ISS Small Lecture Theatre Specification

v1.9

Paul James

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Contents

This specification must be used in conjunction with the installation guidelines document. Always check the latest documents versions.

A small Lecture Theatre would typically have the following properties:

- Normally racked teaching space (some flat floored).
- Guideline size: Up to 70m^2.
- Guideline capacity: Up to 80 people.

Lectern podium

1. The lectern solution for small lecture theatres is the TeamMate Educator or equivalent single rack lectern.

2. The Control Panel Housing to be hinged from the top to allow access for servicing.

3. The lectern should be installed in front of the teaching wall facing towards the student seating area. The lockable castors must be supplied and the unit should be moveable but left with the castors locked down.

4. When providing power to the podium a single power feed to the unit must be used, with the exception of the power feed to the PC which should be separate. It should not be possible for the user of the equipment to power cycle the unit themselves. A PDU with control to reboot all equipment in the rack must be installed. The PDU must be behind the locked door of the cabinet to prevent unauthorised access.

5. Up to eight number network connections will be required into the lectern, A small offline network switch can be used for local LAN data such as Dante, these must be separated from any LU network connections. A sufficient quantity of CAT6 data lines will be provided as patch cables from a connection box in the wall through a channel in the floor to the lectern to allow these to be routed to the equipment. The number of sockets required must be determined at System Design stage.

PC/confidence monitor

6. The installation should provide a suitable 24” display which will act as the PC’s monitor as well as providing a confidence monitor for all the presentation inputs provided. The display screen must have the ability to act as an active tablet for control of the PC and annotation of the PC output.

7. The display should be mounted on a double articulated arm on the lectern. The arm should be adjusted to the appropriate tension to hold the weight of the monitor.

Projector

8. Normally a single 16:10 format projector will be fitted. The projector should be mounted from a ceiling-mount pole, the positioning should minimise the potential for the light source to be walked in front of.

9. Consideration must be given to whether repeater displays are needed to ensure appropriate sightlines of presentation content.

10. Video and control signaling to the projector must run over Cat6 Shielded cable correctly terminated at each end. A second backup CAT6 cable must be installed for each projector correctly terminated for future use.

11. The projector must be provided with the following characteristics:

- Minimum of 6000 ANSI lumens.
- 16:10 projection format.
- Laser light source.
- Serial control interface providing a control API.
- Compatible with the PJLink protocol.
- Support for at least 1920x1200 resolution.
- Support for projector status information to be transmitted to the control system.

Projection screen

12. A new, electrically powered 16:10 projection screen must be provided, sized appropriately to AVIXA standards for viewing distances. The screen should be powered from a fused spur located immediately above the screen and above any false ceiling. The screen should be controlled from the control system, lowering when the system is powered on and raising when powered off. The control system should allow for the user to raise the screen if needed without a full power down of the projector.

13. In some cases, a fixed frame projection screen may be more appropriate in which case the screen must be borderless.

PC

14. Lancaster University ISS will supply a PC to be installed in the lectern. The PC will take up 3U of rack space.

15. The installer must provide a 3U rack mounted shelf which must prevent the PC from moving back in its rack and also from being removed from the front of the rack.

16. The following parts of the PC must be accessible to the end user; Optical drive, USB ports, power button.

17. The PC must be powered separately from the lectern to ensure the PC has constant power and not affected from a system power cycle.

18. The PC will be supplied and installed by ISS; the installation must provide:

    - C13 10A power input.
    - HDMI or DisplayPort output to video scaler/switcher.
    - The installer must specify which connection so a PC can be configured.
    - USB output to interactive display or interactive whiteboard.
    - USB output to USB sockets on lectern connection panel and or confidence monitor.
    - Cat6 ethernet connection.
    - Audio out to audio switcher – this may be provided via HDMI.

Visualiser

19. A visualiser must be provided that is capable of 1080p imaging. The visualiser must also:

    - Have at least a 12x powered optical zoom lens.
    - Be min 15 FSP.
    - Fold flat.
    - The visualiser will be controlled via LAN or RS232 and must control, Power on/off, Zoom in/out and light on/ off.

