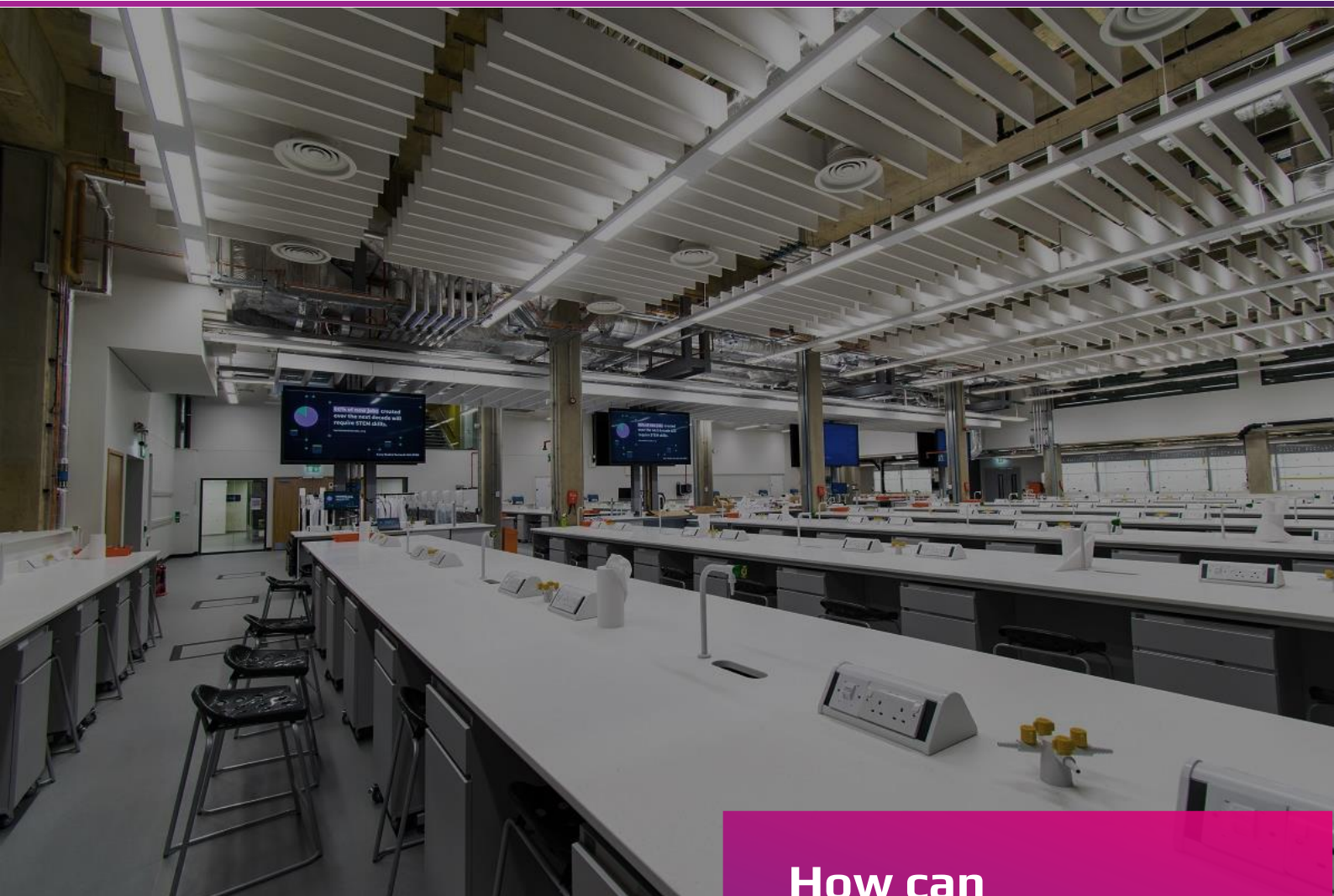


SIX RESEARCH DEPARTMENTS.
Larger Student Cohorts.
All Under One Roof.

SCIENCE CENTRE

Project Case Study

Anglia Ruskin University
Cambridge, UK



How can

AV systems be designed to teach larger cohorts, simultaneously, in teaching spaces designed to deliver the most advanced Biomedical & STEM training?

