Louisiana State University

Repurposing Interim Hospital Audiovisual Systems

December 1, 2021

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SECTION 274116 – INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL

A. Refer to Bidding Instructions for the following:

1. Bidding Documents and Procurement Procedures
2. Pre-Bid Meeting Date/Time and Information
3. Pre-Bid RFI and Substitution Procedure
4. Addendum Issuance Information
5. Bid Submission Date/Time and Requirements

1.2 PRODUCT SUBSTITUTION REQUESTS

A. Where Bidding Documents refer to any items, materials, products, and equipment by means of one or more manufacturer's trade name, catalog reference or similar means of identification of manufacturer, such reference establishes standard of required quality, appearance, dimension, or function.

B. It is not an intention of this specification to limit or restrict Bid Responses to those containing products by specific manufacturers, but rather to set a baseline of operational performance and functionality that all Bid Responses must meet or exceed.

C. All pre-bid substitution requests shall be communicated in writing to Owner, Architect, and Consultant

a. Request shall include name of material, product, or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.

b. Bidder shall assume and bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and has included such costs in the Bid.

c. Burden of proof of merit of proposed substitution is upon Bidder.

2. Some manufacturer's names and product descriptions used in this specification are product specific with no substitutions allowed. These “Brand Specific” products are required to meet compatibility with the Owner’s existing systems and to maintain continuity of support. Refer to Appendix E, 5.1 for a listing of Brand Specific products.

3. All approved substitutions shall be communicated per addenda.

1.3 PROJECT OVERVIEW

A. Louisiana State University is currently Repurposing Interim Hospital in Louisiana for a state of the art medical education and training facility. The new facility will include audiovisual enabled teaching and learning spaces supporting the core medical programs for the University. Spaces in the building include medical simulation spaces, classrooms, labs, and conference spaces as well as recreational facilities, all of which shall include audiovisual technologies.

B. Louisiana State University is seeking a turn-key job to be provided by one vendor to supply equipment, labor, installation materials, control systems programming, audio DSP programming, testing, training, and follow-up support for the audiovisual systems as described in this Specification.

1.4 GENERAL FOR ALL SYSTEMS

A. The following are applicable to all systems unless noted otherwise.

1. AV System type (i.e., SY01) refers to a system signal flow for a particular space/system. X / AVSXX indicates the sheet and the detail that the system can be found within the signal flow drawings.
2. Medical Simulation System type (i.e., MSY01) refers to a system signal flow for a particular space/system.
   X / AVMSXX indicates the sheet and the detail that the system can be found within the signal flow drawings.
3. Control System
   a. The audiovisual control system touch panel or push-button panel associated with each system shall provide control of components within the audiovisual system. Control requirements are dependent upon the functionality of the space. Control may include, but is not limited to, the following capabilities:
      1) Power the system on/off
      2) Control of source device selection
      3) Control of video routing to displays and other devices
         a) The last video source routed to a display will be the audio source utilized within the space. Coordinate final configuration with the Owner.
         b) On touch-panel control systems, this includes secure technician level access to configure or reconfigure default routing.
         c) The Contractor shall develop an easy to use interface on the touch panel that provides control of the routing assignments of the instructor's source content to all or select displays within the space.
      4) Control of audio including volume up/down/mute
         a) On touch-panel control systems, this includes secure technician level access to controllable aspects to the audiovisual system's DSP settings if applicable.
      5) Control room lighting by recalling presets within the lighting control system provided by others.
         a) Coordinate with the Architect regarding spaces that will include this capability
      6) Include a button to reset the system to its default video routes and audio levels without having to shut down and restart the system. This is for spaces with touch panel control only.
   b. Any other operations that the control system can control not explicitly noted.
   c. See Section 3.2 Control System Software Design & Development for further requirements.
   d. If required, a utilities section within the user interface shall provide any user with control of additional parameters of the audiovisual system that may not need to be accessed on a regular basis.
   e. All audiovisual control systems shall include secondary analogous control of the audiovisual system. This shall be enabled through an app and/or web interface on an Owner-provided tablet or other mobile device. See Section 3.2 Control System Software Design & Development for further requirements.
4. Connections to network outlets located outside of a rack mounted patch panel shall utilize patch cables that match the Owner's patch cable requirements for connection to the facility LAN. Reference Division 27 Communications specifications.
5. The Contractor shall coordinate with the Architect and/or Owner on the color and/or finish of the touch panel, push-button panel, flip-top control system, flip-top cable enclosure, exposed

equipment racks, equipment rack cabinets, instructor stations, credenzas, loudspeakers, and ceiling-mounted microphones.

6. The Contractor shall coordinate the cut-outs with the furniture supplier/Architect/Owner on the location of the flip-top cable enclosures, touch panel controllers, microphones, or any other ancillary audiovisual devices that may be located on the surface of a table, instructor's station, or presentation station. This applies to all Contractor supplied furniture or furniture supplied by others that requires integration of audiovisual components. See Scope of Work and Installation Practices for further requirements.
7. Any cables connected to a floor or wall box shall be wrapped in a flexible sheath and shall be color coded. Coordinate colors with the Owner.
8. The Contractor shall coordinate the length of any premade cable assemblies.
9. The Contractor shall be required to coordinate the location of any ceiling-mounted video cameras with the Owner prior to final installation.
10. The Contractor shall provide wire-ties, hooks, raceway, or cable channels as necessary within Owner provided furniture to ensure a complete and neat installation. For example, cables shall not be seen hanging or draped under a table.
11. The Contractor shall provide mounts or mounting solutions for devices that are located behind flat panel displays, under tables, within plenum boxes or other locations that may house audiovisual equipment within the audiovisual system.
12. All instructor's stations, credenzas, and equipment racks provided by the Contractor shall all have locking doors to limit access. All locks shall be keyed identically. Coordinate requirements with the Owner.
13. Manufacturer Assistance
    a. The Contractor shall utilize any manufacturer assistance for programming, configuring, or commissioning any of the systems within the facility as required to provide fully functional systems as indicated within this specification.

1.5 SYSTEMS DESCRIPTIONS

A. SY01, SY02, SY03, SY04, SY05 (AVS01)– Digital Signage. Quantity 13 (Rooms: See Drawings) These spaces shall include a flat panel display that will show custom content from a digital signage system. The system shall include the following:

1. Display System
    a. One wall-mounted flat panel display.
    b. See Drawings for flat panel size and orientation
2. Source devices
    a. An **OFCI** media player shall be located and assigned to the display.
    b. This player shall be able to play content provided through the building LAN. An HDMI connection on the player shall allow for the connection of portable or secondary source device.
    c. A mount for the media player shall be provided.
3. Control
    a. The media player, through the digital signage software provided by the Owner, shall provide for control of the display such as power on/off, and volume control.

B. SY06, SY07, SY08 (AVS01) - Digital Signage and Collaboration. Quantity 7 (Rooms: See Drawings): The Digital Signage and Collaboration system shall show custom content from the

digital signage system until the wireless presentation device is engaged. Then the system shall accommodate small group collaboration enhanced by audiovisual presentation capabilities. This system shall include the following:

1. Display System
   a. One wall-mounted flat panel display.
   b. See Drawings for flat panel size and orientation
2. Source devices
   a. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
      1) Mounting hardware shall be provided
   b. A **OFCI** media player shall be located and assigned to each display within the group.
      1) The player shall be able to play content provided through the campus LAN. An HDMI connection on the player shall allow for the connection of portable or secondary source device.
      2) **Emergency video messaging from campus network will need to be displayed as needed.**
      3) A mount for the media players shall be provided.
3. Equipment required for system functionality shall be located behind the flat panel display. Equipment mounts shall be provided by the Contractor.

C. SY09 (1/AVS02) – Multi-purpose. Quantity 1 (Room 1001): The Multi-purpose Room shall accommodate meetings and group collaboration enhanced by audiovisual presentation and web-conferencing applications featuring a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device. This system shall include the following:

1. Display System
   a. One large 2.5 pixel LED display
   b. The display shall be wall-mounted
2. Source devices shall include:
   a. A wall plate connection for a laptop
   b. A floor plate connection for a laptop
   c. A media player shall be located at the display.
      1) The player shall be able to play content provided through the campus LAN. An HDMI connection on the player shall allow for the connection of portable or secondary source device. This secondary content can be either full screen or windowed within other signage content.
      2) A mount for the media players shall be provided.
3. Audio
   a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all source devices
   b. A complement of microphones shall include:
      1) Combo lavalier and handheld wireless microphone systems for the instructors
   c. A complement of wired microphones
4. Control
   a. Control of the audiovisual system shall be through a wall mounted touch panel control user interface.
5. Equipment shall be located in a rack in the AV Closet (AVS04)

D. SY10 (1/AVS03) – Fresh Tissue Lab A & B. Quantity 1 (Rooms 2020, 2022) The Fresh Tissue Lab A & B shall accommodate instruction enhanced by audiovisual presentation. The space shall be divisible and will allow for simultaneous instructional activities when the wall is in the closed position. When the wall is in the open position, the room shall feature a dual screen large flat panel display per room. The audiovisual system shall support the display of multiple source devices. The audiovisual system shall include the following (per room):

1. Instruction / Presentation / Capture / Web-Conference
    a. Display System
        1) Two large flat panel displays
2. Source devices available for each instructor/presenter shall include:
    a. A dedicated all in one computer (OFCI)
3. A wireless presentation device shall be associated with the display system. The device shall enable video display of the presenter's and student's wireless enabled devices to the display system.
4. Auxiliary input for portable HDMI video sources shall be located at the floor
    a. Cables and adapters shall be provided.
5. Capture
    a. Two capture and streaming appliances shall be provided.
    b. Each device shall provide for the capture of simultaneous video sources and audio.
    c. A dedicated computer (OFCI) acting as a dedicated Zoom conference appliance shall be provided and located in the equipment rack.
    d. The dedicated computer at each instructor's station shall be utilized for application-based web-conferencing. Video and audio content shall be made available via the associated AV bridge.
    e. Two ceiling-mounted PTZ cameras shall be provided. These cameras will be located above a station dedicated as teaching location. Coordinate final location with the Owner. Cameras shall be used for: Image magnification within the room and Capture / Streaming through a web-conference application
    f. Audio
        1) Wireless **headset** microphone systems shall be provided.
        2) A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement.
        3) When the wall is in the open position, the audio DSP shall combine the loudspeakers.
        4) Coordinate the finish color of the loudspeakers with the Owner and architect.
6. Control
    a. Control of the audiovisual system shall be from a touch panel control system located on the wall.
7. Either instructor station shall be able to be utilized when the wall is in the open position.
8. Furniture
    a. A credenza shall be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
    b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving integral to the furniture.
    c. Coordination of style and finish with the Owner and Architect shall be required.

E. SY11 (2/AVS03) – Classroom/Conference. Quantity 1 (Room 2002) The Classroom/Conference Rooms shall accommodate meetings, small classes and group collaboration enhanced by audiovisual presentation and web-conferencing applications featuring a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device. This system shall include the following:

1. Display System
   a. Projection:
      1) Ceiling mounted projector with appropriate lens
      2) Electronic projection screen by Others
   b. ~~Instructor Courtesy Monitor~~
      1) **~~Locate on lectern~~**
2. Source devices shall include:
   a. A dedicated All in One (AOI) computer (OFCI) with keyboard and mouse acting as a primary source and as a web conference appliance.
   b. A lectern cubby with HDMI connection for laptops
   c. Mounting hardware shall be provided
3. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
   a. Mounting hardware shall be provided
4. Web-conference / Capture
   a. An automatically framing wide field of view camera located at the ceiling. The camera shall automatically detect meeting participants and resize the field of view. This camera shall be used for:
   b. Web-conference applications.
   c. Capture through the web-conference application.
5. Audio
   a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all source devices
   b. A multi-element microphone array shall be ceiling-mounted in each room.
6. Control
   a. Control of the audiovisual system shall be through a lectern mounted touch panel control user interface.
7. Room Schedule Panel
   a. There will be a room schedule panels located outside room.
8. A lectern shall be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
   a. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving integral to the furniture.
   b. Coordination of style and finish with the Owner and Architect shall be required.

F. SY12 (AVS04) – AV Closet. Quantity 1 (Room 2046) This AV Closet is the central processing hub for the Multipurpose Room and other spaces located adjacent to this area. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the systems to fulfill the system described herein. The audiovisual system shall include the following:

1. Audiovisual Transport and Processing
2. Audiovisual system control processors.

3. Audiovisual IP transport system.
4. Audio DSP system.
5. Audiovisual transport data switches
    a. The Contractor shall be required to coordinate with the Owner to configure the switches in coordination with the video transport manufacturer.
6. Audio Network switches shall be provided by the Owner but installed by the Contractor (OFCI)
7. Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to OFOI network switches and OFCI network switches. Network connected equipment residing within the equipment rack shall connect directly to the OFOI and OFCI provided network switches.
8. Equipment racks shall house all the audiovisual equipment.