Wireless BYOD mirroring device

20. A wireless connection device should be provided to allow mobile devices to be connected

to the display. The device should connect to the LU network and must not rely on using an internal wireless router for connections to devices. The device must be supplied with an Educational Perpetual License.

Video switcher/scaler

21. A suitable video scaler must be used to switch video inputs. The scaler must be HDCP compliant and must allow the confidence monitor to enter standby mode when the PC goes to sleep.
22. All sources must be scaled to the native resolution of the projector.
23. It must be possible for the user to blank the feed to the projector whilst leaving the signal displaying on the confidence monitor. This behavior should be repeated for all video sources
24. Control must be available for switching between a 16:10, 16:9 and a 4:3 projected image. This is to allow material created by users to retain its original formatting.
25. A spare HDMI input must be kept available in each room on the switcher to allow for an additional presentation source to be added in future. This input must not be shared with another source and must be able to be switched to via AMX control.

Audio

26. An audio system to provide program sound should be installed; all signals shall be able to be switched to the program sound speakers.
27. Wall mounted speakers should be installed, which should normally be white unless specified. All input channels must be balanced, and a suitable mix should also be provided to the induction loop.
28. Two digital wireless lapel microphone systems are required for voice reinforcement in the room, tuned to the 1.9 GHz frequency range. The units must be supplied with a rechargeable battery pack and desktop charging cradle/device. Monitoring must be available to check power status, battery life and mute status.
29. One or multiple Ceiling Mounted Beam Forming Microphones sufficient to cover the student seating areas must be specified for use with conferencing solutions. With appropriate mounting systems and safety cables.
30. An overall volume control with a programmed default level shall be provided on the control system.
31. Wall speakers or ceiling speakers should be of good quality and be supplied with a full back-box and all necessary baffling. Voice reinforcement loudspeakers must not be placed to close to the lectern (source). Gain structure, appropriate EQ and delays should be used dependent on the space, to ensure a consistent audio experience without introducing feedback.
32. A suitable amplifier shall be provided to power the loudspeakers. Class D amplifiers with automatic standby mode for power saving must be specified.
33. A Microsoft Teams Certified DSP audio system to provide program sound, Tutor Voice reinforcement, audience microphones for conference feeds to the PC as well as to a laptop via USB should be installed. The USB drivers must be class compliant to avoid the need for vendor specific drivers to be installed. The USB feed must switch between either the PC or a laptop with users able to select which device receives the active USB connection. All

microphones must be fully EQ'd for the room with appropriate gain structures applied to eliminate feedback.

34. Separate audio mixes must be available for the room reinforcement and feeds to USB Devices for recording and conferencing. These must be available via the Control panel Engineer pages. Discrete level control of inputs and outputs with muting per channel available for all mixes.

Assistive hearing system

35. An inductive loop shall be provided in all seminar rooms, this should provide a voice signal as captured by:

    - the wireless microphone and white button style microphone located on the top of the lectern desk ***or***
    - a white ceiling-mounted microphone above the lectern.

36. The assistive hearing system must provide a suitable mix of program sound as well as voice.

37. The finished and tested system shall comply with all current legislation.

Lectern connectivity

38. The lectern should provide a connection panel for laptop and auxiliary connections, connections provided should include (but may not be limited to):

    a. Laptop HDMI input.
    b. 1 x laptop network RJ45 connections.
    c. 2 x 5a power sockets on control power housing fused separately to the rest of the rack for laptops.
    d. USB socket connected to PC.
    e. USB connectivity for laptops to room microphones and camera.

    For panel layout see Appendix B.

39. The input plate must be free from Installer corporate branding, logos and contact details.

40. The HDMI leads must be presented through a brushed pattress faceplate connected to the switcher input with suitable restraint inside the equipment rack. This is to avoid the need for an input plate so that cables cannot be removed from the room. For servicing, it must be possible for authorised staff to replace the user accessible HDMI lead.