#SwitchOnthepossibilities



Why did Anglia Ruskin University need a new building?

The Science Centre is a new £45 million facility at the Cambridge campus, but the project was far from simply kitting-out lecture theatres and classrooms.

'A Dedicated Science Centre'

brings together teaching, postgraduate and staff facilities for all six research departments within the Faculty of Science and Technology- Biomedical Science/Forensics, Computing and Technology; Psychology and more.

Tailored for the end-user, and the science.

Each of these departments have highly specialised spatial requirements for technical training, which the building and its AV infrastructure were categorically designed to meet.

Under one roof.

The building was part of the 2009 Masterplan- to introduce new facilities, and spaces categorically adapted to the specialised requirements of the faculty. Previously, teaching was accommodated in a variety of spaces scattered across the campus, which led faculties and departments to become fragmented over time, straining the overall estates strategy and posing concurrent timetabling challenges.

Rising demand calls for consolidation of space.

Anglia Ruskin also saw the number of STEM students increase by 51% between 2007 and 2013, and the new building will enable the recruitment of more students to take account of the increase in demand and the needs of industry.

More pertinently, consolidation of courses has created larger group sizes, and inevitably this created a requirement for larger, more flexible spaces.



The focus had moved from nimble individual / small group spaces to specialised scientific training for large groups, in one space at any given time.

THE CLIENT BRIEF

- **Scale-up the hugely successful Superlab concept** (ARU Chelmsford campus, 2015) to accommodate up to 200 students, and capable of delivering up to four separate lectures simultaneously.
- **294-seater lecture theatre** to accommodate larger cohorts attending theoretical lectures all at once.
- Find a solution to the challenges posed by the lack of projection position in the lecture theatre.
- Find a solution to latency in the deployment of AV over IP across the new development.

The brief lays specific focus on flexibility: in the sense that the physical location of the student and lecturer does not matter anymore.

For example, at the Superlab, whether a student arrives late to the lecture, or when the student is not sat at the same bench as the lecturer – they can start and finish the lecture without a hassle or interruption.

SUPERLAB

ONE LAB.
200 STUDENTS.
FOUR SEPARATE LECTURES.
SIMULTANEOUSLY.

The system provides four lecturer positions, and each lecturer position is also equipped with the following inputs:

- Main (fixed) PC
- USB connections X2 (connected to installed PC)
- Go-Pro camera
- Laptop HDMI
- Laptop VGA + Audio
- Presenter Camera

Each lecturer position is equipped with a high-res camera facing the lecturer, an installed PC and GoPro Camera (ideal for environments handling corrosive chemicals and water) on a snake mount.

AUDIO

For up to four simultaneous lecturer sessions taking place at any time, audio distribution is via radio frequency headphones available to each student.

Each lecturer also has a ULXD digital wireless microphone transmitter which is distributed wirelessly, along with any content from the lecturer fixed PC, laptop or other connected audio source.

Microphone feeds are received by a ULXD4Q Quad receiver, with antennas mounted at high level within the laboratory, and the receiver unit in the main AV rack.

Presentation audio from the lecturer PC's / Laptops runs along with the video feed over CAT6A infrastructure to the main AV rack.

The presentation audio is then de-embedded and mixed with the radio microphone feeds via a DSP matrix unit. The mixed feeds are then re-transmitted as four FM channels via an Audeon multichannel transmitter unit. Transmission antennas for the Audeon unit are mounted at high level within the laboratory space.

Students use a clip-on radio receiver to select one of the four lecturer audio feeds. These receivers are compatible with 'personal induction loops' which provide for DDA compliance.

