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SUTD, Singapore:
Measured steps to success

Hurrairah bin Sohail speaks with the integrator and the end user to discover how the AV systems at Singapore University of Technology and Design are being upgraded with care and consideration.

Geared to perform

Designing and deploying the right AV systems for an educational institute is not the easiest of task at the best of times. This task was no easier for the Singapore University of Technology and Design (SUTD), a university which was established in Singapore with the mission to advance knowledge and nurture technically grounded individuals. Established in 2009, SUTD is a young university that has incorporated the discipline of design as a central component of its curriculum across all courses.

Ang Lek Han, director of Information Technology at SUTD, talks about how starting from scratch with respect to developing AV systems was a challenge: "As a new and emerging university in Singapore, we are moving into green fields with a lot of our decisions. When I joined SUTD, many people thought that the job would be easy since I could work with a blank canvas. However it is not as simple. A blank canvas meant that we had to implement the right procedures and make the right calls with regards to our AV systems and capabilities while still performing the duties to support the academic side of SUTD."

> ## *IT can add value to AV and vice versa by looking at the components in a new way that differs from traditional views.*
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> *- Ang Lek Han, SUTD*

However, SUTD is determined to tackle the problem of delivering a modern learning environment. To do so the university's approach is evolving. One of the core steps along the path was to give the responsibility of managing the AV systems to the IT department. Ang from SUTD says: "The decision to make AV a part of the IT department was because of the global shift towards digitisation and in this light the move made a lot of sense. IT can add value to AV and vice versa by looking at the components in a new way that differs from traditional views."

Due to the fact that operational procedures were just being established as SUTD was a new university, having adequate and future-proof AV infrastructure was a challenge. However, now that SUTD has settled into its new premises in Changi it is beginning to evaluate its AV systems and embark on an upgrading process. Students specialising in Architecture and Sustainable Design (ASD), Engineering Product Development (EPD), Engineering Systems and Design (ESD) or Information Systems Technology and Design (ISTD), all use its learning spaces such as Cohort Classrooms, Fabrication Lab (Fab Lab) and Lecture Theatres. Starting with these most critical spaces, SUTD has taken the time to evaluate the whole AV system and upgrade it to meet new requirements.

To undertake the upgrades, SUTD appointed EAS, the integrator which had deployed and commissioned the AV systems at its old Dover campus and also at its Changi campus after the move. In this upgrade, EAS worked closely with Epson and Crestron to design a system that facilitates teaching and collaboration for both the teaching staff and students. Fadzil Zainuddin, senior sales engineer at EAS, comments: "We worked closely with SUTD in terms of the upgrades that the university requires.

Epson ultra-short throw laser projection is employed in the Cohort Classrooms to help the spaces perform their function

It is unavoidable that older or legacy equipment tends to fail with the passage of time. EAS' role is to help the university upgrade phase by phase."

Ang from SUTD says: "At SUTD, we focussed on a new transformation which began from the move from our old campus to our new one. This transformation aims to extend to our spaces and the equipment we use to teach."

DP Architects, in collaboration with UNStudio from Amsterdam, designed the academic cluster of SUTD's permanent campus in Changi. Ang from SUTD explains that one of the main issues they faced for the projection infrastructure is the physical ambience and the level of natural light in the rooms which affect the sharpness of the images projected. Another issue arises where a large amount of time and effort are needed to monitor and maintain the lamp projectors still in operation. There are approximately 400 projectors on campus and by replacing the lamp projectors with the laser projectors, the maintenance team of SUTD sought to put their worries about lamp failure aside.

Reflecting the values of SUTD, the modular design of 12 Cohort Classrooms enables students to have group discussions one moment and then work on hands-on the next, all within the same space. The impact of upgrading the projectors is felt most in the Cohort Classrooms, the core learning space for the students at SUTD. Each Cohort Classroom features a total of seven projectors arrayed in a configuration so that the space can be used as a whole or partitioned into smaller classrooms. These configurations are enabled by moveable furniture, which can be arranged as islands around an ultra-short throw Epson projector, and a unique provisioning of power overhead in the ceiling. Understanding the vision SUTD had for such spaces at its campus was important for EAS.

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Under control

Control systems were another area for upgrade identified by the university. Ang from SUTD says: "We had some issues with the AV controllers due to the age of the equipment. This isn't good as it takes up the lecturers' time as well as the students' time. There is further downtime while we respond to the issue. We wanted to ensure that scenarios such as these were eliminated."

Besides improving efficiency in learning spaces, Jason Philip Dean, AV manager from Office of Information Technology at SUTD, explains the need for control systems for learning spaces: "Having a comprehensive control system for the AV systems is necessary. We can't have individual remote controls for every piece of equipment in every room. Our old control system was upgraded with the latest Crestron control solution which suited our needs at our new campus as well."

Initially the university was using Crestron AV2 processors at its old campus. These were upgraded to AV3 processors. Lam Tze Tze, director for business development at EAS, adds: "EAS has a long history with Crestron, being the first to bring the brand to Southeast Asia in the 80s. We have the knowledge and expertise to program and deploy the Crestron control system for SUTD without issues. The control systems have been tailored to the spaces such as lecture theatres, giving the users ease of control." ᴧ

Feedback loop

Microphones are always problematic to deploy in universities. Despite the range of wireless microphone options available on the market today, finding the right product is difficult. The problem is that by bringing in more equipment that uses wireless frequencies the possibilities of clashes increases.