G. SY13 (1/AVS05) – Group Fitness. Quantity 1 (Room 3036) This system will provide audiovisual support for instruction of fitness classes and group workouts. The audiovisual system shall include the following:
    1. Display
        a. Large flat panel display mounted on wall
    2. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
        a. Mounting hardware shall be provided
    3. Audio
        a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
        b. Wireless headset microphone system for instructor
        c. Bluetooth connection for instructor sources
    4. Control
        a. Touch panel mounted at wall
    5. Room Schedule Panel
        a. There will be a room schedule panel located outside room.
    6. Equipment rack shall house all the audiovisual equipment.

H. SY14 (2/AVS05) – Group Fitness. Quantity 1 (Room 3037) This system will provide audiovisual support for instruction of fitness classes and group workouts. The audiovisual system shall include the following:
    1. Display
        a. Ceiling mounted projector with appropriate lens
        b. Electronic projection screen by Others
    2. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
        a. Mounting hardware shall be provided
    3. Audio
        a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
        b. Wireless headset microphone system for instructor
        c. Bluetooth connection for instructor sources
    4. Control

a. Touch panel mounted at wall

5. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
6. Equipment rack shall house all the audiovisual equipment.

I. SY15 (3/AVS05) – Spinning. Quantity 1 (Room 3039)

1. Display
   a. Ceiling mounted projector with appropriate lens
   b. Electronic projection screen by Others
2. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
   a. Mounting hardware shall be provided
3. Audio
   a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
   b. Wireless headset microphone system for instructor
   c. Bluetooth connection for instructor sources
4. Control
   a. Touch panel mounted at wall
5. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
6. Equipment rack shall house all the audiovisual equipment.

J. SY16 (1/AVS06) – Small Group. Quantity 1 (Room 3040) This system will provide audiovisual support for instruction of fitness classes and group workouts. The audiovisual system shall include the following:

1. Display
   a. Large flat panel display mounted on wall
2. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
   a. Mounting hardware shall be provided
3. Audio
   a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
   b. Wireless headset microphone system for instructor
   c. Bluetooth connection for instructor sources
4. Control
   a. Touch panel mounted at wall
5. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
6. Equipment rack shall house all the audiovisual equipment.

K. SY17 (2/AVS06) – Pin-Loaded Machines/Cardio. Quantity 1 (Room 3038) This system will provide audiovisual support for instruction of fitness classes and group workouts. The audiovisual system shall include the following:

1. Display
   a. Three large flat panel displays mounted on wall

2. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
    a. Mounting hardware shall be provided
3. Audio
    a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
    b. Wireless headset microphone system for instructor
    c. Bluetooth connection for instructor sources
4. Control
    a. Touch panel mounted at wall
5. Equipment rack shall house all the audiovisual equipment

L. SY18 (3/AVS06) – Cardio. Quantity 1 (Room 3034) This system will provide audio support for instruction of workouts. The audiovisual system shall include the following:

1. Audio
    a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all sources
    b. Wireless headset microphone system for instructor
    c. Bluetooth connection for instructor sources
2. Control
    a. Touch panel mounted at wall
3. Equipment rack shall house all the audiovisual equipment.

M. SY18 (AVS07) – AV Closet Level 2. Quantity 1 (Room 3044) This AV Closet is the central processing hub for spaces located adjacent to this area. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the systems to fulfill the system described herein. The audiovisual system shall include the following:

1. Audiovisual Transport and Processing
2. Audiovisual system control processors.
3. Audiovisual IP transport system.
4. Audio DSP system.
5. Audiovisual transport data switches
    a. The Contractor shall be required to coordinate with the Owner to configure the switches in coordination with the video transport manufacturer.
6. Audio Network switches shall be OFCI
7. Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to OFOI network switches and OFCI network switches. Network connected equipment residing within the equipment rack shall connect directly to the OFOI and OFCI provided network switches.
8. Equipment racks shall house all the audiovisual equipment.

N. SY20 (1/AVS08) – Testing Lab. Quantity 1 (Room 4000) The Testing Lab shall accommodate large group and individual testing enhanced by an audio speech only system and honesty camera system. A proctor location to allow a laptop connection to view testing stations as well as a room viewing station located in an office will complete the system. This system shall include the following:

1. Large Group Testing
    a. Audio

1) Ceiling-mounted loudspeakers shall provide audio reinforcement for the voice lift system
2) Wireless lapel microphone system for proctor

b. Testing Honesty System
1) Ceiling mounted camera over each testing station feed back to office and proctor laptop for real time viewing
2) Camera feed also to OFOI capture/recording system

2. Individual Testing:
a. Audio
1) Ceiling-mounted loudspeakers shall provide audio reinforcement for the voice lift system

b. Testing Honesty System
1) Ceiling mounted camera over each testing station feedback to office and proctor laptop for real time viewing
2) Camera feed also to OFOI capture/recording system

3. Office
a. Display
1) Three flat panels mounted on wall

b. Source
1) Three OFCI computers with feed from Testing Room cameras through building LAN

c. Equipment Rack for mounting equipment

O. SY21 (1/AVS09) – Large Conference Room. Quantity 10 (Rooms: See Drawing): The Large Conference Rooms shall accommodate meetings and group collaboration enhanced by audiovisual presentation and web-conferencing applications featuring a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device. This system shall include the following:

1. Display System
a. One large flat panel display
b. The display shall be wall-mounted

2. Source devices shall include:
a. A dedicated computer (OFCI) with keyboard and mouse acting as a primary source and as a web conference appliance.
b. A tabletop cubby with HDMI connection for laptops
c. Mounting hardware shall be provided

3. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
a. Mounting hardware shall be provided

4. Web-conference / Capture
a. An automatically framing wide field of view camera located at the display. The camera shall automatically detect meeting participants and resize the field of view. This camera shall be used for:
b. Web-conference applications.
c. Capture through the web-conference application.

5. Audio
a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all source devices

b. A multi-element microphone array shall be ceiling-mounted in each room.

6. Control
   a. Control of the audiovisual system shall be through a wall mounted touch panel control user interface.
7. A credenza shall be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
   a. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving integral to the furniture.
   b. Coordination of style and finish with the Owner and Architect shall be required.

P. SY22 (2/AVS09) – Small Conference Room. Quantity 6 (Rooms: See Drawing): The Small Conference Rooms shall accommodate small meetings and group collaboration enhanced by audiovisual presentation featuring a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device. This system shall include the following:

1. Display System
   a. One wall-mounted flat panel display.
2. Source devices
   a. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
      1) Mounting hardware shall be provided
   b. Auxiliary input for portable video sources shall be located at the table.
      1) HDMI cable shall be provided to the Owner upon completion
      2) This input shall connect to the wireless presentation device via the wireless presentation device's HDMI input.
3. Audio
   a. A sound bar with integrated camera and microphone shall provide audio reinforcement for all source devices
4. Control
   a. Control of the audiovisual system shall be from a wall mounted touch panel
5. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
6. Room Schedule Panel will be located on the wall in the hallway outside of the door.
7. Equipment required for system functionality shall be located behind the flat panel display. Equipment mounts shall be provided by the Contractor.

Q. SY23 (3/AVS09) – Distance Learning. Quantity 1 (Room 4353) The Distance Learning room shall accommodate meetings and group collaboration enhanced by audiovisual presentation and web-conferencing applications featuring a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device. This space can be used for distance learning via using the web-conferencing system. This system shall include the following:

1. Display System
   a. One large flat panel display
   b. The display shall be wall-mounted
2. Source devices shall include:
   a. A dedicated computer (OFCI) with keyboard and mouse acting as a primary source and as a web conference appliance.

b. A tabletop cubby with HDMI connection for laptops
c. Mounting hardware shall be provided

3. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the display system.
   a. Mounting hardware shall be provided
4. Audio
   a. Ceiling-mounted loudspeakers shall provide audio reinforcement for all source devices
   b. Wireless Microphone
5. Control
   a. Control of the audiovisual system shall be through a wall mounted touch panel control user interface.
6. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
7. A credenza shall be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
   a. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving integral to the furniture.
   b. Coordination of style and finish with the Owner and Architect shall be required.

R. MSY01 (1/AVMS01) – Exam Room. Quantity 14 (Rooms: See Drawings):The Exam room will support the use of actors & confederates. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras. The spaces shall include the following:

1. Student Computer (OFCI) located in the corridor at the exam room door on a wall mount system (provided by the AV Contractor). This computer shall be connected to the building LAN.
2. Exam room computer for Electronic Medical Records(EMR), Telemedicine and SP post scenario (OFCI), located in the exam rooms on a wall mount system (provided by the AV Contractor). This computer shall be connected to the building LAN.
3. Sound/Audio system:
   a. A ceiling-mounted loudspeaker shall provide speech audio reinforcement, paging and talkback. Coordinate the finish color of the loudspeakers with the Owner and architect.
   b. A ceiling microphone shall pick up general audio for capture via the medical simulation capture system.
   c. The audio shall be processed through the system's main audio DSP system, and appropriate mixes shall be sent to the capture system audio encoders and ceiling loudspeakers.
4. Telemedicine:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
5. Capture:
   a. Two PTZ video cameras shall be ceiling and/or wall mounted to provide views of the procedures and the participants. The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant per the mockup requirements

described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location. These cameras shall be connected to the building LAN / CAE VLAN.

b. Audio configuration:
   1) The ceiling microphone shall pick up general audio in the room for capture via the medical simulation capture system.
   2) Route and mix ceiling microphones to the simulation network audio interface inputs for the associated room and the audio monitor for the associated control station only. This is a permanent route.
   3) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system.

c. High resolution video (EMR) shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.

6. An additional AVoIP input shall be available in the room to accommodate any other device brought in with video output.

7. The medical simulation system shall facilitate the capturing of the audio & video during simulations.

8. Mock-up System in coordination with CAE:
   a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras.
      1) A wireless installation tool is in the portable equipment pool to accommodate.
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the interaction between the standardized patient and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.
   e. The approved locations shall be duplicated in all similar rooms.

S. MSY02 (2/AVMS01) – Exam Large. Quantity 2 (Rooms 1103, 1114): The Exam room will support the use of actors & confederates. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras. The spaces shall include the following:

1. Student Computer (OFCI) located in the corridor at the exam room door on a wall mount system (provided by the AV Contractor). This computer shall be connected to the building LAN.

2. Exam room computer for Electronic Medical Records(EMR), Telemedicine and SP post scenario (OFCI), located in the exam rooms on a wall mount system (provided by the AV Contractor). This computer shall be connected to the building LAN.

3. Sound/Audio system:

a. A ceiling-mounted loudspeaker shall provide speech audio reinforcement, paging and talkback. Coordinate the finish color of the loudspeakers with the Owner and architect.
b. Ceiling microphones shall pick up general audio for capture via the medical simulation capture system.
c. The audio shall be processed through the system's main audio DSP system, and appropriate mixes shall be sent to the capture system audio encoders and ceiling loudspeakers.

4. Telemedicine:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
5. Capture:
   a. Four PTZ video cameras shall be ceiling and/or wall mounted to provide views of the procedures and the participants. The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location. These cameras shall be connected to the building LAN / CAE VLAN.
   b. Audio configuration:
      1) The ceiling microphone shall pick up general audio in the room for capture via the medical simulation capture system.
      2) Route and mix ceiling microphones to the simulation network audio interface inputs for the associated room and the audio monitor for the associated control station only. This is a permanent route.
      3) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system (simulation network audio input).
   c. High resolution video (EMR) shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
   d. Additional AVoIP input shall be available in the room to accommodate any other device brought in with video output.
6. The medical simulation system shall facilitate the capturing of the audio & video during simulations.
7. Mock-up System in coordination with CAE:
   a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras
      1) A wireless installation tool is in the portable equipment pool to accommodate.
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.

d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the three cameras in the system. This includes capture of facial expressions as well as body language from the participants.
e. The approved locations shall be duplicated in all similar rooms.