SIGNAL DISTRIBUTION:

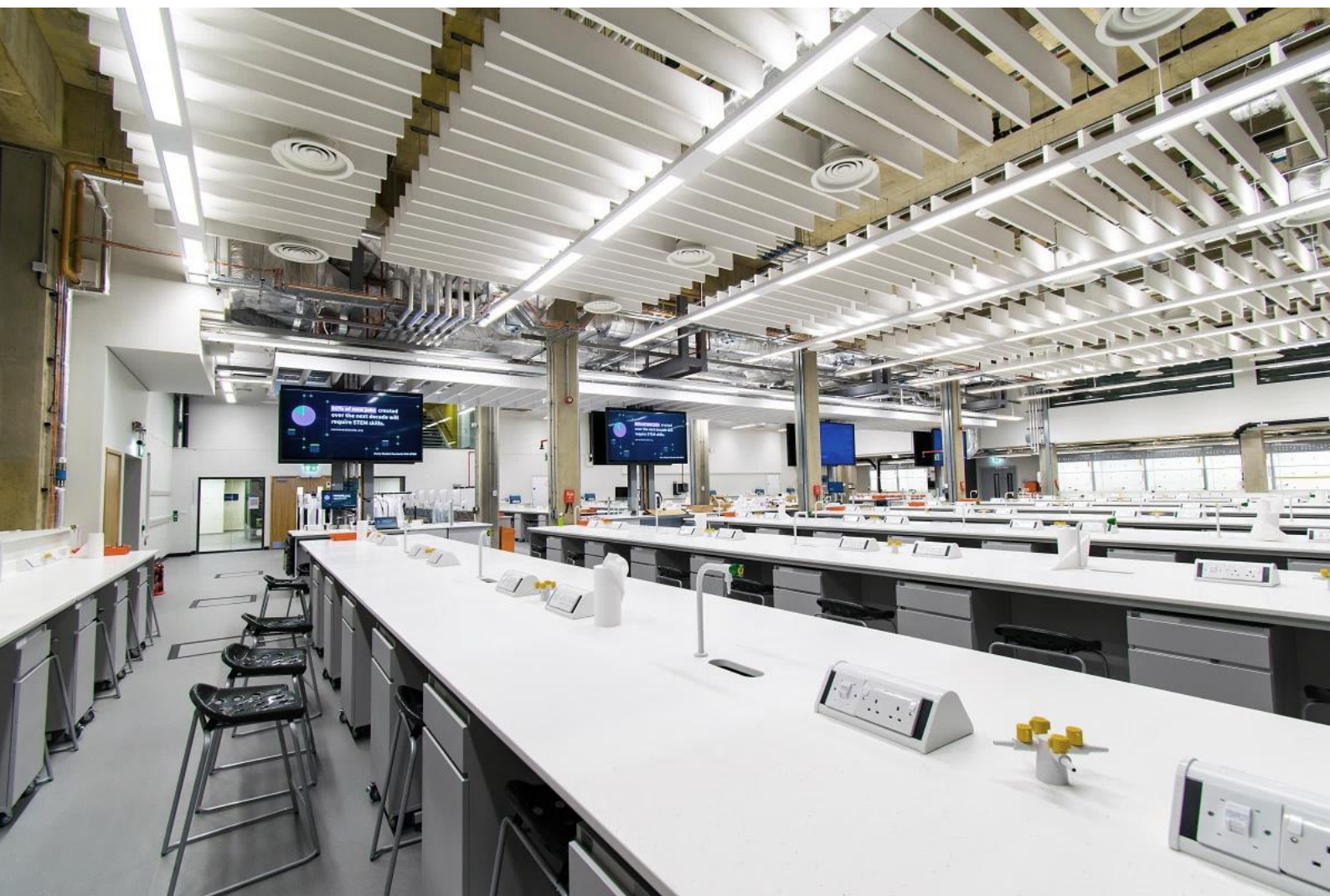
Main AV Rack to/from Screens

Signal distribution between the main AV Rack and Screens is over CAT6A STP certified cable systems with a total of 16x points. Four RF coax cables (RG213) run from the main AV rack to a high-level position in the laboratory to connect the antennae for wireless systems.

Within Lecturer benches

Each of 4 lecturer benches house one Middle Atlantic 12U height rack system and installed in a 19" rack sub assembly. Signal distribution within lecturer benches are over pre-terminated HDMI cables, while one HD-BaseT feed is sent from the lecturer bench to the central AV rack position





INNOVATION

A solution was sought for the end-user's audio requirement. While there were several options, we explored unconventional ideas.