41. Control must be available to the user to enable or disable HDCP for the HDMI input to allow for protected content to be displayed when necessary. The default behavior for HDCP must be 'Off'.

42. The lectern should also provide housing for the AMX touch panel.

Additional audio and video connectivity

43. To allow extra video and audio equipment to take feeds from the presentation system as well as inject signals into the system then additional connectivity is required in the lectern as well as at the rear of the room when indicated by ISS.

44. Inside the lectern we require:

    - Left and right program sound and microphone mixed output – 2 x male XLR line level.

- 2 x HDMI output from projector video source feed. One for use with a USB 3.0 HDMI video capture device for lecture capture and one for future use for auxiliary HDMI output devices.

45. The system must provide the following connections terminated as follows:

    - As per point 44. An HDMI output mirroring projector output to include a mixed audio feed from presentation source and microphones.

46. The system must provide the following inputs terminated as follows:

    - HDMI input from Auxiliary receiver solution to HDMI on the switcher.

    The additional HDMI input must be selectable as a video presentation source from a PIN protected menu on the AMX Touch panel.

Camera

47. A PTZ camera for use with lecture capture and video calling must be specified. The camera must be ceiling mountable with USB cabling extended with appropriate extenders or converted to CAT6 cabling for longer distances. The camera should have the following characteristics:

    - Controlled via LAN or RS-232C (VISCA).
    - At least 10x Optical Zoom.
    - At least 50 degrees wide angle lens.
    - Simultaneous HDMI or SDI Output and USB 3.0 output.
    - White in colour.

48. It is not necessary for the camera to have a direct input to the projection system as a presentation source however the PTZ controls should be present on the AMX touch panel. USB 3.0 output should be presented alongside the additional audio and video connectivity.

49. The camera will be connected via USB to the Teaching PC and a users laptops when required. PTZ controls must be present on the touch panel with preset recall available to a standard room user, whilst the preset store options are in the PIN Protected Engineer pages.

Control system

50. A 7” touch panel-based control system should be provided to control all of the audio visual equipment in the room.

    A touch panel design must adhere to the Lancaster style of touch panels.

51. The control system should connect to a controller of appropriate capability for the features of the room. The control system should provide a means of controlling all inputs and outputs of the system as well as interfacing to elements of the room such as a powered screen (if fitted).

    Touch panel layouts and functionality are outlined in Appendix C.

52. It must be possible to connect a second touch panel device to the system without the need for Lancaster University to make alterations to the control code.

Programming

53. A 7” touch panel-based control system will be provided to control all of the audio visual equipment in the room.

54. *A 7" Touch panel design must adhere to the Lancaster style of touch panels.*

55. The control system processor should have appropriate capability for the features of the room. The control system should provide a means of controlling all inputs and outputs of the system as well as interfacing to elements of the room such as a powered screen (if fitted).

56. Touch panel layouts and functionality are outlined in Appendix C.

57. Consideration must be given to minimizing power consumption when devices are not in use either through using devices that enter a low power state when not in use i.e. amplifiers or a Power distribution unit to power of equipment that is not in use.

58. It must be possible to connect a second touch panel device to the system without the need for Lancaster University to make alterations to the control code.

Remote monitoring and control

59. The control system must interface with the room management system (RMS) and must provide a minimum of:

    a. Projector or display screen power status.
    b. Source input usage.
    c. Projector lamp hours (if projector present).
    d. Projector filter times (if projector present).
    e. The status of all connected devices.
    f. Remote control of the touch panel (if present).
    g. Power usage.
    h. Error statuses of all connected devices.
    i. Current volume level.

60. The contractor must liaise with ISS to determine the exact requirements of the integration required.

Building management integration

61. The System must integrate to the buildings fire management system such that in the case of a fire all audio is muted so that sounding alarms can be heard. A message must also be displayed on the touch panel to see the fire alarm is sounding and that the room must be evacuated.