T. MSY03 (3/AVMS01) – Control/Monitoring. Quantity 1 (Room 1123 East, North, South):

1. Proctor Station:
   a. Display System
      1) Multiple flat panel displays shall be located at the station. These displays shall give the proctors the ability to view all of the cameras within the standardized patient exam rooms, debrief rooms and hallways simultaneously.
      2) The displays shall be wall mounted
   b. Computers: Multiple high-performance workstations shall be located at the proctor station.
      1) 1 high performance computer for camera display/control.
      2) 1 computer for CAE system control.
      3) These computers shall provide control and configuration of the medical simulation capture system and cameras. The users shall be able to connect to the medical simulation capture system allowing them to configure scenarios prior to beginning the session, control the recording of scenarios (such as start/stop), annotate events and control of cameras within the capture and viewer software. These computers shall be connected to the building LAN.
   c. Sound/Audio:
      1) A paging microphone shall allow the users to page into the exam rooms as well as the hallways.
      2) A push-to-talk (PTT) microphone shall be located the proctor station. The microphone shall work in concert with the AV touch panel and the audio DSP to provide the choice of single room, multi-room, corridors, SP lounge, and Debrief rooms, individually, any combination, or whole SP area. A cancel button on the touch panel shall be provided to cancel all microphone routing for that station.
      3) CAE prerecorded announcements shall be distributed via the audio DSP system to the various loudspeakers.
      4) Headphones and countertop loudspeakers shall be provided for audio playback. A two-input headphone amp with selector switch shall be wired to monitor the feed from the audio DSP (live) and the control PC audio (CAE). Audio levels shall be balanced to match.
      5) A USB Headset shall be provided for use in the CAE system.
   d. Control:
      1) A touch panel located at the operator’s station shall control specific aspects of the audiovisual system, such as, but not limited to:
      2) Selection of live audio monitoring and talkback of the spaces.
      3) A section of buttons on the touch panel shall have the selection of which exam room/debrief to monitor live and shall be exclusive to the chosen room.
   e. System power and system volume
      1) Push-to-talk(PTT) microphone volumes shall be on their own page for adjustment, if necessary, by the proctor(s) only.
      2) System and device power.
   f. Loudspeaker volumes (limited).

1) Audio source levels going to the simulation network audio interface inputs in a subpage accessible only by the technician
2) Changes made to the capture interface level shall be reflected in the audio monitor for the associated control station.
3) All initial levels and default routes shall be restored as shutdown/startup.

g. An equipment rack shall be located at the Proctor station and house all local audiovisual devices. Additional equipment racks shall be located in the rack rooms and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

2. Observer Stations (QTY 3):
   a. A computer shall be located at the observation station. This computer shall be connected to the building LAN.
   b. The users shall be able to use these computers to control all events associated with the assigned simulation space(s). The users shall be able to control recording of scenarios (such as start/stop) and annotate events during the simulation.
   c. The observer shall be able to select any camera within the spaces being observed for control via the on-screen display and control via the mouse.
   d. Sound/Audio:
      1) A USB Headset shall be provided for use in the CAE system.

U. MSY04 (1/AVMS02) – SP Area Corridors; SP Corridor and Student Corridors (See Drawings):
   1. A distributed ceiling loudspeaker system for paging audio. Coordinate the finish color of the loudspeakers with the Owner and architect.
   2. Ceiling mounted pan-tilt-zoom cameras for observing student and confederate movement in the corridors.
      a. Coordinate final locations with the Owner.

V. MSY05 (2/AVMS02) – SP Lounge. Quantity 1 (Room 1125): SP Lounge shall be used for actor preparation and training during Standardized Patient events and shall accommodate the ability to host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:
   1. Display system
      a. One flat panel display.
   2. Audiovisual source devices shall include:
      a. A dedicated computer with keyboard, mouse, and monitor (OFCI).
      b. A wireless presentation device shall enable video display of the user's wireless enabled device to the display system.
      c. HDMI auxiliary inputs for a laptop computer or other audiovisual devices.
   3. Audio
      a. A wired gooseneck microphone shall be located at each instructor station.
      b. Wireless lavaliere microphone system shall be provided.
      c. A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement, as well as announcements via the paging system from the control room and CAE system, i.e., the proctor shall be able to page here, and CAE automated messages can be heard. Coordinate the finish color of the loudspeakers with the Owner and architect. Program audio shall be sent from the AVoIP decoders at the display via AES67 to the systems audio DSP and routed to the loudspeakers.

1) Coordinate the finish color of the loudspeakers with the Owner and architect.

d. An audio output at the lectern shall be available for a portable assisted listening system

4. Web conference
   a. Video and audio shall be available to web conference software via a web conference interface connected to the local PC.
   b. A wall mounted PTZ camera shall be routed to the web conference interface via the AVoIP distribution system
   c. A ceiling array microphone shall provide room audio to the web interface via the system's audio DSP and AVoIP distribution system.
5. Capture / Monitoring
   a. Two PTZ video cameras shall be ceiling mounted to provide views of the activities and the participants. The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location. These cameras shall be connected to the building LAN / CAE VLAN.
6. Furniture
   a. An instructor's station to allow instruction in a sitting or standing position shall be provided. Audiovisual equipment shall be located and stored within or on this furniture. The Contractor shall coordinate the style and finish with the Owner and Architect.
   b. All connectivity for the instructor station shall be provided through a disconnect panel within the floor box.

W. MSY06 (1/AVMS03) – Briefing Type 1. Quantity 6 (Rooms: See Drawings): The Type 1 Briefing rooms shall accommodate the ability to view simulation scenarios previously captured by the medical simulation capture system, view live scenarios in progress, capture debrief sessions, host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:
   1. Display System
      a. A large format wall-mounted flat panel display.
   2. Source devices shall include:
      a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
      b. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
      c. Digital auxiliary inputs for portable audio and/or video sources located in a cable cubby in the table.
      d. Cables and adapters shall be provided.
   3. Capture:
      a. Two PTZ video cameras shall be ceiling (optical) and wall (digital) mounted to provide views of the participants. This capture is planned to be utilized to debrief the debriefer.
         1) The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
         2) These cameras shall be connected to the building LAN / CAE VLAN.
      b. Wired ceiling mounted microphones

1) Routing and mixing shall be established via the audio DSP.
2) Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.

c. The content shown on the flat panel display within the room shall be captured by a MedSIM capture system high resolution capture appliance. This appliance shall be connected to the building LAN / CAE VLAN.

4. Audio:
   a. Ceiling-mounted loudspeakers shall provide program audio sound reinforcement corresponding with all source devices.
   b. This space shall be a node on the paging system from the Control / Monitoring room, i.e., the proctor shall be able to page here. All paging into the room is only to the ceiling loudspeakers.
5. Web conference video and audio via an integrated Sound Bar / Microphone / Camera bar that shall include:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the display. The camera shall automatically detect meeting participants and resize the field of view
   b. Integrated loudspeakers for presentation and conference audio.
   c. An integrated multi-element microphone for in-room audio conferencing support.
6. Control
   a. Control of the audiovisual system shall be through a wall-mounted touch panel control user interface.
7. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
8. Furniture
   a. A credenza shall be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
   b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
   c. Coordination of style and finish with the Owner and Architect shall be required.
   d. Some equipment required for system functionality shall be located behind the flat panel display.
   e. Equipment mounts shall be provided by the Contractor.

X. MSY07 (2/AVMS03) – Briefing Type 2. Quantity 1 (Room 1148): The Type 2 Briefing room shall accommodate the ability to view simulation scenarios previously captured by the medical simulation capture system, view live scenarios in progress, capture debrief sessions, host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:

1. Display System:
   a. A large format wall-mounted flat panel display.
2. Source devices shall include:

a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
b. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
c. Digital auxiliary input for portable audio and/or video sources located in a cable cubby in the table.
d. Cables and adapters shall be provided.

3. Capture:
   a. Two PTZ video cameras shall be ceiling (optical) and wall (digital) mounted to provide views of the participants. This capture is planned to be utilized to debrief the debriefer.
      1) The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
      2) These cameras shall be connected to the building LAN / CAE VLAN.
   b. Wired ceiling mounted microphones
      1) Routing and mixing shall be established via the audio DSP.
      2) Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.
   c. The content shown on the flat panel display within the room shall be captured by a MedSIM capture system high resolution capture appliance. This appliance shall be connected to the building LAN / CAE VLAN.
4. Web conference video and audio via an integrated Sound Bar / Microphone / Camera bar that shall include:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the display. The camera shall automatically detect meeting participants and resize the field of view
   b. Integrated loudspeakers for presentation and conference audio.
   c. An integrated multi-element microphone for in-room audio conferencing support.
   d. Integrated loudspeakers for presentation and conference audio.
5. Audio:
   a. Ceiling-mounted loudspeakers shall provide program audio sound reinforcement corresponding with all source devices.
   b. This space shall be a node on the paging system from the Control / Monitoring room, i.e., the proctor shall be able to page here. All paging into the room is only to the ceiling loudspeakers.
6. Control
   a. Control of the audiovisual system shall be through a wall-mounted touch panel control user interface.
7. Room Schedule Panel
   a. There will be a room schedule panels located outside room.
8. IP Phone:
   a. This phone shall receive calls from Overflow Resuscitation, Major Resuscitation and the Emergency Common, as well as the Control / Monitoring room.
9. Furniture

a. A credenza will be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
c. Coordination of style and finish with the Owner and Architect shall be required.
d. Some equipment required for system functionality shall be located behind the flat panel display.
e. Equipment mounts shall be provided by the Contractor.

Y. MSY08 (3/AVMS03) – Control/Monitoring. Quantity 1 (Room 1123 West, for Resuscitation areas)
1. Display System
a. Multiple flat panel displays shall be located at the station. These displays shall give the proctors the ability to view all of the cameras within the Overflow Resuscitation beds and Nurse Station, Major Resuscitation, ED Bed Nook and Emergency Commons. simultaneously.
b. The displays shall be wall mounted
2. Computers: Multiple high-performance workstations shall be located at the proctor station.
a. 1 high performance computer for camera display/control.
b. 1 computer for CAE system control.
c. These computers shall provide control and configuration of the medical simulation capture system and cameras. The users shall be able to connect to the medical simulation capture system allowing them to configure scenarios prior to beginning the session, control the recording of scenarios (such as start/stop), annotate events and control of cameras within the capture and viewer software. These computers shall be connected to the building LAN.
3. Sound/Audio:
a. A paging microphone shall allow the users to page to the Overflow Resuscitation area and beds, Nurse Station, Major Resuscitation, ED Bed Nook and Emergency Commons.
1) A push-to-talk (PTT) microphone shall be located the control station. The microphone shall work in concert with the AV touch panel and the audio DSP to provide the choice of single room, multi-room, individually, any combination, or whole Resuscitation area. A cancel button on the touch panel shall be provided to cancel all microphone routing for that station.
b. CAE prerecorded announcements shall be distributed via the audio DSP system to the various loudspeakers.
c. Headphones and countertop loudspeakers shall be provided for audio playback. A two-input headphone amp with selector switch shall be wired to monitor the feed from the audio DSP (live) and the control PC audio (CAE). Audio levels shall be balanced to match.
d. A USB Headset shall be provided for use in the CAE system.
4. Control:
a. A touch panel located at the operator’s station shall control specific aspects of the audiovisual system, such as, but not limited to:
b. Selection of live audio monitoring and talkback of the areas.
c. A section of buttons on the touch panel shall have the selection of which bed /area to monitor live and shall be exclusive to the chosen area.
5. System power and system volume
a. Push-to-talk(PTT) microphone volumes shall be on their own page for adjustment, if necessary, by the proctor(s) only.

b. System and device power.

6. Loudspeaker volumes (limited).
   a. Audio source levels going to the simulation network audio interface inputs in a subpage accessible only by the technician
   b. Changes made to the capture interface level shall be reflected in the audio monitor for the associated control station.
   c. All initial levels and default routes shall be restored as shutdown/startup.
7. IP Phone:
   a. This phone shall receive calls from Overflow Resuscitation, Major Resuscitation and the Emergency Common, as well as Debrief 1148.
8. An equipment rack shall be located at the control station and house all local audiovisual devices. Additional equipment racks shall be located in the rack rooms and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

Z. MSY09 (1/AVMS04) – Overflow Resuscitation. Quantity 1 (Room 1160) – The Overflow Resuscitation Room will support the use of actors/confederates as well as low and medium fidelity medical manikins. The simulation activities will include PACU, emergency room and resuscitation scenarios and instruction. During simulation exercises, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. This space shall also include presentation capabilities through a wall-mounted flat panel display. The audiovisual system shall include the following:

1. Display System
   a. One flat panel display for presentation
   b. One flat panel display at Nurses Station for patient Telemetry.
      1) Video from the patient vitals PCs in the suite(7) shall be routed via the AVoIP distribution system to a multiview processor, the output of which shall be sent to this display as windows depicting each bed's vitals for the nurses to monitor. Coordinate with the users for layout. May be mounted portrait orientation.
   c. The displays shall be wall mounted
2. Source devices shall include:
   a. A wall mounted dedicated computer with keyboard, mouse, and monitor (OFCI), for Electronic Medical Records(EMR), wall mounted. This computer shall be connected to the building LAN.
   b. A wireless presentation device shall be provided. The device shall enable video display of the user's wireless enabled device to the presentation display system.
   c. Auxiliary input for portable HDMI video sources shall be located at the table surface.
   d. Cables and adapters shall be provided.
   e. Touch-enabled All-In-One PC's (OFCI) shall be mounted on articulating arms next at the patient headwalls for viewing the manikin's physiological (vitals) data. Display data shall be captured via the AVoIP distribution system to a MedSIM capture system high resolution capture appliance in the AV room.
3. Sound/Audio system:
   a. Ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
   b. Ceiling recessed loudspeakers shall provide general talk-back and instruction from the control room as well as automated announcements the CAE system.