The perfect solution was found in an increasingly popular application within gyms and other recreational areas. Direct-to-User radio broadcasts allow gym-goers to choose from a host of proprietary music channels provided by the gym or radio stations. Users can simply plug in their personal headsets and access HQ stereo content while at the gym.

This was a perfect match to the end-user application at the Superlab. Audeon are the leading providers of the technology, and their largest market constitutes gyms and recreation spaces.



MAIN LECTURE THEATRE

The AV infrastructure of this lecture theatre is specified and designed to be entirely user-operated, and therefore there isn't a technician booth.

The physical dimensions of the space preclude the use of projection equipment entirely. **Therefore, the solution was a large High Definition LED display.**

- 4610 x 2590mm LED Display system capable of up to Full HD resolution
- Provides the ability to display single content or two different pieces of content side-by-side
- Capable of working with input resolutions to 1080p
- Vitreous Enamel Whiteboards also cover the presentation wall under the main screen
- Compliant with Infocomm standards for viewing angles at all seating positions.

The front furniture is a bespoke lab bench, with audio visual systems incorporated as follows:

- 1x Extron 10" Touch screen controls all audio visual equipment.
- Input points for HDMI, VGA + audio and CV + audio signals
- 2x USB Connection's (connected to installed PC)
- Permanent PC with Sharp interactive display
- Wired and Wireless KB/Mouse
- Ability to preview all sources before going live to main screen
- Provision for BYOD Hardware
- Beyerdynamic Condenser Speech Lectern microphone and Shure Wireless Microphones (2x handheld & 2x lavalier)
- 1x Wolfvision Full HD desktop visualizer
- Go-Pro camera on flexible SnakeClamp mount and gooseneck arm.
- Denon DN-500BD Professional Blu-ray player
- 1x Echo SafeCapture Pro for lecture capture capabilities.
- Cisco Video Conferencing CODEC and Cisco Telepresence PrecisionHD Camera

AUDIO

- Voice reinforcement from lectern, handheld and lavalier microphones via dedicated system
- Ampetronic HOH loop system with the ability to operate independently from main AV system
- Extron Full 7.1 channel system for presentation audio
- Dedicated Record Output

The audio capabilities are specified to perform the following functions:

The audio capabilities are specified to perform the following functions:

- Provides Voice reinforcement
- Provides Stereo Program Sound
- Provides 7.1 Surround Sound (Blu-Ray Playback)
- Assistive Listening (Induction Loop)
- Lecture Capture
- Record Output
- Video Conferencing Microphone Feed
- Video Conferencing Content audio Feed

2 x Beyer MPR211 microphones installed at a height feed the DMP128. These are configured to operate independently of the AV system for Assisted Hearing and Lecture Capture purposes.

ULXD digital wireless microphone transmitters are received by two ULXD4 receivers- antennae are mounted at a height within the theatre, and the receiver units are mounted in the equipment rack.

Presentation audio from the lecturers PC / Laptop is fed along with the video feed to the HDMI matrix; the audio from a discreet output from the matrix is de-embedded and presented to the DSP as a stereo program feed. The stereo program feed may be configured to 'follow video' or as 'breakaway'.

An output from the HDMI matrix is fed to a professional 7.1 surround decoder, this is used to feed the Blu-Ray players 7.1 audio to the DSP's.

VIDEO CONFERENCING

The Video Conferencing CODEC's program audio output is fed independently to the DSP's; this allows the correct content audio to be routed through the HDMI matrix.

The Video Conferencing CODEC's microphone input is fed independently from the DSP's; this allows for 'per microphone' AEC rather than rely on the CODEC's internal AEC.

The assistive listening facility uses the Audio Frequency Induction Loop System (AFILS) Specifically an Ampetronic MLD7.

