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SHARING KNOWLEDGE

How one university enlisted AV over IP to deliver a fully connected campus



LESSONS LEARNED

Anna Mitchell explores a university campus that has harnessed AV technology to deliver a cutting-edge learning experience complete with powerful simulation spaces to train medical professionals.

What would you do if you were able to start a project again? However well executed the original job was, the chances are you'd have learned something along the way, and most of us would jump at the chance to apply that knowledge with a fresh start.

But, whilst the odd meeting room or classroom might largely replicate the last one, it's not likely you'll be able to repeat a large building-wide university project.

Not likely but, as this story shows, it can happen. Back in 2017 Stouenborg completed work on the Maersk Tower in Copenhagen. We covered this project in the JanFeb 2017 edition of Inavate magazine. The project was large, the budget was high, the site vast, the client engaged and the technology specification high.

So just imagine what would be

possible to have all those parameters in place again and a chance to repeat the job with the added bonus of fast-forwarding five years and taking advantage of all the technological developments that had happened within the last half-decade.

"In 2019 we were approached by Örebro University and asked if we'd delivered the Maersk Tower," begins Anders Jørgensen, project lead at Stoeunborg. "We confirmed and then heard nothing back, thought little of it until June 2020 when they got in touch again."

The Swedish university had embarked on the third stage of a new medical campus development situated next to Örebro University Hospital (USÖ) and designed by Klara Arkitekter. With stages one and two complete, they wanted stage three to look very like the Maersk Tower with many of the same technologies and capabilities on offer there.

"They'd looked at the Maersk

Tower, they liked it and they said 'We want you to do it again but better, taking into account everything you learned from delivering a project of that scale,'" adds Jørgensen.

AV-over-IP was an area that had moved on significantly between the completion of the Maersk Tower and this project. "When we integrated the Maersk Tower everything was standalone, we only combined three auditoriums for sharing video feeds. On this project, we combined everything. To achieve that back in 2018 would have been hugely complex. Here we simply installed Crestron NVX boxes and we can just stream back and forward," says Jørgensen.

With the video infrastructure throughout the entire campus built on Crestron NVX Stouenborg installed around 100 NVX boxes to deliver a solid backbone for the university's needs. Network traffic is routed and managed by Netgear switches.



Seat of learning

At a glance, the auditorium in the new Örebro building is a replica of the one delivered for Maersk Tower. The 300-seat venue has a full Meyer Sound Constellation system that supports voice lift and microphone-free Q&A sessions with the entire audience.

Display provision looks very similar too with a large wide-screen projection created with three Panasonic PT-RCQ10 projectors. A key difference here however was in the screen.

Stouenborg designed and built an enormous projection screen that incorporates acoustically absorbent material. Mounting a screen of this size and weighing about 500kg would be difficult but Stouenborg had the added challenge that it had to sit 28cm from the wall so that the two whiteboards on stage could raise up behind it. Therefore, Stouenborg had to hang the monster unit using just small rigging points.

In another custom-built element, Stouenborg built a clever bracket system in the ceiling for hanging lighting. Light fixtures highlight the stage area and Stouenborg also supplied Martin Mac moving headlights and light bars for events such as graduation ceremonies.

A Midas Pro series concert mixer was also installed to support events like graduations as well as concerts. For these sorts of events, the AV systems in the auditorium are designed to support additional rental kit. “We designed the Constellation system so we could add on the mixer. When we were creating the Maersk Tower we had a naïve thought that the Constellation system could do everything. The reality is it could do 95% and the remaining 5% required additional equipment. The main reason for this is that some professors are talking so quietly that it becomes more or less impossible to lift their voice without using body-

worn microphones.”

The space is managed by Crestron control with access through a Crestron control panel. Various room setups are pre-programmed and there’s a ‘start lecture’ button that will provide an audio alert that a lecture is about to begin and people should take their seats. There is also an Ampetronic hearing loop fitted in this space.

A Wolfvision Cynap presentation and collaboration system provides wireless connections for presenters who also have a Panasonic 43-in comfort screen available to them on stage. All proceedings are captured with four Panasonic PTZ cameras, which are installed at the back of the room pointing to the stage, and from the stage pointing to the audience. This feeds into the Kaltura lecture capture system and supports remote learning.