4. Telemedicine:
    a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
5. IP Phone: One wall-mounted phone for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
    a. The phones shall only be able to make internal calls.
        1) This phone shall be able to make calls to the Control /Monitoring room and Debrief 1148. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.
    b. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
        1) The audio cable shall share the VoIP data pathway to the cable basket
6. Capture:
    a. Twelve (12) PTZ video cameras shall be ceiling and/or wall-mounted, two at each bed to provide views of the procedures and the participants at each bed and around the room as well as the Nurse Station. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location. These cameras shall be connected to the building LAN / CAE VLAN.
    b. High resolution video (Vital and EMR) shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
    c. Audio configuration:
        1) The ceiling microphones shall pick up general audio at each bed and in the room for capture via the medical simulation capture system.
            a) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
            b) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
        2) The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
            a) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
            b) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    d. The medical simulation system shall facilitate the capturing of the video during simulations.
7. Control
    a. Control of the audiovisual presentation system shall be through a wall-mounted touch panel control user interface.

8. Furniture
    a. A credenza will be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
    b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving integral to the furniture.
    c. Coordination of style and finish with the Owner and Architect shall be required.
9. Some equipment required for system functionality shall be located behind the flat panel display.
10. Equipment mounts shall be provided by the Contractor.
11. Mock-up System in coordination with CAE:
    a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras.
        1) A wireless installation tool is in the portable equipment pool to accommodate.
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
    d. The emphasis on this review will be the ability to capture the activities of the students with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.
    e. The approved locations at one bed shall be duplicated at all beds in the room.

AA. MSY10 (2/AVMS04) – ED Bed Nook, Major Resuscitation, Emergency Common. Quantity 1. (Rooms 1057, 1058, 1059) The ED Bed Nook, Major Resuscitation and Emergency Common will support the use of actors/confederates as well as low and medium fidelity medical manikins. The simulation activities will include PACU, emergency room and resuscitation scenarios. During simulation exercises, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. The audiovisual system shall include the following:

1. The audiovisual system shall include the following:
    a. Two charting stations with dedicated computer with keyboard, mouse, and monitor (OFCI) shall be located within the room and mounted on a height adjustable wall-mount. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system.
2. Display Devices:
    a. Touch-enabled All-In-One PC’s (OFCI) shall be mounted on articulating arms next at the patient headwalls for viewing the manikin’s physiological (vitals) data. Display data shall be captured via the AVoIP distribution system to a MedSIM capture system high resolution capture appliance in the AV room.
3. Source Inputs
    a. Wall plates shall provide for auxiliary I/O for additional devices.

4. Sound/Audio system:
    a. Ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
    b. Ceiling recessed loudspeakers shall provide general talk-back and instruction from the control room as well as automated announcements the CAE system.
5. IP Phone: Wall-mounted phones for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
    a. The phones shall only be able to make internal calls.
        1) This phone shall be able to make calls to the Control /Monitoring room and Debrief 1148. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.
    b. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
        1) The audio cable shall share the VoIP data pathway to the cable basket
6. Telemedicine:
    a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at each EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
7. Capture
    a. Three (3) PTZ video cameras per bed (9 total) shall be ceiling-mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location. These cameras shall be connected to the building LAN / CAE VLAN.
    b. High resolution video (Vital and EMR) shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
    c. Audio configuration:
        1) The ceiling microphones shall pick up general audio at each bed and in the room for capture via the medical simulation capture system.
            a) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
            b) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
        2) The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
            a) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
            b) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.

d. The medical simulation system shall facilitate the capturing of the video during simulations.

8. Mock-up System in coordination with CAE:
   a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras.
      1) A wireless installation tool is in the portable equipment pool to accommodate.
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the activities of the students with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.
   e. The approved locations at one bed in Major Resuscitation shall be duplicated at the other bed in the room.

BB. MSY11 (AVMS05) – Divisible Classroom. Quantity 1 (Room 1044, 1046) The Divisible Classroom shall accommodate instruction and group collaboration enhanced by audiovisual presentation, web-streaming and medical capture. The space shall be divisible and will allow for simultaneous instructional activities when the wall is in the closed position. When the wall is in the open position, the room shall feature a dual screen front projection system. The audiovisual system shall support the display of multiple source devices The audiovisual system shall include the following:

1. Instruction / Presentation / Web-Conference:
   a. Display System
      1) Two ceiling-mounted projectors
      2) Two motorized projection screens (provided by others)
      3) One annotation monitor located at each instructor station shall be mounted on an adjustable armature. This shall function as the monitor for the dedicated computer.
   b. Source devices available for each instructor/presenter shall include:
      1) A dedicated computer with keyboard and mouse (OFCI).
      2) A wireless presentation device shall be associated with each display system. The device shall enable video display of the presenter’s and student’s wireless enabled devices to the display system.
      3) Auxiliary input for portable HDMI video sources shall be located at the instructor’s station.
      4) Cables and adapters shall be provided.
2. Web-conference
   a. Video and audio shall be available to web conference software via a web conference interface connected to the local PC at the lectern.
   b. A wall mounted PTZ camera in each room shall be routed to the web conference interface via the AVoIP distribution system
   c. Two (2) ceiling array microphones in each room shall provide room audio to the web interface via the system’s audio DSP and AVoIP distribution system.

1) Two wall-mounted PTZ cameras shall be provided. Two cameras shall be located within each of the divided spaces. When the rooms are combined both cameras shall be available as sources. The Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera on the attention wall (front of room). This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera. Coordinate final location with the Owner. Cameras shall be used for web conference only.

3. Audio
   a. A wired gooseneck microphone shall be located at each instructor station.
   b. Wireless lavaliere microphone system shall be provided.
   c. A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement, as well as announcements via the paging system from the control room and CAE system, i.e., the proctor shall be able to page here, and CAE automated messages can be heard. Coordinate the finish color of the loudspeakers with the Owner and architect. Program audio shall be sent from the AVoIP decoders at the display via AES67 to the systems audio DSP and routed to the loudspeakers.
      1) The loudspeakers shall be zoned for a front and rear zone within each of the spaces when the wall is in the closed position. When the wall is in the open position, the audio DSP shall combine the loudspeakers and there shall be two zones, a front and back zone.
      2) Coordinate the finish color of the loudspeakers with the Owner and architect.
   d. An audio output at each lectern shall be available for a portable assisted listening system
   e. Two ceiling array- microphones in each room (4 total) for audio capture by the medical simulation capture system and for web conferencing.
4. Control – Instructor/Presenter location
   a. Control of the audiovisual system shall be from a touch panel control system located on the instructor's station.
   b. Either instructor station shall be able to be utilized when the wall is in the open position.
5. Room Schedule Panel
   a. There will be a room schedule panels located outside room.
6. Furniture
   a. An instructor's station to allow instruction in a sitting or standing position shall be provided. Audiovisual equipment shall be located and stored within or on this furniture. The Contractor shall coordinate the style and finish with the Owner and Architect.
   b. All connectivity for the instructor station shall be provided through a disconnect panel within the floor box.
7. Medical Simulation Capture
   a. Capture of this space shall be through the medical simulation capture system.
   b. Two (2) ceiling-mounted PTZ cameras per room (4 total) shall be provided.
   c. Coordinate with the Owner on the final location of the cameras.
   d. High resolution video shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.

CC. MSY12 (AVMS06 / AVMS07) – AV Room. Quantity 1 (Room 1138): The AV Room is the central processing hub for the medical simulation capture system and associated AV systems. is the data network hub for the AVoIP systems and medical simulation capture system for Level 1. This space shall provide the appropriate technologies to facilitate the processing, switching, and

control for the medical capture system to fulfill the system described herein. The AVoIP system is a parallel network that is not on the building network. The audiovisual scope shall include the following:

1. Capture
    a. The medical simulation capture hardware shall be utilized in controlling, capturing, storing, and viewing the simulations.
        1) Video capture servers shall digitize the audio and video streams for transport over the network and archive them on network attached storage for later review. The archived video files will have associated descriptive text information to allow for easy searching. The archived video will then be available for review and debriefing after the recording is complete. All access to the stored files will be through secure internet protocols and will be accessible only by authenticated users through a secure web interface. Additionally, authorized personnel will be able to observe the encounter in real-time on any computer in the building network LAN with the proper credentials. These servers shall be able to connect to the facility LAN and medical simulation data VLAN.
2. MedSIM Network Switches and cabling
    a. Network switches OFOI
    b. The AV Contractor shall provide patch cables required for the medical simulation data network. All patch cables shall conform to the project's Division 27 specifications.
    c. The Contractor and Medical Simulation manufacturer shall be required to coordinate with the owner to configure the switches in coordination MedSIM Capture system needs.
3. AV over IP (AVoIP) Network Switches and cabling
    a. Audio Network and AVoIP switches shall be provided by the owner and installed and configured by the AV Contractor.
    b. The AV Contractor shall provide horizontal cabling, patch panels, equipment racks, cable management, faceplates, patch cables and network electronics required for the AVoIP data network. All copper and fiber cabling shall conform to the project's Division 27 specifications.
    c. The Contractor shall be required to configure the switches for Audiovisual system needs.
    d. Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to the Contractor provided network switches. Network connected equipment residing within the equipment racks shall connect directly to the Contractor provided network switches via patch cable.

DD. MSY13 (AVMS08) – Divisible Conference & Flex. Quantity 1 (Room 1024, 1026) The Divisible Conference & Flex shall accommodate instruction and group collaboration enhanced by audiovisual presentation, web-streaming and medical capture. The space shall be divisible and will allow for simultaneous instructional activities when the wall is in the closed position. When the wall is in the open position, the room shall feature a dual screen front projection system. The audiovisual system shall support the display of multiple source devices The audiovisual system shall include the following:

1. Instruction / Presentation / Web-Conference:
    a. Display System
        1) Two ceiling-mounted projectors
        2) Two motorized projection screens (provided by others)
        3) One annotation monitor located at each instructor station shall be mounted on an adjustable armature. This shall function as the monitor for the dedicated computer.
    b. Source devices available for each instructor/presenter shall include:
        1) A dedicated computer with keyboard and mouse (OFCI).

2) A wireless presentation device shall be associated with each display system. The device shall enable video display of the presenter's and student's wireless enabled devices to the display system.
3) Auxiliary input for portable HDMI video sources shall be located at the instructor's station.
4) Cables and adapters shall be provided.

c. Web-conference
1) Video and audio shall be available to web conference software via a web conference interface connected to the local PC at the lectern.
2) A wall mounted PTZ camera in each room shall be routed to the web conference interface via the AVoIP distribution system

d. Two (2) ceiling array microphones in each room shall provide room audio to the web interface via the system's audio DSP and AVoIP distribution system.
1) Two wall-mounted PTZ cameras shall be provided. Two cameras shall be located within each of the divided spaces. When the rooms are combined both cameras shall be available as sources. The Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera on the attention wall (front of room). This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera. Coordinate final location with the Owner. Cameras shall be used for web conference only.

e. Audio
1) A wired gooseneck microphone shall be located at each instructor station.
2) Wireless lavaliere microphone system shall be provided.
3) A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement, as well as announcements via the paging system from the control room and CAE system, i.e., the proctor shall be able to page here, and CAE automated messages can be heard. Coordinate the finish color of the loudspeakers with the Owner and architect. Program audio shall be sent from the AVoIP decoders at the display via AES67 to the systems audio DSP and routed to the loudspeakers.
a) The loudspeakers shall be zoned for a front and rear zone within each of the spaces when the wall is in the closed position. When the wall is in the open position, the audio DSP shall combine the loudspeakers and there shall be two zones, a front and back zone.
b) Coordinate the finish color of the loudspeakers with the Owner and architect.
4) An audio output at each lectern shall be available for a portable assisted listening system
5) Two ceiling array- microphones in each room (4 total) for audio capture by the medical simulation capture system and for web conferencing.

f. Control – Instructor/Presenter location
1) Control of the audiovisual system shall be from a touch panel control system located on the instructor's station.
2) Either instructor station shall be able to be utilized when the wall is in the open position.

g. Room Schedule Panel
1) There will be a room schedule panels located outside room.

h. Furniture
1) An instructor's station to allow instruction in a sitting or standing position shall be provided. Audiovisual equipment shall be located and stored within or on this

furniture. The Contractor shall coordinate the style and finish with the Owner and Architect.

2) All connectivity for the instructor station shall be provided through a disconnect panel within the floor box.

2. Medical Simulation Capture
   a. Capture of this space shall be through the medical simulation capture system.
   b. Two (2) ceiling-mounted PTZ cameras per room (4 total) shall be provided.
   c. Coordinate with the Owner on the final location of the cameras.
   d. High resolution video shall be captured by a MedSIM capture system high resolution capture appliance, located in the AV room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.