Occupancy Sensor

62. A suitable occupancy sensor to be provided to allow the control system to monitor and control power state. If no activity is detected within the space or does register a button press from the control panel within a programmed time period, the system will be automatically shut down to reduce power consumption.

Cabling and installation

63. All cables entering or leaving the podium must be protected by a black braided umbilical cord with a moveable distance of approx. 2 metres. There should be strain relief to the umbilical cord of a shorter length than the cord to prevent accidental damage to cables when moving the unit.

64. All cabling should run in suitable containment above the suspended ceiling, in wall voids or under the floor. Permitted containment options include copex, cable baskets or concealed

trunking. **Surface Mounted trunking and visible cable snakes will not be permitted**, except cables between the floor box and the lectern which should be braided in a black umbilical with sufficient length to allow the lectern to be repositioned.

- All cabling must be run in suitable containment, e.g. circular polypropylene flexible conduit.
- It is not acceptable to share a cable conduit with power or data cabling.
- Where three-compartment shared trunking is used power cabling, data cabling and AV cabling must run in separate compartments.
- Where individual conduits are installed for AV cabling 40mm conduit is preferred. Two 25mm conduits for AV cabling are also acceptable. This is the minimum requirement, additional conduits maybe requested depending on the number of cables required for the installation.
- Cables running in ceiling voids must be installed within suitable containment used for AV cabling only, sufficient to meet all current Fire, Electrical and Health and Safety regulations. Cabling in containment must meet or exceed CPR Rating 'Cca' for Fire Safety.

  For Example:
  - Cables should be contained in 32mm Copex, e.g. https://uk.rs-online.com/web/p/conduit/0623710/
  - Fixed to the soffit/slab with metal tie wraps, plastic ties must not be used, e.g. https://uk.rs-online.com/web/p/cable-ties/1235035/
  - The metal tie wraps must be looped through flat hanger screws fixed with a nylon wall plug to the soffit/slab at no more than 1m intervals, e.g. https://www.gexpro.com/usg/Root-Category/Fasteners/Fixture-Hardware/Hangers%2C-Bolts/Screws---Flat-Hanger/Multiple-631-Flat-Hanger-Screw/p/523430

The containment must not be fixed to any existing data cabling baskets or trays as this contravenes the ISS Networking Installation specifications.

65. A spare CAT6 cable must be run to each projector and repeater display.
66. All Cables must be labelled at both ends with the following information: Signal type, source, destination, e.g. Sig - HDMI, Src – PC, Dest – Switch Input 1.
67. In all cases the floor box should be able to be fully closed; this may necessitate right angle connectors for shallow floor boxes.
68. Final build schematics showing all devices and connectivity must be provided for video signals, audio signals and control signals as well as the rack build layout.
69. Manufacturer, model, serial numbers and MAC Addresses of all equipment in each room should be provided to Lancaster University as part of the handover process.
70. All power and data will be provided by a third-party contractor employed by the University. You will be required to work closely with the electrical contractor to ensure successful completion of the installations.
71. All equipment installed at height must have low level electrical isolation, e.g. for each projector, display screen or other powered device.

Whiteboard

72. New vitreous enamel magnetic whiteboards should be provided in each Seminar room, these should be fixed mounted and cover as much of the teaching wall as possible. In the case of

an electric screen then where possible it should avoid covering whiteboards when in use. If a display screen is used then they should be installed either side of the display screen if space allows, otherwise they should be installed on other wall space. Additional whiteboards may be required on walls other than the main teaching wall, dependent on space.

Wireless networking

73. A review of the wireless coverage of each Seminar room should be undertaken by ISS Networking and if necessary, additional high-level CAT6 data points should be provided to support wireless access points.