Universities also need to ensure that the people using the microphones, the lecturers and teachers, are comfortable with the equipment. SUTD embarked on a trial process to ensure that the correct microphones were selected.

Dean from SUTD details: "At first, we were using lapel microphones which were from our Dover campus. Our lapel microphones had small diaphragms so lecturers who did not project their voices were unhappy with the microphones' performance. We thought about using handled microphones and ceiling microphones but found them not to be conducive for our spaces. Our lecturers prefer a hands-free option and ceiling microphones do not work in a space where you have multiple voices engaged in discussion."

Dean continues: "So in the end, we decided to go with Panasonic DAC pendant microphones on lanyards." ᴧ

Fabrication Lab

The Fabrication Lab at SUTD exhibits the university's commitment to inculcating its students with hands on design experience. It aims to allow students to design and construct "virtually anything" with high-performance equipment such as Waterjet machine as well as 3D printers. The space itself has dedicated AV systems that went through different design iterations in order to meet the specific requirements of the client.

Zainuddin from EAS details: "SUTD briefed us that the Fabrication Lab can get extremely bright in terms of ambient light during the afternoon. However the infrastructure for this space was already designed, according to SUTD's specifications, and already in place. We had a small junction board for equipment plug-in. But as time went on the university wanted to include enhancements such as control via iPad."

To combat the ambient light, two Epson EB-L1505UHNL 12k lumens brightness laser projectors are used to replace the old projectors. As previously highlighted, the initial design for the space did not include control. As the project progressed, it became clear that a control system was needed to control the whole AV system in lab. The whole space can be used or it can be split into two parts and this is made possible via the Crestron AV3 control processor.

The Fab Lab has two levels and for this reason a creative monitoring system has been deployed so that workstations can be viewed. Teaching staff and students can connect to the AV network by simply plugging in their laptops through connectivity options provided via wall and floor plates.

Workstations on the second floor of the Fab Lab can be monitored by a CCTV system. The feeds from the cameras can be brought up onto a laptop wirelessly. If the laptop is plugged into the AV system, the CCTV camera feed can be projected via the AV system. The CCTV camera feeds go through an IT switch. The audio system comprises of Tannoy speakers and Lab.gruppen Lucia amplifiers. Control is provided by a Crestron AV3 control processor. Video switching is handled by a Key Digital matrix. ∿

Epson projection provides the bright visuals required by the Fab lab

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< In the Cohort Classroom, two front facing projectors have been retained. The upgrade comes in the form of five Epson EB-695Wi ultra-short throw projectors. The Epson UST projectors were selected because they were the only ones which provided the brightness levels required for the environment of the cohort classrooms while still delivering ultra-short throw functionality.

Reconciling the UST projectors with the intended use of the Cohort Classrooms was a challenge and a compromise had to be made. Zainuddin from EAS explains: "UST projection is meant to project images on a hard surface or a board. But as you can see, we are using projection screens with a weighted bar. The reasoning behind this is the multi-function usage of the space. The two main projectors are fixed to project at the front of the class. But the UST projectors around the room are used during breakout sessions."

The video system in the Cohort Classroom is based around a Kramer VS-1616D matrix switcher and a Kramer 8x8K scaler switcher. A Wolfvision VZ-8lights3 is also provided for use by teacher and lecturers.

Audio in the room is provided by Extron speakers. Amplification is provided by Yamaha amplifiers as well as Extron XPA 1002 units. A Biamp Nexia serves as the DSP for the cohort classroom. Panasonic DAC pendant microphones are provided for audio input and for use by the teachers and lecturers.

Crestron AV3 control processors and Crestron touch panels were deployed to manage the AV systems.

Projection has also been upgraded in the lecture theatres where Epson EB-L1100U 6K lumens laser projectors and Crestron AV3 control system were installed, enhancing the visual and control capacities.

Once again the video is based around a Kramer VS-1616D switcher.

The audio system comprises Yamaha speakers, Lab.Gruppen E series amplifiers, Biamp Audia Flex DSP and Shure microphones.

With the current phase of upgrading, the university is looking towards the future and focusing its efforts on increasing the levels of collaboration and interactivity for its learning spaces. ∿

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– Fadzil Zainuddin, EAS

Tech-Spec

Audio

Biamp Nexia DSP, Audia Flex DSP

Extron Speakers

Lab.gruppen E series, Lucia amplifiers

Panasonic DAC pendant microphones

Shure Microphones

Tannoy speakers

Yamaha amplifiers

Video

Epson EB-695Wi ultra short throw projectors, EB-L1100U 6K lumens laser projectors EB-L1505UHNL 12K lumens brightness laser projectors

Key Digital matrix switch

Kramer 8x8K scaler switcher, VS-1616D matrix switcher

Remaco projection screens

Wolfvision VZ-8lights3 visualisers

Video

Crestron AV3 control processors, touch panels