EE. MSY14 (1/AVMS09) – Med Mall Digital Signage & Collaboration. Quantity 1 (Room 1120): The Digital Signage and Collaboration system shall show custom content from the digital signage system until the wireless presentation device is engaged. Then the system shall accommodate small group collaboration enhanced by audiovisual presentation capabilities. This system shall include the following:

1. Display System
   a. One wall-mounted flat panel display.
2. Source devices
   a. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
      1) Mounting hardware shall be provided
   b. A media player shall be located and assigned to each display within the group.
      1) The player shall be able to play content provided through the campus LAN. An HDMI connection on the player shall allow for the connection of portable or secondary source device. This secondary content can be either full screen or windowed within other signage content.
      2) A mount for the media players shall be provided.
3. Equipment required for system functionality shall be located behind the flat panel display. Equipment mounts shall be provided by the Contractor.

FF. MSY15 (2/AVMS09)– Labs and Medical Mall. **Quantity 4**. (Room 1021, 1022, 1023, 1025) This space will function as lab and flexible demonstration space. Multiple scenarios from various manufacturers can be installed for exploration and hands on training. The room can also act as a single large space. Audiovisual equipment will be primarily of a moveable nature and be installed on a grid with connectivity. The system includes the following:

1. A specialty grid system with AV/IT and Power connectivity. The grid system will be provided by others
2. Cameras, microphones shall be mounted to the grid system with service loop cabling to allow for position adjustment. Each camera, video input and microphone shall be clearly labeled readable from the floor. All labeling shall correspond with touch panel control buttons and switcher labels
3. Captured material will be combined with outputs from manikin (if applicable) and medical devices to create a single viewable episode that can be edited and marked for playback and training purposes.
4. Captured episodes will be retained for future use and review via a special configured server.
5. There will be a combining system to allow the rooms to become a single space or be combined in multiple fashions.

6. The AV systems shall be manually reconfigurable based on the used scenario of the space. The microphone system should be reconfigurable via the touch panels. Technicians shall be able to select a number of microphones that can the mixed together to the same output.
7. Display System:
    a. A large format cart-mounted flat panel display.
8. Source devices shall include:
    a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
    b. Digital auxiliary inputs and portable VoIP end points for portable AV sources located around the room.
    c. Cables and adapters shall be provided.
9. Capture:
    a. Four (4) PTZ video cameras shall be grid mounted to provide views of the participants.
    b. The Contractor and CAE shall utilize the ceiling back box locations.
    c. These cameras shall be connected to the building LAN / CAE VLAN.
    d. Ceiling hung ceiling array microphones connected to the AVoIP network
        1) Routing and mixing shall be established via the audio DSP.
        2) Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.
    e. A USB Headset shall be provided for use in the CAE system.
10. Control
    a. Control of the audiovisual system shall be through a touch panel control user interface.
11. Furniture
    a. An AV Cart will be provided by the Contractor for the control station. Audiovisual equipment shall be located and stored in this furniture.
    b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
    c. Coordination of style and finish with the Owner and Architect shall be required.
12. Equipment mounts shall be provided by the Contractor.

GG. MSY16 (AVMS10) – Labs and Medical Mall AV Room. Quantity 1 (Room 1007): The AV Room is the central processing hub for the medical simulation capture system and associated AV systems. is the data network hub for the AVoIP systems and medical simulation capture system for the Medical Mall. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the medical capture system to fulfill the system described herein. The room shall be shared with SY09 rack equipment. The AVoIP system is a parallel network that is not on the building network. The audiovisual scope shall include the following:

1. Capture
    a. The medical simulation capture hardware shall be utilized in controlling, capturing, storing, and viewing the simulations.
    b. Video capture servers (located in 1138) shall digitize the audio and video streams for transport over the network and archive them on network attached storage for later review. The archived video files will have associated descriptive text information to allow for easy searching. The archived video will then be available for review and debriefing after the recording is complete. All access to the stored files will be through secure internet

protocols and will be accessible only by authenticated users through a secure web interface. Additionally, authorized personnel will be able to observe the encounter in real-time on any computer in the building network LAN with the proper credentials. These servers shall be able to connect to the facility LAN and medical simulation data VLAN.

2. AV over IP (AVoIP) Network Switches and cabling
   a. Audio Network and AVoIP switches shall be provided by the owner and installed and configured by the AV Contractor.
   b. The AV Contractor shall provide horizontal cabling, patch panels, equipment racks, cable management, faceplates, patch cables and network electronics required for the AVoIP data network. All copper and fiber cabling shall conform to the project's Division 27 specifications.
   c. The Contractor shall be required to configure the switches for Audiovisual system needs.
   d. Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to the Contractor provided network switches. Network connected equipment residing within the equipment racks shall connect directly to the Contractor provided network switches via patch cable.

HH. MSY17 (AVMS11) – Surgical Simulation and Control Room. Quantity 6 (Rooms: See Drawing)
Each Surgical Simulation and Control Room will support the use of actors/confederates as well as medical manikins. The simulation activities will include OR style procedures and be very flexible. During a simulation exercise, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. This space shall also include presentation capabilities and a simulated OR integration system through a wall-mounted flat panel display. and a simulated OR AV system. The audiovisual system shall include the following within each space:

1. A charting station with dedicated computer with keyboard, mouse, and monitor (OFCI) shall be located within the room and mounted on a height adjustable wall-mount. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system.
2. Display Devices:
   a. A Touch-enabled All-In-One PC(OFOI) or a hospital patient monitor (OFOI) shall be mounted at the anesthesia cart/boom for viewing the manikin's physiological (vitals) data. Display data shall be captured via the AVoIP distribution system to a MedSIM capture system high resolution capture appliance.
   b. A touch-enabled flat panel display shall be mounted on a pole cart shall be available for viewing the manikin's physiological (vitals) data in the event the hospital patient monitor or in room All-In-One is not used. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
   c. A large flat panel display shall be mounted to the wall to provide room wide viewing of patient vitals, EHR, procedure camera or any other medical device in the room connected to the AVoIP system, as well as to support in room debriefing through the medical simulation capture system using the PC in the control room, EMR computer or laptop connected to a wall input in the room.
3. Source Inputs
   a. Multiple wall plates shall provide for auxiliary I/O for additional devices.
   b. Six portable AVoIP endpoints shall be provided.

c. An AVoIP encoder shall be provided and coordinate with a potential Boom mounted camera

4. Sound/Audio system:
   a. Three ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. Ceiling recessed loudspeakers shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to manikin shall provide manikin voice by the operator.
5. IP Phone:
   a. One wall-mounted phone (OFCI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
   b. The phones shall only be able to make internal calls.
      1) This phone shall be able to make calls to the Control room and Debrief rooms. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.
   c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
   d. The audio cable shall share the VoIP data pathway to the cable basket
   e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
6. Telemedicine:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the large display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located under the large monitor.
7. Control:
   a. A touch panel located at the attending nurse's station shall control functions specific to simulation of the OR AV integration system, such as, but not limited to:
      1) In room source routing to the large flat panel display, and the boom mounted display, i.e., the EHR, patient vitals and video enabled medical devices.
      2) Ceiling loudspeaker volume.
      3) This touch panel shall also be used for presentation activities from the displays within the room.
8. Capture:
   a. Five (5) PTZ video cameras shall be ceiling-mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   b. One (1) camera may be located within an OR light on a boom. This camera shall be provided with the OR light system. The Contractor shall provide connectivity of this camera to the greater audiovisual system.

c. High resolution video (Vital, EMR and other sources) shall be captured by a MedSIM capture system high resolution capture appliances, located in the control room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.

9. Audio configuration:
   a. The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
      2) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   b. The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
      2) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
      2) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   d. The medical simulation system shall facilitate the capturing of the video during simulations.

10. Nurse Call: This room shall have a simulated hospital style simulated nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button coordinated with the headwall in the room.
    a. Patient Call:
       1) Initiate and cancel from each room’s associated control room touch panel with visual feedback of activation at the touch panel.
       2) Visual indication at associated bedside (lights staff call lamp at switch)
       3) Cancel at the bedside switch utilizing the staff call button.
    b. Staff Call:
       1) Initiate and cancel from each room’s associated control room touch panel with visual feedback of activation at the touch panel.
       2) Visual indication at associated bedside (lights staff call lamp at switch)
       3) Initiate and cancel at the bedside switch.
    c. Code Blue:
       1) Initiate and cancel from each room’s associated control room touch panel with visual feedback of activation at the touch panel.
       2) Visual indication at associated bedside (lights staff call lamp at switch)
       3) Initiate and cancel at the bedside switch.
    d. Nurse Call programming:

1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.
2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.
3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

11. Control Room:
    a. A computer (OFCI) shall be located at the control station. This computer shall be connected to the MedSIM LAN.
        1) This computer shall provide control and configuration of the medical simulation capture system and cameras .
        2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
        3) The operator shall be able to select any camera for control through on-screen camera controls.
    b. Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
        1) The manikin Vitals computer is a source in the system for both capture and display.
        2) The default routing of the Vitals PC shall be to the touch enabled flat panel to display at the headwall and the high-resolution input of the simulation capture device.
        3) Default routing shall be restored on shutdown and/or startup.
    c. An auxiliary HDMI source device input shall be available at the control station.
    d. Sound/Audio:
        1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).
            a) Default routing shall be restored on shutdown and/or startup.
        2) An additional (single button) microphone shall be provided for the manikin’s voice. An audio pitch changer shall be associated with this microphone.
            a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.
        3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.
        4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.
    e. IP Phone:
        1) This phone shall receive calls from the associated simulation room and all Simulation spaces on level 2, as well as any space in the system.
    f. Control:
        1) A touch panel located at the operator’s station shall control specific aspects of the audiovisual system, such as, but not limited to:

a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.

b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button for each wireless microphone shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.

c) Source routing to the Vitals display in the room. The default source for the Vitals display shall be the Vitals PC in the control room.

d) Source routing to the Large displays in the room.

e) Source routing to the High-Resolution input of the simulation capture device. Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.

f) System and device power.

g) Loudspeaker volumes (limited).

h) Push to Talk Microphone button 1 destination selection for paging. Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.

i) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician. Level changes made to the capture interface shall be reflected in the audio monitor for the associated control station.

2) All initial levels and default routes shall be restored as shutdown/startup.

g. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the Control Room EL203D and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

12. Mock-up System in coordination with CAE:

a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.

b. During this review, the Owner shall be able to view the outputs of these cameras.

1) A wireless installation tool is in the portable equipment pool to accommodate.

c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.

d. The emphasis on this review will be the ability to capture the interaction between the standardized patient and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

e. The approved locations shall be duplicated in all similar rooms.

II. MSY18 (1/AVMS12) – Briefing Type 3. Quantity 1. (Room 2029): The Type 3 Briefing room shall accommodate the ability to view simulation scenarios previously captured by the medical simulation capture system, view live scenarios in progress, capture debrief sessions, host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web

conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:

1. Display System:
   a. A large format wall-mounted flat panel display.
2. Source devices shall include:
   a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
   b. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
   c. Digital auxiliary input for portable audio and/or video sources located in a cable cubby in table.
   d. Cables and adapters shall be provided.
3. Capture:
   a. Two PTZ video cameras shall be ceiling (optical) and wall (digital) mounted to provide views of the participants. This capture is planned to be utilized to debrief the debriefer.
      1) The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
      2) These cameras shall be connected to the building LAN / CAE VLAN.
   b. Wired ceiling mounted microphones
      1) Routing and mixing shall be established via the audio DSP.
      2) Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.
   c. The content shown on the flat panel display within the room shall be captured by a MedSIM capture system high resolution capture appliance. This appliance shall be connected to the building LAN / CAE VLAN.
4. Web conference and audio
   a. An integrated Sound Bar / Microphone / Camera bar shall include:
   b. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the display. The camera shall automatically detect meeting participants and resize the field of view
   c. An integrated multi-element microphone for in-room audio conferencing support.
   d. Integrated loudspeakers for presentation and conference audio.
5. This space shall be a node on the paging system from the any control room, All paging into the room is only to the ceiling loudspeakers, not the record channel.
6. Control
   a. Control of the audiovisual system shall be through a wall-mounted touch panel control user interface.
7. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
8. Furniture

a. A credenza will be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
c. Coordination of style and finish with the Owner and Architect shall be required.

9. Some equipment required for system functionality shall be located behind the flat panel display.
10. Equipment mounts shall be provided by the Contractor.