CONTROL & SWITCHING

- Extron IPCP Pro 550 control processor
- Extron DXP HD 4K matrix switcher with audio de-embedding
- Extron DVC RGB to HDMI Converter audio embedding
- Extron HDMI distribution amplifier
- Cisco Telepresence Touch 10 touchscreen interface
- Cisco 12 port and 16 port switches

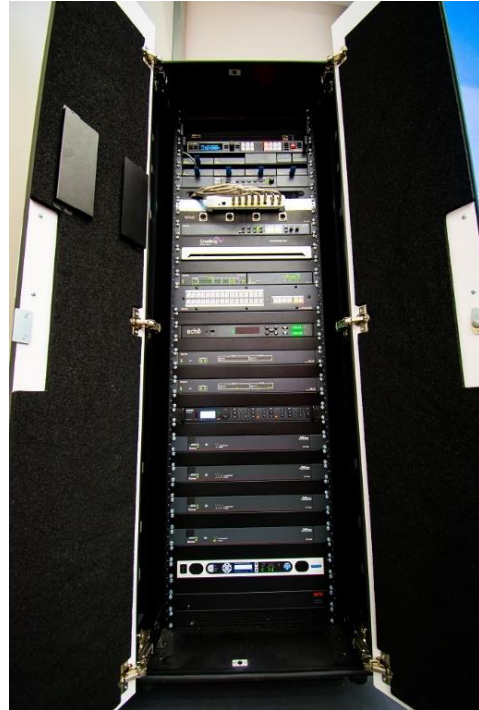
VIDEO SWITCHING / DISTRIBUTION

Extron DXP 84 HDMI and an Extron DXP 168 HD 4K switching matrices allows for flexible routing of the following sources:

- ✓ Installed PC Primary Display
- ✓ Installed PC Secondary Display
- ✓ HDMI I/P plate (embedded audio)
- ✓ VGA + audio I/P plate (3.5mm jack)
- ✓ Composite Video + audio I/P plate (3 x RCA)
- ✓ Wolfvision VZ8 Document Camera
- ✓ Blu-Ray player
- ✓ GoPro camera
- ✓ Wireless Collaboration Device
- ✓ Video Conferencing CODEC
- ✓ PiP I/P
- ✓ VC Camera Self View

The outputs of the matrix are configured as follows:

- ✓ Custom Large Screen LED Video Wall
- ✓ Lecturers Preview Monitor
- ✓ Lecture Capture
- ✓ Video Conferencing CODEC
- ✓ Record Output
- ✓ Wireless Collaboration Device
- ✓ PiP feed 1
- ✓ PiP feed 2



The Extron DVS 605 PiP unit is configured to allow any two of the listed sources to be displayed on the Custom Large Screen LED Video Wall. The images may be Picture in Picture (PiP), Pictures side by side (PaP).

A matrix output is fed to the Video conferencing CODEC and allows for any of the listed sources (or a duplicate of the main screen) to be sent as 'content' to the far end site.



OTHER TEACHING SPACES

TRAINING ROOMS

The system provides one lecturer position; audio visual content from this position is displayed on a 55" LCD flat panel.

The lecturer position is equipped with an installed PC and the following inputs:

- ✓ Main (fixed) PC
- ✓ Laptop HDMI
- ✓ Laptop VGA + Audio

The lecturer position also has two auxiliary inputs (HDMI & VGA with Audio) for the connection of laptops or other devices.

The system can be operated via a push button control panel which will allow the routing of any input to the screen.

The control panel can also control the volume of each input when in use.

The system provides one lecturer position, and audio visual content from this position can be distributed to the **NEC 5000 ANSI projector** (1920 X 1080 resolution) and **two NEC 46" FHD relay screens**.

A fixed frame projection screen is mounted on the wall facing the students accompanied by one speaker (QSC AcousticDesign surface mount speakers) either side dispersing the left/right audio signals.

Content can also be sent to an interactive touch display to act as a Preview monitor and PC Monitor.

The lecturer position is equipped with the following inputs:

- ✓ Main (fixed) PC – 2 outputs used
- ✓ Document Camera
- ✓ Laptop HDMI
- ✓ Laptop VGA + Audio
- ✓ Laptop LAN Connection
- ✓ USB Connection's X2 (connected to installed PC)
- ✓ Blu-Ray Player

MEETING ROOMS

The lecturer position is equipped with one 9-button fixed control panel connected to the LAN, this panel allows:

- ✓ Input selection (ARU standard for VC rooms)
- ✓ Volume control
- ✓ On/Off

Audio visual content from the Video Conferencing Codec is displayed on a single wall mounted 55" Panasonic LCD flat panel.