A green room is paired with the auditorium to allow presenters a

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Anders Jørgensen, Stouenborg



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Anders Jørgensen, Stouenborg

space in which to prepare, a Panasonic 32-in screen here allows them to preview materials or camera feeds from the room.

Training through simulation

While the Mearsk Tower was used as a template for the auditorium and teaching spaces there is a key area where the Örebro campus departs. A very specific and highly-bespoke set of rooms were integrated into this specialist facility for training doctors and medical professionals.

Five KTC rooms were delivered to enable effective simulation of medical emergencies and scenarios doctors are likely to come across when treating patients.

Each room has a medial simulation mannequin from Laerdal Medical and a hospital bed with associated sensors for vital signs and displays with which to view them. Jørgensen adds: "We then harnessed audio and projection to colour the rooms with sound and visuals that in one moment could show a chaotic emergency scene on the street, and the next a sterile hospital surrounding." Projection is delivered by two Epson

projectors powered by Brightsign players in each room. Audio is delivered in the room through Shure MXN5W-C networked ceiling speakers and doctors in the training sessions are also provided with in-ear monitors.

The simulation rooms are equipped with telephones, pagers, and sirens all of which had to interface with the AV equipment and Crestron control. Stouenborg also had to make sure the control system integrated seamlessly with some specialist medical equipment including what's known as a media central, an arm in the centre of the room that gathers, analyses, and displays the vital sign information from the patient, or in this case medical mannequin.

Because of the diverse range of systems and technologies packed into these relatively small spaces, integration and ensuring everything communicated effectively with everything else was complex but, Jørgensen says, relatively straightforward. "It was additional programming hours sure, but as the specialist medical equipment ran on the BACnet protocol we didn't have

any problems to make this happen," he says.

Each room is paired with a control room which houses the kit to power the space, as well as the teaching staff overseeing the simulation; and a breakout space for feedback and discussion. Panasonic cameras and Shure ceiling microphones integrated into the KTC capture what goes on in detail so there can be meticulous analysis of how people reacted in the situation and appraisal and teaching based on their actions. Proceedings are viewed in the briefing room on a display paired with a Poly Studio videobar and Wolfvision Cynap is used for wireless pairing to support teaching and collaboration in the space.

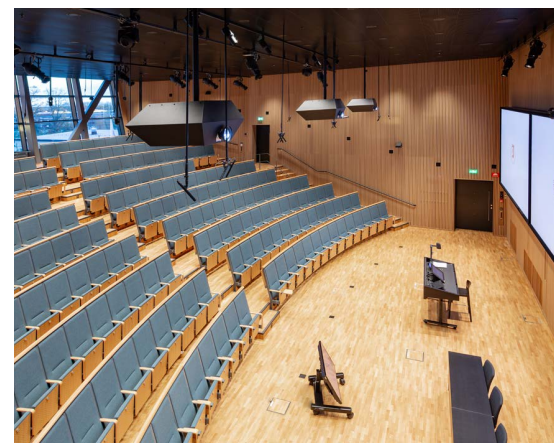
Thanks to the Crestron NVX backbone, complex training sessions in the KTCs can be streamed to the auditorium, while people in the auditorium can ask questions back to the KTC area.

Multipurpose spaces

The building also houses a restaurant called Spring; a multiuse space that also hosts presentations, music, and