JJ. MSY19 (2/AVMS12) – Briefing Type 4. Quantity 3. (Room 2092, 2094, 2096): The Type 4 Briefing rooms shall accommodate the ability to view simulation scenarios previously captured by the medical simulation capture system, view live scenarios in progress, capture debrief sessions, host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:

1. Display System:
   a. A large format wall-mounted flat panel display.
2. Source devices shall include:
   a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
   b. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
   c. Digital auxiliary input for portable audio and/or video sources located in a cable cubby in credenza.
   d. Cables and adapters shall be provided.
3. Capture:
   a. Two PTZ video cameras shall be ceiling (optical) and wall (digital) mounted to provide views of the participants. This capture is planned to be utilized to debrief the debriefer.
   b. The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   c. These cameras shall be connected to the building LAN / CAE VLAN.
4. Wired ceiling mounted microphones
   a. Routing and mixing shall be established via the audio DSP.
   b. Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.
5. The content shown on the flat panel display within the room shall be captured by a MedSIM capture system high resolution capture appliance. This appliance shall be connected to the building LAN / CAE VLAN.
6. Web conference and audio
   a. An integrated Sound Bar / Microphone / Camera bar shall include:
   b. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the display. The camera shall automatically detect meeting participants and resize the field of view

c. An integrated multi-element microphone for in-room audio conferencing support.
d. Integrated loudspeakers for presentation and conference audio.

7. This space shall be a node on the paging system from the any control room, All paging into the room is only to the ceiling loudspeakers, not the record channel.
8. Control
   a. Control of the audiovisual system shall be through a wall-mounted touch panel control user interface.
9. Room Schedule Panel
   a. There will be a room schedule panel located outside room.
10. IP Phone:
    a. This phone shall receive calls from all Simulation spaces on level 2, as well as any space in the system.
11. Furniture
    a. A credenza will be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
    b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
    c. Coordination of style and finish with the Owner and Architect shall be required.
12. Some equipment required for system functionality shall be located behind the flat panel display.
13. Equipment mounts shall be provided by the Contractor.

KK. MSY20 (3/AVMS12) – Briefing Type 5. Quantity 1. (Room 2116): The Type 5 Briefing room1 shall accommodate the ability to view simulation scenarios previously captured by the medical simulation capture system, view live scenarios in progress, capture debrief sessions, host small meetings, instruction, and group collaboration enhanced by audiovisual presentation and web conference. The space shall feature a flat panel display system. The audiovisual system shall support wired and wireless display of a user's laptop/device and a local PC. The audiovisual system shall include the following:

1. Display System:
   a. A large format wall-mounted flat panel display.
2. Source devices shall include:
   a. A dedicated PC with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop debrief capture. This PC shall be connected to the building LAN.
   b. A wireless presentation device shall be associated with the display system. The device shall enable video display of the user's wireless enabled device to the display system.
   c. Digital auxiliary input for portable audio and/or video sources located in a cable cubby in the table.
   d. Cables and adapters shall be provided.
3. Capture:
   a. Two PTZ video cameras shall be ceiling (optical) and wall (digital) mounted to provide views of the participants. This capture is planned to be utilized to debrief the debriefer.
   b. The Contractor and CAE shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   c. These cameras shall be connected to the building LAN / CAE VLAN.

4. Wired ceiling mounted microphones
    a. Routing and mixing shall be established via the audio DSP.
    b. Utilize medium noise reduction. Do not utilize gates or echo canceling for capture. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the network audio interface.
5. The content shown on the flat panel display within the room shall be captured by a MedSIM capture system high resolution capture appliance. This appliance shall be connected to the building LAN / CAE VLAN.
6. Web conference and audio
    a. An integrated Sound Bar / Microphone / Camera bar shall include:
    b. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the display. The camera shall automatically detect meeting participants and resize the field of view
    c. An integrated multi-element microphone for in-room audio conferencing support.
    d. Integrated loudspeakers for presentation and conference audio.
7. This space shall be a node on the paging system from the any control room, All paging into the room is only to the ceiling loudspeakers, not the record channel.
8. Control
    a. Control of the audiovisual system shall be through a wall-mounted touch panel control user interface.
9. Room Schedule Panel
    a. There will be a room schedule panel located outside room.
10. IP Phone:
    a. This phone shall receive calls from all Simulation spaces on level 2, as well as any space in the system.
11. Furniture
    a. A credenza will be provided by the Contractor. Audiovisual equipment shall be located and stored in this furniture.
    b. The Contractor shall provide any mounts or mounting hardware as required or shall locate equipment on shelving and/or rack integral to the furniture.
    c. Coordination of style and finish with the Owner and Architect shall be required.
12. Some equipment required for system functionality shall be located behind the flat panel display.
13. Equipment mounts shall be provided by the Contractor.

LL. MSY21 (AVMS13) – OR Simulation and Control Station. Quantity 2. (Room 2104, 2108, 2106): Each Simulation OR and Control Station (located in the adjacent control room) will support the use of actors/confederates as well as medical manikins. These rooms in particular shall support a CAE Human Patient Simulator (HPS) manikin and support rack. A surface mount cable trough shall be provided. The simulation activities will include OR style procedures. During a simulation exercise, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. This space shall also include presentation capabilities and a simulated OR integration system through a wall-mounted flat panel display and a simulated OR AV system. The audiovisual system shall include the following within each space:

1. A charting station with dedicated computer with keyboard, mouse, and monitor (OFCI) shall be located within the room and mounted on a height adjustable wall-mount. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system.
2. Display Devices:
    a. A hospital patient monitor (OFOI) shall be mounted at the anesthesia cart/boom for viewing the manikin's physiological (vitals) data. Display data shall be captured via the AVoIP distribution system to a MedSIM capture system high resolution capture appliance.
    b. A touch-enabled flat panel display shall be mounted on a pole cart shall be available for viewing the manikin's physiological (vitals) data in the event the hospital patient monitor or in room All-In-One is not used. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
    c. A large flat panel display shall be mounted to the wall to provide room wide viewing of patient vitals, EHR, procedure camera or any other medical device in the room connected to the AVoIP system, as well as to support in room debriefing through the medical simulation capture system using the PC in the control room, EMR computer or laptop connected to a wall input in the room.
3. Source Inputs
    a. Multiple wall plates shall provide for auxiliary I/O for additional devices.
    b. Two portable AVoIP endpoints shall be provided.
    c. An AVoIP encoder shall be provided and coordinate with a potential Boom mounted camera
4. Sound/Audio system:
    a. Three ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
    b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
    c. Ceiling recessed loudspeakers shall provide general talk-back and instruction from the control room.
    d. A small cube loudspeaker by the pillow next to manikin shall provide manikin voice by the operator.
5. IP Phone:
    a. One wall-mounted phone (OFCI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
    b. The phones shall only be able to make internal calls.
        1) This phone shall be able to make calls to the Control room and Debrief rooms. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.
    c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
    d. The audio cable shall share the VoIP data pathway to the cable basket
    e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

6. Telemedicine:
    a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the large display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located under the large monitor.
7. Control:
    a. A touch panel located at the attending nurse's station shall control functions specific to simulation of the OR AV integration system, such as, but not limited to:
        1) In room source routing to the large flat panel display, and the boom mounted display, i.e., the EHR, patient vitals and video enabled medical devices.
        2) Ceiling loudspeaker volume.
        3) This touch panel shall also be used for presentation activities from the displays within the room.
8. Capture:
    a. Four (4) PTZ video cameras shall be ceiling-mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
    b. One (1) camera may be located within an OR light on a boom. This camera shall be provided with the OR light system. The Contractor shall provide connectivity of this camera to the greater audiovisual system.
    c. High resolution video (Vital, EMR and other sources) shall be captured by a MedSIM capture system high resolution capture appliances, located in the control room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
9. Audio configuration:
    a. The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
        2) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    b. The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
        2) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
        2) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.

d. The medical simulation system shall facilitate the capturing of the video during simulations.

10. Nurse Call: This room shall have a simulated hospital style simulated nurse-call system. The mom's bed location shall have an illuminated Code Blue and an illuminated staff call button coordinated with the headwall in the room.
    a. Patient Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Cancel at the bedside switch utilizing the staff call button.
    b. Staff Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Initiate and cancel at the bedside switch.
    c. Code Blue:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Initiate and cancel at the bedside switch.
    d. Nurse Call programming:
        1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.
        2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.
        3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

11. Control Room:
    a. A computer (OFCI) shall be located at the control station. This computer shall be connected to the MedSIM LAN.
        1) This computer shall provide control and configuration of the medical simulation capture system and cameras .
        2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
        3) The operator shall be able to select any camera for control through on-screen camera controls.
        4) Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
            a) The manikin Vitals computer is a source in the system for both capture and display.
            b) The default routing of the Vitals PC shall be to the touch enabled flat panel to display at the headwall and the high-resolution input of the simulation capture device.

c) Default routing shall be restored on shutdown and/or startup.

5) An auxiliary HDMI source device input shall be available at the control station.

b. Sound/Audio:

1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).

a) Default routing shall be restored on shutdown and/or startup.

2) An additional (single button) microphone shall be provided for the manikin's voice. An audio pitch changer shall be associated with this microphone.

a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.

3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.

4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.

c. IP Phone:

1) This phone shall receive calls from all Simulation spaces on level 2, as well as any space in the system.

d. Control:

1) A touch panel located at the operator's station shall control specific aspects of the audiovisual system, such as, but not limited to:

a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.

b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button for each wireless microphone shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.

c) Source routing to the Vitals display in the room. The default source for the Vitals display shall be the Vitals PC in the control room.

d) Source routing to the Large displays in the room.

e) Source routing to the High-Resolution input of the simulation capture device. Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.

f) System and device power.

g) Loudspeaker volumes (limited).

h) Push to Talk Microphone button 1 destination selection for paging. Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.

i) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician. Level changes made to the capture interface shall be reflected in the audio monitor for the associated control station.

2) All initial levels and default routes shall be restored as shutdown/startup.

e. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the Control Room EL203D and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

12. Mock-up System in coordination with CAE:
    a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras.
        1) A wireless installation tool is in the portable equipment pool to accommodate.
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
    d. The emphasis on this review will be the ability to capture the interaction between the standardized patient and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.
    e. The approved locations shall be duplicated in all similar rooms.

MM. MSY 22 (AVMS14) – LDR Simulation and Control Station. Quantity 1. (Room 2112, 2114): LDR Simulation and Control Station (located in the adjacent control room) will support the use of actors/confederates as well as medical manikins. The simulation activities will include labor and delivery and inpatient room procedures. During a simulation exercise, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. This space shall also include presentation capabilities through a wall-mounted flat panel display. The audiovisual system shall include the following:

1. A charting station with dedicated computer with keyboard, mouse, and monitor (OFCI) shall be located within the room and mounted on a height adjustable wall-mount. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system.
2. Display Devices:
    a. Two touch-enabled flat panel displays shall be mounted at the patient headwalls for viewing the manikin's physiological (vitals) data. In labor and delivery scenarios, one display shall be dedicated to the mother manikin and the other shall be dedicated to the baby at a bassinette location. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PCs in the control room. Additionally, a USB connection between the displays and the Vitals PCs shall be provided to enable touch control and ancillary medical device use.
    b. One large flat panel display shall be mounted to the wall to provide room wide viewing of patient vitals, EHR, or any other medical device in the room connected to the AVoIP system, as well as to support in room debriefing through the medical simulation capture system using the PC in the control room or laptop connected to a wall input in the room.
    c. The display shall have integrated loudspeakers for audio reproduction of source devices during in room debrief.
3. Source Inputs

a. Multiple wall plates shall provide for auxiliary I/O for additional devices.
b. A portable AVoIP endpoint shall be provided.

4. Sound/Audio system:
   a. Three ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. A ceiling recessed loudspeaker shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to manikin shall provide manikin voice by the operator. This loudspeaker alternately may be mounted below the headwall at pillow level.
5. Telemedicine:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
6. IP Phone:
   a. One wall-mounted phone (OFCI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
   b. The phones shall only be able to make internal calls.
      1) This phone shall be able to make calls to the Control room and Debrief rooms. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.
   c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
   d. The audio cable shall share the VoIP data pathway to the cable basket
   e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
7. Control:
   a. A wall mounted control panel shall control functions such as, but not limited to:
      1) In room source routing to the large flat panel display, i.e., the EHR, patient vitals and video enabled medical devices.
      2) Ceiling loudspeaker volume.
      3) This control panel shall also be used for presentation activities from the displays within the room.
8. Capture:
   a. Four (4) PTZ video cameras shall be ceiling and/or wall-mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   b. High resolution video (Vital and EMR) shall be captured by a MedSIM capture system high resolution capture appliances, located in the control room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.

9. Audio configuration:
    a. The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
        2) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    b. The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
        2) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
        1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
        2) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
    d. The medical simulation system shall facilitate the capturing of the video during simulations.
10. Nurse Call: This room shall have a simulated hospital style simulated nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button coordinated with the headwall in the room.
    a. Patient Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Cancel at the bedside switch utilizing the staff call button.
    b. Staff Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Initiate and cancel at the bedside switch.
    c. Code Blue:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch)
        3) Initiate and cancel at the bedside switch.
    d. Nurse Call programming:
        1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.