Two auxiliary inputs (HDMI & VGA with Audio) will be available for the connection of laptops or other devices.

CLASSROOMS

There are three types of classrooms at the Science Centre, differentiated by their physical layouts.

The specifications of the AV infrastructure are fully standardised and designed to effortlessly adapt to physical characteristics of each room type.



TESTIMONIAL

“With the Science Centre we set out very clear objectives – technology solutions for highly flexible teaching and learning spaces. We sought solutions that were instinctive to use and designed to meet the specialised training needs in the building.

I can confidently state that our objectives have been fully met. For example, the new lecture theatre LED Display provides incredible quality and clarity, with the capabilities to present contrast ratios and definition that simply would not have been possible using a projector-based system. Immersive audio and a naturalistic control system allied with reliability and flexibility of use provided by the hardware components provide our University with a highly functional space that also has the ‘wow’ factor.

Similarly, the SuperLab takes our facilities first deployed in 2015, and evolves them to enable larger cohorts and a greater variety of subjects to be taught within the large multi-functional space.

Building on our longstanding relationship with SBS, the teaching facilities provide faculty with a system that both functions in line with other environments across our estate, while at the same time replacing the hardware with newer, more reliable and more cost-effective technology

The teams from Snelling Business Systems were involved in the Specification, Design, Installation and Commissioning stages of the project were of absolute skill and professionalism, delivering a product both on time and budget.

I’ll take this opportunity to commend SBS for the exceptional experience we’re now accustomed to. Their strict professionalism, wide project experience, and knowledge – especially in design-led engineering (I believe Infocomm recognised Colin Jacobs the CTS Design Professional of the year). They take design-thinking very seriously, which has worked tremendously to our advantage. This covers all their staff, from Design, Engineering, Logistics, Marketing and Director level.

The cooperation provided between each of the third-party contractors involved in the project (including Building, AV, and Lab Furniture) all helped to create a final building of both cutting edge technology and flexible functionality. I’d like to make a special mention of the work done by Mr. Chris Tempest, who was the Snelling Project Manager. His work alone was of almost paramount dedication and quality; without him the project would have not been possible.

One of our primary objectives was to accommodate more students in the teaching spaces, at the same time, without any compromise on teaching quality. In theory we had a very clear understanding of how we wanted the systems to perform. Personally, the key indicator for success was to identify whether these systems performed reliably, every time.

I can confidently say the systems delivered have far exceeded our high expectations.

I have worked on a vast range of AV and IT projects with SBS; working with them is truly refreshing and stimulating. I believe Snelling Business Systems and the entire project team are truly deserving of this award and I wish them every success”.

Matt Hall
Multimedia Infrastructure Engineer
Anglia Ruskin University

SNELLING BUSINESS SYSTEMS

Our roots go back to 1954; Roy Snelling started his business out of a redundant Victorian laundry in rural Norfolk, selling Television and Radio sets in the earliest days of broadcasting. He witnessed a major transformation as more and more TV and Radio sets found a place in living rooms- a whole new way for people to interact, engage and consume information. The same purpose for which many AV systems and environments are designed and built for today.

More importantly, there was a new medium for engagement and interactions at a 'sensory level'. Over the years, our experience led us to ask ourselves the pertinent question.

"How can we use the potential in AV systems and environments to unlock newer possibilities for

businesses to interact with and engage their audiences, better"?

As we grew and evolved as a business, our internal culture and design/engineering philosophy begins with a simple question "How can..?". As an AV integration specialist, thinking 'How Can..?' has also evolved to build AV systems that can solve problems of strategic importance to your business/institution.

We deliver all aspects of audio visual integration from design, integration, supply, installation and on-going maintenance - all backed by a service ethic, which continues to carry the Snelling signature of quality. Based in London and Norwich, we have maintained our portfolio of major clients and diverse projects across Higher Education, Corporate, Public Sector and niche projects.

Contact Snelling Business Systems to find out how we can address your challenges with building-wide integrated spaces.

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