Kit list

- Audio**
 Ampetronic C10-2D and C7-2D hearing loop drivers
 Atlona AT-UHD-EX-100CE-TX HDBaseT transmitter
 Audinate Dante AVIO 2-channel analogue output
 Biamp Impera Echo Plus control pads
 Genelec 8010A and 4010A monitors
 König & Meyer 16075 headphone stand
 Meyer Sound MPS-488
 Midas M32R Live digital console
 Millenium DS200 microphone boom arm
 Palmer Monicon XL studio monitor controller
 Røde NT1 studio microphone
 Sennheiser handheld, gooseneck and Speechline microphones, wireless in-ear monitor system and HD25 headphones
 Shure Mircoflex Advance ceiling array and linear array microphones and MXN5W-C - networked ceiling speakers
Video
 Atlona AT-OME-EX-TX transmitters and AT-OME-SR21 receivers
 Blackmagic Design ATEM Mini Extreme switcher
 Brightsign XT244 media players
 Crestron DM-NVX-E30 encoders and DM-NVX-D30 decoders, DM-NVX-360 encoder/decoders
 Chief display wall mounts, projector mounts, table arms for displays, swing arm wall mounts and comfort monitor cart
 Epson EB-L630SU projectors
 Huddly IQ Room meeting camera
 Iiyama 27-in Prolite display
 Magewell USB Capture HDMI Gen 2 transmitter
 Panasonic 86-in, 55-in and 43-in displays; PTZ cameras; and PT-RCQ10 and PT-VMZ60 projectors
 Poly Studio videobar
 Projecta projection screens
 Samsung U28E590DSL 28-in displays
 Skarhøj PTZ Fly w/ Blue Pill inside camera controller
 Vaddio AV Bridge 2x1 networked AV mixer
 Wacom DTH-2452 touch tablet
 Wolfvision Cynap Core Pro and Pure Mini wireless presentation systems and VZ-8. UHD visualiser
Control
 Crestron Cameo keypads, SSC-102-EL room availability signs, TS-1070-B-S tabletop touchscreens
 Elgato Stream Deck Mini keypad
 Gude GU-80313 power management and monitoring
 Netgear managed and unmanaged switches
 Onelan Reserva Edge room signs
 Q-Sys Axon C1 wall controller, unD610-BT Dante networked audio wall plate, I/O-USB Bridge and Core 8 Flex and Core 110f T-racks racks
Lighting
 Avolites Titan Mobile Wing
 Elgato Key Light Air lighting panel
 Martin Rush OS series lighting, ELP-WW LED fixtures and Mac Aura XB LED wash lights



speeches. Stouenborg flush mounted Meyer Sound UP-4Slim loudspeakers in the ceiling. A Panasonic projector is also installed in the ceiling and fires onto a tensioned roll-down screen. A touchscreen was installed as well as Wolfvision Cynap.

“They needed an audio system with a high SPL here for events and parties,” says Jørgensen. “Even in the outside terrace, we’ve integrated speakers into the structural columns.”

A set of seminar rooms ranging in size follow largely the same technology template. All are kitted out with Panasonic PTZ cameras, loudspeakers, Shure ceiling microphones, projectors, and Projecta Extensa projection screens and whiteboards (that roll up and down in front of the projection screen). Stouenborg opted for a decentralised system for the teaching rooms and each set of two seminar rooms shares a rack.

Wireless content sharing is again supported with Wolfvision Cynap, HDMI connections were also supplied. “It’s safer to also offer the wired connection,” says

Jørgensen. “Because of IT security concerns, we do sometimes have people that don’t have permissions on their laptop to allow them to connect through the Wolfvision system.”

At the top of the building is a boardroom that has a higher specification and is a carefully designed space for executive meetings. Much of the technology here matches the template of the seminar rooms and a Panasonic 86-in display was provided for presentations and videoconferencing.

Distance learning

Being based in Denmark and delivering a project 600km away in Sweden comes with challenges. Jørgensen credits being able to build the project within a BIM model as a reason that it went so smoothly.

“We did part of the physical installation and we built much of the systems in our facility in Denmark before delivery to the site,” he says. “But realistically it would not have been cost-effective for anyone to have our people on site for the full project integration, so we had to rely on local technicians. All products

came from us, and were prepared by us, but shipped to the site and installed by local professionals.

“First, we created everything in a BIM model and put all products in there. It meant that we could be sure that any collisions were handled in advance which is what made it possible to have a remote team handle much of the physical installation.”

With the system in place and operating smoothly the results speak for themselves. It’s also abundantly clear that using an existing template and building on it has reaped huge rewards for both the integration team at Stouenborg and its client.

With all AV routed over IP, the university has full flexibility in sharing content across the entire building and uses that functionality extensively, particularly when sharing insights from activities in the KTC rooms. All the best parts of the Maersk Tower project have been retained with a major boost from the advancement in technology between the two projects, as well as some lessons learned from experience. 🌐