2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.
3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

11. Control Room:
    a. A computer (OFCI) shall be located at the control station. This computer shall be connected to the MedSIM LAN.
        1) This computer shall provide control and configuration of the medical simulation capture system and cameras .
        2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
        3) The operator shall be able to select any camera for control through on-screen camera controls.
    b. Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
        1) The manikin Vitals computers are a source in the system for both capture and display.
            a) The default routing of the Vitals PCs shall be to the touch enabled flat panel displays at the headwalls and the high-resolution input of the simulation capture device.
            b) Default routing shall be restored on shutdown and/or startup.
    c. An auxiliary HDMI source device input shall be available at the control station.
    d. Sound/Audio:
        1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).
            a) Default routing shall be restored on shutdown and/or startup.
        2) An additional (single button) microphone shall be provided for the manikin’s voice. An audio pitch changer shall be associated with this microphone.
            a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.
        3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.
        4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.
    e. IP Phone:
        1) This phone shall receive calls from all Simulation spaces on level 2, as well as any space in the system.
    f. Control:
        1) A touch panel located at the operator’s station shall control specific aspects of the audiovisual system, such as, but not limited to:
            a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.

b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button for each wireless microphone shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.

c) Source routing to the Vitals display in the room. The default source for the Vitals display shall be the Vitals PC in the control room.

d) Source routing to the Large displays in the room.

e) Source routing to the High-Resolution input of the simulation capture device. Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.

f) System and device power.

g) Loudspeaker volumes (limited).

h) Push to Talk Microphone button 1 destination selection for paging. Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.

i) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician. Level changes made to the capture interface shall be reflected in the audio monitor for the associated control station.

2) All initial levels and default routes shall be restored as shutdown/startup.

g. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the Control Room EL203D and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

12. Mock-up System in coordination with CAE:

a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.

b. During this review, the Owner shall be able to view the outputs of these cameras.

1) A wireless installation tool is in the portable equipment pool to accommodate.

c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.

d. The emphasis on this review will be the ability to capture the interaction between the standardized patient and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

NN. MSY 23 (AVMS15) – SIM (A-G) and Control Station. Quantity 7. (Room: See Drawing): The SIM and Control Station (located in the adjacent control room) will support the use of actors/confederates as well as medical manikins. The simulation activities will include inpatient room procedures. During a simulation exercise, the video and audio signals shall be fed to the medical simulation capture system for viewing, tagging, and archiving. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data

from the high-fidelity manikins. This space shall also include presentation capabilities through a wall-mounted flat panel display.

1. The audiovisual system shall include the following:
   a. A charting station with dedicated computer with keyboard, mouse, and monitor (OFCI) shall be located within the room and mounted on a height adjustable wall-mount. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system.
2. Display Devices:
   a. A touch-enabled flat panel display shall be mounted at the patient headwall for viewing the manikin's physiological (vitals) data. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
   b. One large flat panel display shall be mounted to the wall to provide room wide viewing of patient vitals, EHR, or any other medical device in the room connected to the AVoIP system, as well as to support in room debriefing through the medical simulation capture system using the PC in the control room or laptop connected to a wall input in the room.
      1) The display shall have integrated loudspeakers for audio reproduction of source devices during in-room debrief.
3. Source Inputs
   a. Multiple wall plates shall provide for auxiliary I/O for additional devices.
   b. A portable AVoIP endpoint shall be provided.
4. Sound/Audio system:
   a. Three ceiling microphones shall be utilized for audio capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. A ceiling recessed loudspeaker shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to manikin shall provide manikin voice by the operator. This loudspeaker alternately may be mounted below the headwall at pillow level.
5. Telemedicine:
   a. An integrated automatically framing wide field of view camera with integral microphone array shall be located at the EMR display. The camera shall automatically detect meeting participants and resize the field of view connected to the EMR computer and located on top of the EMR monitor.
6. IP Phone:
   a. One wall-mounted phone (OFCI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
   b. The phones shall only be able to make internal calls.
      1) This phone shall be able to make calls to the Control room and Debrief rooms. These destinations shall be labeled per the Owner and may not read as the actual rooms, i.e., a doctor, pharmacy, or other department. This phone shall also be able to make calls to other simulation spaces in the system.

c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room, as well as the far side.
d. The audio cable shall share the VoIP data pathway to the cable basket
e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

7. Control:
   a. A wall mounted control panel shall control functions such as, but not limited to:
      1) In room source routing to the large flat panel display, i.e., the EHR, patient vitals and video enabled medical devices.
      2) Ceiling loudspeaker volume.
      3) This touch panel shall also be used for presentation activities from the displays within the room.
8. Capture:
   a. Three (3) PTZ video cameras shall be ceiling and/or-wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant per the mockup described below. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   b. High resolution video (Vital and EMR) shall be captured by a MedSIM capture system high resolution capture appliance, located in the control room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
9. Audio configuration:
   a. The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
      2) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   b. The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
      2) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   c. The phone audio tap shall provide audio capture of phone conversation originating in the SIM room.
      1) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the phone audio tap to the appropriate digital audio interface input.
      2) Do not utilize echo canceling. The tap should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
   d. The medical simulation system shall facilitate the capturing of the video during simulations.
10. Nurse Call: This room shall have a simulated hospital style simulated nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button coordinated with the headwall in the room.

a. Patient Call:
   1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
   2) Visual indication at associated bedside (lights staff call lamp at switch)
   3) Cancel at the bedside switch utilizing the staff call button.
b. Staff Call:
   1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
   2) Visual indication at associated bedside (lights staff call lamp at switch)
   3) Initiate and cancel at the bedside switch.
c. Code Blue:
   1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
   2) Visual indication at associated bedside (lights staff call lamp at switch)
   3) Initiate and cancel at the bedside switch.
d. Nurse Call programming:
   1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.
   2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.
   3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

11. Control Room:
    a. A computer (OFCI) shall be located at the control station. This computer shall be connected to the MedSIM LAN.
       1) This computer shall provide control and configuration of the medical simulation capture system and cameras .
       2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
       3) The operator shall be able to select any camera for control through on-screen camera controls.
    b. Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
       1) The manikin Vitals computer is a source in the system for both capture and display.
          a) The default routing of the Vitals PC shall be to the touch enabled flat panel displays at the headwalls and the high-resolution input of the simulation capture device.
          b) Default routing shall be restored on shutdown and/or startup.
    c. An auxiliary HDMI source device input shall be available at the control station.
    d. Sound/Audio:
       1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants

(confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).

a) Default routing shall be restored on shutdown and/or startup.

2) An additional (single button) microphone shall be provided for the manikin's voice. An audio pitch changer shall be associated with this microphone.

a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.

3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.

4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.

e. IP Phone:

1) This phone shall receive calls from all Simulation spaces on level 2, as well as any space in the system.

f. Control:

1) A touch panel located at the operator's station shall control specific aspects of the audiovisual system, such as, but not limited to:

a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.

b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button for each wireless microphone shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.

c) Source routing to the Vitals display in the room. The default source for the Vitals display shall be the Vitals PC in the control room.

d) Source routing to the Large displays in the room.

e) Source routing to the High-Resolution input of the simulation capture device. Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.

f) System and device power.

g) Loudspeaker volumes (limited).

h) Push to Talk Microphone button 1 destination selection for paging. Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.

i) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician. Level changes made to the capture interface shall be reflected in the audio monitor for the associated control station.

2) All initial levels and default routes shall be restored as shutdown/startup.

g. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the Control Room EL203D and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

12. Mock-up System in coordination with CAE:

a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.

b. During this review, the Owner shall be able to view the outputs of these cameras.

1) A wireless installation tool is in the portable equipment pool to accommodate.

c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.

d. The emphasis on this review will be the ability to capture the interaction between the standardized patient and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

e. The approved locations shall be duplicated in all similar rooms

OO. MSY24 (AVMS16 / AVMS17) –AV Room. Quantity 1. (Room 2120): The AV Room is the central processing hub for the medical simulation capture system and associated AV systems. is the data network hub for the AVoIP systems and medical simulation capture system for Level 2. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the medical capture system to fulfill the system described herein. The AVoIP system is a parallel network that is not on the building network. The audiovisual scope shall include the following:

1. Capture
   a. The medical simulation capture hardware shall be utilized in controlling, capturing, storing, and viewing the simulations.
   b. Video capture servers shall digitize the audio and video streams for transport over the network and archive them on network attached storage for later review. The archived video files will have associated descriptive text information to allow for easy searching. The archived video will then be available for review and debriefing after the recording is complete. All access to the stored files will be through secure internet protocols and will be accessible only by authenticated users through a secure web interface. Additionally, authorized personnel will be able to observe the encounter in real-time on any computer in the building network LAN with the proper credentials. These servers shall be able to connect to the facility LAN and medical simulation data VLAN.
2. MedSIM Network Switches and cabling
   a. Network switches OFOI
   b. The AV Contractor shall provide patch cables required for the medical simulation data network. All patch cables shall conform to the project’s Division 27 specifications.
   c. The Contractor and Medical Simulation manufacturer shall be required to coordinate with the owner to configure the switches in coordination MedSIM Capture system needs.
3. AV over IP (AVoIP) Network Switches and cabling
   a. Audio Network and AVoIP switches shall be provided by the owner and installed and configured by the AV Contractor.
   b. The AV Contractor shall provide horizontal cabling, patch panels, equipment racks, cable management, faceplates, patch cables and network electronics required for the AVoIP data network. All copper and fiber cabling shall conform to the project’s Division 27 specifications.
   c. The Contractor shall be required to configure the switches for Audiovisual system needs.

d. Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to the Contractor provided network switches. Network connected equipment residing within the equipment racks shall connect directly to the Contractor provided network switches via patch cable.

4. IP Phone System:
   a. The core processing and network switch for the simulated VoIP phone system shall reside in this AV room.
   b. The phones shall only be able to make internal calls to phones in this system.
   c. VoIP network switches shall be provided by the owner and installed and configured by the AV Contractor.
   d. The AV Contractor shall provide horizontal cabling, patch panels, equipment racks, cable management, faceplates, patch cables, system core and network electronics required for the VoIP system. All copper and fiber cabling shall conform to the project's Division 27 specifications.
   e. The Contractor shall be required to configure the switches for VoIP system needs.
5. Equipment racks shall house all the audiovisual and MedSIM equipment

PP. MSY25 (AVMS18) – Interprofessional Clinical Training Lab. Quantity 1. (Room 2130): The Interprofessional Clinical Training Lab will support the use of actors and low and mid fidelity manikins and shall support instruction via column mounted monitors as well as wall mounted monitors at each bed location. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras. The medical simulation capture hardware/software system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as data from the high-fidelity manikins. And presentation sources. The spaces shall include the following:

1. Display Devices shall include:
   a. Large column mounted flat panel display for viewing presentation materials and in room debrief via playback from the medical simulation system.
   b. Wall mounted flat panel display at the record bed stations
   c. Wall mounted flat panel display at the skills bed stations
2. Sources include:
   a. Dedicated PC's (OFCI). These PCs shall be connected to the building LAN.
   b. Two Laptop EMR Workstations on carts shall be connected to the AVoIP system via HDMI cable to inputs at the beds or a portable AVoIP encode plugged in at a floor box and shall be able to be associated with captured scenarios. These EMRs shall connect to the building wireless network.
   c. Touch-enabled All-In-One PC's (OFCI) shall be mounted on pole carts for viewing physiological (vitals) data. Display data shall be captured via the HDMI at the record bed wall and the AVoIP distribution system to a MedSIM capture system high resolution capture appliance in the rack room. Quantity to be coordinated with the owner.
   d. HDMI inputs.
   e. Wireless presentation gateways for BYOD connectivity.
   f. A wired HDMI input at each bed location shall accommodate multiple vitals monitors (OFCI) to be sent to the appropriate MedSIM capture appliance. When the system is shut down, these inputs shall be routed to the local display at the bed.
   g. The audio heard in the room loudspeakers will follow video from the appropriate lectern shown on all displays.

3. Sound/Audio system:
    a. A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement. Coordinate the finish color of the loudspeakers with the Owner and architect.
    b. A complement of microphones shall include:
        1) Combo lavalier and handheld wireless microphone systems for the instructors
        2) A ceiling microphone over each record bed shall pick up audio for capture via the medical simulation capture system.
    c. A USB Headset shall be provided for use in the CAE system.
    d. The audio shall be processed through the system's main audio DSP system, and appropriate mixes shall be sent to the capture system audio encoders and ceiling
    e. Control – Instructor location
        1) Control of the audiovisual system shall be from a touch panel control system located on the instructor's station.
        2) Two additional wall mounted control panels shall be provided
    f. Furniture
        1) An instructor's station to allow instruction in a sitting or standing position shall be provided. Audiovisual equipment shall be located and stored within or on this furniture. The Contractor shall coordinate the style and finish with the Owner and Architect.
        2) All connectivity for the instructor station shall be provided through a disconnect panel within the floor box.
4. Medical Simulation Capture
    a. Capture of this space shall be through the medical simulation capture system.
    b. Two (2) ceiling-mounted PTZ cameras per bed (8 total) shall be provided.
    c. Coordinate with the Owner on the final location of the cameras per mockup described below.
    d. High resolution video (Vital, EMR and other sources) shall be captured by MedSIM capture system high resolution capture appliances, located in the rack room, via the AVoIP distribution system, and shall be connected to the building LAN / CAE VLAN.
    e. Audio configuration:
        1) The ceiling microphones shall pick up general audio at each bed for capture via the medical simulation capture system.
        2) Routing and mixing shall be established via the audio DSP and audiovisual control to assign the microphone to the appropriate digital audio interface input.
        3) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the digital audio interface and medical simulation capture system.
5. Mock-up System in coordination with CAE:
    a. Prior to the final installation of AV devices within this space type, the Contractor shall assist CAE, when necessary, with the coordination of the final location of the cameras with the Owner . The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras.
        1) A wireless installation tool is in the portable equipment pool to accommodate.