Physical space

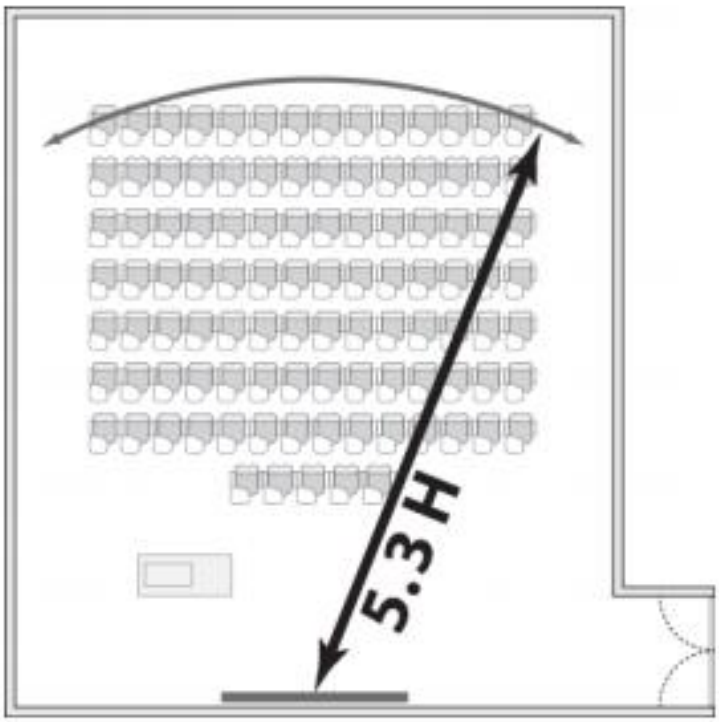
74. The room should contain one analogue clock without second hand affixed to the wall opposite the main teaching wall. The clock must be PoE powered and take a time signal using an NTP server.

Room Acoustics

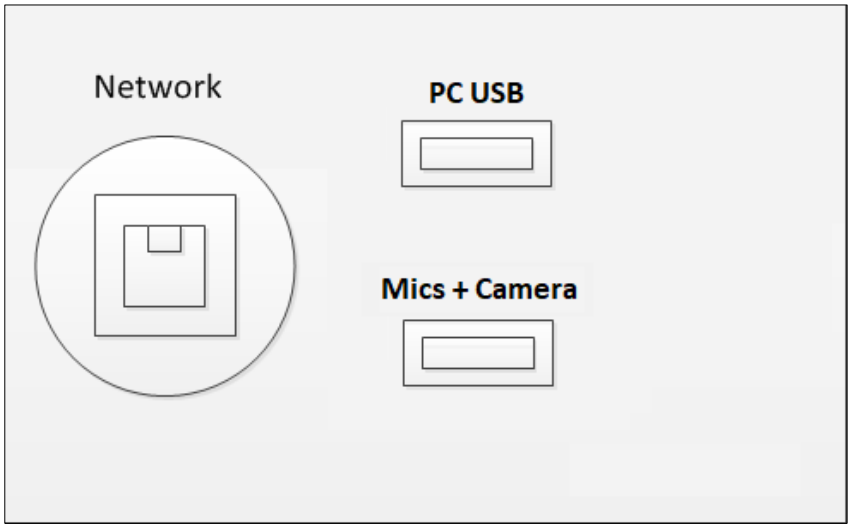
75. Considerations must be given to the acoustics of the space in particular ambient noise levels and reverberation times, with appropriate acoustic treatments applied to the walls and or ceiling. A meeting room should have an ambient noise level of no more than 50db and the RT60 (reverberation time) should be less than 1 second. The minimum expected standard is BS8233.

Appendix A – Screen size calculator

The height of the display screen should be no less than the distance from the centre of the screen to the furthest audience member divided by 5.3, i.e. **D / 5.3 > H** (where screen height = H; distance to further audience member = D). *AETM Audio Visual Design Guidelines 2nd Edition Rules for Screen Size and Sightlines.*



Appendix B - Panel layout for input plate



Appendix C - Touch panel layout and functionality

ISS will provide a TP design which can be used to create the desired look and feel of the control system.

Appendix D - Sign-off documentation

All work is subject to final sign-off and approval. All elements of the installation including the control system and interfaces to external systems must be shown as working.

The sign-off documentation will be provided at the start of the project and can also be found here for reference.