staff provide instruction on organizing and exploiting data sets, creating data visualizations using graphics of many forms, and using geospatial methodologies. Campus groups focused on data science and digital research also use these spaces as meeting hubs. Multimedia is key to the data visualization techniques



The Data Experience Lab.

practiced in these labs. The Data Experience lab is used for demonstrations to small groups. The South Learning Lab is set up as an active learning classroom for both large and small groups.

The Data Experience lab includes an 86" interactive touchscreen flat panel display. HDMI video and audio are fed to the display from a PC, a wireless access point, or an HDMI connector wallplate by an HC 404 Meeting Space Collaboration System. The flat panel display touchscreen port and its wireless keyboard-mouse connect to the PC via a USB Extender Plus transmitter-receiver pair. User control is via a wall mounted NBP 106 D Network Button Panel.

The South Learning Lab has many AV content sources and displays. An XTP II CrossPoint 1600 matrix switcher is used to select and distribute program content and control signals. Students can share HDMI content by plugging into six XTP T HWP 101 4K HDMI wallplate transmitters or linking to seven wireless access points. The instructor lectern contains a PC and a guest HDMI connection, both of which supply content to the matrix switcher via XTP transmitters. Video from a PTZ camera connected to the lectern PC USB port is also available. The two ceiling mounted projectors and six 48" active learning displays all receive signals from the XTP matrix switcher.

The room's audio system includes ceiling array mics, wireless mics, and program audio feeds from the matrix switcher via both analog and Dante network sources. An MPA 601 amplifier drives the room's speakers.

The AV system is controlled by an IPCP Pro 555 control processor. There are two touchscreen user interfaces: one at an iPad mini running the Extron Control App and the other at a TLP Pro 1220TG 12" Tabletop TouchLink Pro Touchpanel at the instructor desk.



The South Learning Lab.

AV-Enabled Group Study Rooms on all Floors are Convenient Collaboration Spaces

The Group Study rooms are perfect places to share ideas. Each seats four around a table, has a side wall devoted to a whiteboard, and a front wall containing a 48" flat panel display. Participants can share HDMI



Visualization Studio AV Rack shown at left; Innovation Studio AV Rack shown at right.



Group Study Rooms are available on all nine floors of the library.

content through an HC 402 Meeting Space Collaboration System via a wired connection to an HC 402 wallplate transmitter or via a wireless access point. Users control the AV system at a wall mounted NBP 106 D Button Panel next to the transmitter wallplate.

Results

As students arrived back on campus for the Fall 2021 semester, the North Carolina State University Hill and Hunt libraries hosted multi-day welcome events to publicize the services, spaces, and expertise offered by the libraries — including the transformed Hill Library building. After a one-year hiatus due to COVID-19, a full schedule of virtual and in-person workshops, seminars, and events took place in Fall 2021, many of which were presented in HyFlex formats that accommodated in-person attendees in the new AV-enabled spaces as well as remote attendees.

A small sample of interesting and educational experiences presented in these spaces includes screenings and commentaries on vintage 16 mm films, newsreels, and documentaries curated by a local business founded by an NCSU alumnus, and a workshop series that teaches geospatial data analysis and visualization through layer building maps. After a “soft” opening providing access to limited groups of faculty and students, the Hill Library and its many new technology spaces became accessible to everyone in mid August 2021. Given its long history of constantly re-inventing itself, the D. H. Hill Jr. Library will be the scene of future renovations and upgrades. For now, people who walk through its doors are benefitting from state-of-the-art audiovisual technology that holds the interest of even the latest generation of students accustomed to pervasive technology in every aspect of their lives.

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