2) The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
3) The emphasis on this review will be the ability to capture the activities of the students with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.
4) The approved locations at one record bed in in the room shall be duplicated at the other record beds in the room.

6. System Core: The system core shall be located in Storage Support 2132, and is the central processing hub Interprofessional Clinical Training Lab. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the medical capture system to fulfill the system described herein. The AVoIP system is a parallel network that is not on the building network. The audiovisual scope shall include the following:
   a. Capture
      1) The medical simulation capture hardware shall be utilized in controlling, capturing, storing, and viewing the simulations.
      2) Video capture servers (located in AV 2120) shall digitize the audio and video streams for transport over the network and archive them on network attached storage for later review. The archived video files will have associated descriptive text information to allow for easy searching. The archived video will then be available for review and debriefing after the recording is complete. All access to the stored files will be through secure internet protocols and will be accessible only by authenticated users through a secure web interface. Additionally, authorized personnel will be able to observe the encounter in real-time on any computer in the building network LAN with the proper credentials. These servers shall be able to connect to the facility LAN and medical simulation data VLAN.
   b. MedSIM Network outlets and cabling
      1) Network outlets OFOI
      2) The AV Contractor shall provide patch cables required for the medical simulation data network. All patch cables shall conform to the project's Division 27 specifications.
   c. AV over IP (AVoIP) Network Switches and cabling
      1) Audio Network and AVoIP switches shall be provided by the owner and installed and configured by the AV Contractor.
      2) The AV Contractor shall provide horizontal cabling, patch panels, equipment racks, cable management, faceplates, patch cables and network electronics required for the AVoIP data network. All copper and fiber cabling shall conform to the project's Division 27 specifications.
      3) The Contractor shall be required to configure the switches for Audiovisual system needs.
      4) Network connected equipment residing external to the equipment rack room shall terminate on patch panels prior to connection to the Contractor provided network switches. Network connected equipment residing within the equipment racks shall connect directly to the Contractor provided network switches via patch cable.
   d. An equipment rack shall house all the audiovisual and MedSIM equipment

QQ. Portable Equipment Pool shall include the following:

1. Display Devices shall include:

a. 55” flat panel displays on a carts
   1) For use in spaces without an installed AV system or for ad-hoc collaboration
b. Portable Network Camera Set
   1) For use in setting up and re-configuring cameras as needed for Sim Spaces
c. Portable hearing assistance system
   1) For use on an “as needed” basis for ADA requirements

1.6 CONTRACTOR QUALIFICATION REQUIREMENTS:

A. Bidder shall submit with the bid response evidence of his/her qualifications to perform the work specified. Contractor qualifications shall be the most current information available but not more than one year old. Submit one copy of documentation to both Owner and Consultant for review and approval. All contractor qualifications shall be communicated by way of the enclosed Contractor Qualification Requirements Form (APPENDIX C),

1. Corporate Profile
   a. Location of Corporate Headquarters
   b. Number of offices and locations
   c. Location of office assigned to this project
   d. Identify key personnel that will be assigned to this project including:
      1) Project Executive
      2) Project Manager
      3) Systems Engineer/Designer
      4) Lead Installer/Crew Chief/Superintendent/Lead Technician
      5) Control Systems Programmer
      6) Audio DSP Programmer
      7) Commissioning Agent
      8) Trainer
   e. For each Individual listed above provide a resume that includes:
      1) Office Location
      2) Percentage of individual’s time that will be allocated to this project
      3) Work History
      4) Previous Project Experience:
         a) The assigned Project Manager shall have a minimum of five (5) years’ experience in the fabrication, assembly, and installation of audiovisual systems of similar magnitude and quality to that indicated for this project.
         b) The assigned Systems Engineer/Designer shall have a minimum of five (5) years’ experience in the fabrication, assembly, and installation of audiovisual systems of similar magnitude and quality to that indicated for this project.
      5) Length of Employment
      6) Certifications: CTS, CTS-D, CTS-I, EST-L2, RCDD, PMP, Certified Control System Programmer, Certified DSP Programmer, CompTIA Network+, CCNA, other.
      7) The project will utilize DigitalMedia NVX products by Crestron Electronics. The Contractor’s Systems Engineer/Designer shall hold a current Crestron DM-NVX (Digital Media NVX Design and Application) and Crestron DM-NVX-N (Crestron Digital Media Networking) certifications. The Bidder shall submit the name of the Systems Engineer/Designer, certification expiration dates and certification numbers.
      8) The Contractor’s Lead Installer shall hold a current CTS-I (Certified Technology Specialist – Installation) certification from AVIXA/InfoComm International, and/or a

current EST-L2 (Electronic Systems Technician) certification from NSCA. The Bidder shall submit the name of the lead installer and certification expiration dates.

9) The project will utilize control system products by Crestron Electronics. Due to the potential complexity of the control system, a Crestron Certified Programmer(s) with active certification shall be required to author the programming component of this project. The Bidder shall provide documentation listing project team member(s) who will create the control system programming including a listing of years of experience, a statement of manufacturer authorization, certification type, date of certification and the certificate number.

10) Due to the potential complexity of the Audio DSP system, a QSC Q-SYS Level Two Training certified individual, with active certification(s), shall be required to author the programming for the Audio DSP component of this project. The Bidder shall provide documentation listing project team member(s) who will program the Audio DSP including a listing of years of experience, a statement of manufacturer authorization, certification type and date of certification. In addition to the DSP certifications, the bidder shall provide any audio supportive certifications of merit (i.e., Syn-Aud-Con and AVIXA/InfoComm certifications relevant to audio training and/or CompTia and Cisco certifications relevant to network training).

2. Resources
   a. A manufacturers' line card for products in which the Bidder is an authorized Distributor or Dealer. Include date initially authorized.
   b. A list of any manufacturers specialized technical certifications or designations held by the Bidder.
   c. A list of manufacturers for whom the Bidder is an authorized service center.
   d. A list of computer software and/or systems owned by the Bidder, which will be used to communicate, measure, draw, and/or document the project.
   e. A list of system test equipment owned and used by the Bidder, including manufacturer, model number and, where applicable, latest software revision.

1.7 GENERAL CONDITIONS

A. The General Conditions, Requirements, and Special Provisions, of any larger body of specifications, of which this Specification may be a part, are hereby made a part of this Specification. In the event that any clauses or provisions of the larger body of specification conflict with the letter or intent of this Specification, the Contractor shall immediately notify the Consultant for clarification and direction.

1.8 THE SPECIFICATION

A. The "Specification" is defined as the body of documentation provided to the Contractor with the Request for Quotation, as well as all addenda to said documentation. Throughout this document, words such as "herein" refer to the entire Specification, and not just this written document.

B. The Specification includes, but is not limited to:
   1. This written specification document.
   2. All drawings, as listed in the List of Drawings.
   3. Additions and/or modifications as detailed in written addenda.
   4. Additions and/or modifications as detailed in drawing additions or reissues.

C. The purpose of the Specification is to provide sufficient detail for the Bidder to understand the functional requirements of the systems, the installation and performance standards that must be met, and the required scope of work, in order to generate and submit a complete and accurate bid.

1.9 DEFINITION OF TERMS

A. Within this section of the specification, the following definitions shall apply:

1. The term “Owner” is used to indicate Louisiana State University.
2. The term “Architect” is used to indicate Eskew+Dumez+Ripple.
3. The term “Consultant” is used to indicate: NV5 Engineering and Technology.
4. The term “Bidder” is used to indicate that entity generating the bid response.
5. The term “Contractor” is used to indicate the successful Bidder to whom the Owner has awarded the contract.
6. The term “Furnish” is used to indicate the responsibility to procure and ship or deliver the item to the job site, freight prepaid, for receipt, staging and installation by others.
7. The term “Install”, or “Installation” is used to indicate the responsibility of receiving the item at the job site, assuring adequate storage, unpacking, or uncrating the item, physically securing the item, configuring, and testing the item, or otherwise making ready the item for its intended use by following the instructions and approved methods of the manufacturer and any additional requirements described herein.
8. The term “Provide” is used to indicate the responsibility to both “Furnish” and “Install.”
9. The term “Provided by Others” shall refer to material and work, which is related to this contract, but has been provided by parties other than the AV Contractor. An example might be in reference to a projection screen installed during building construction but requiring interface to the AV control system.
10. The terms “NIC” and “Not In Contract” are equivalent to “Provided by Others.”
11. The term “OFCI” (Owner Furnished Contractor Installed) shall refer to equipment that will be furnished by the Owner for installation by the Contractor. The Contractor shall be responsible for coordinating with the Owner in regard to the specific requirements of the equipment as applicable to meet the functional requirements of the systems as specified. The Contractor shall be responsible for installing and integrating this equipment as required to produce a fully-functioning system. This may include the installation and configuration of software, PCI cards or other components within or attached to OFCI computers that are required by the AV systems.
12. The term “Contractor Selected” refers to ancillary items where no specific manufacturer and/or model number has been listed as the basis of design in the Bidding Equipment List. The Contractor shall select a product that meets the performance and functional requirements of the system and submit the product as part of the line item pricing, Shop Drawings and Bill of Materials submittal process as defined herein.
13. The term “Installation Materials” shall reference installed cable, loose cable, terminations, signal extenders, cable management, voice/data/video patch cords, adapters, I/O panels, cable dressing, lacing bars, copper bus bars, labels, rack shelves, rack mounts, power supplies and adapters, power strips/distribution and other materials as needed to install the systems defined herein.
14. The term “Substantial Completion” is used to indicate the stage in the progress of the work where the systems are determined to be sufficiently complete in accordance with the Specification so that the Owner can utilize the systems for their intended use.
15. The term “Final Acceptance” is used to indicate the point in which all contract requirements have been met by the Contractor after Substantial Completion has been achieved. This includes, but is not limited to, the correction and acceptance of any remaining punch-list items, approval and delivery of all Final Documents, and user training as specified.
16. The term “shall” is mandatory; the term “will” is informative; and the term “should” is advisory.

1.10 SCOPE OF WORK

A. The Contractor shall provide complete, turnkey audiovisual systems performing all of the services and functions as described herein, together with all other apparatus, cable, materials, labor, tools, transportation, and any other resources necessary to provide a complete system.

B. Specifically, the work shall include, but is not limited to:

1. Coordination
    a. Communicating and coordinating directly with the Consultant, Owner, Architect, and other trades complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of this specification.
    b. Scheduling installation operations in sequence required in order to obtain best completion results.
    c. Coordinating installation of different components to assure maximum accessibility for required maintenance, service, and repair.
    d. Verifying required cable lengths for all bulk cable or manufactured cable assemblies prior to ordering as outlined in 'Installation Practices'.
    e. Verifying the accuracy of Master Quote or other quotation numbers prior to ordering.
        1) Where given, Master Quote numbers or other quotation numbers have been provided as a convenience to Bidders and are intended to be used for bidding purposes only.
        2) Bidding Equipment List subsystem sections, where a Master Quote has been provided, may only show a small number of items to help convey the design intent of the subsystem. Refer to the Master Quote for the expanded list of subsystem components.
        3) A Master Quote may not be inclusive of all components or accessory items necessary to provide for a complete, functioning and properly integrated subsystem. The Bidder shall include all miscellaneous materials that may be required to complete the subsystem.
        4) Where discrepancies between a Master Quote and the Bidding Equipment List exist, the Master Quote shall rule.
2. Documentation
    a. Generating and submitting Shop Drawings as required for approvals and As-Built drawings as specified herein.
    b. Generating and Submitting "Progress Reports" as defined herein.
    c. Documenting the completed installed systems as defined herein.
3. Design Verification and Acceptance
    a. Verifying the accuracy of the system designs documented in the Specification and acceptance of responsibility. Any issues, discrepancies substitutions, or exceptions to the Specification by the Contractor shall be communicated to the Consultant prior to the purchase of any equipment or materials by way of the Shop Drawings Submittal process. Upon approval of the Contractor's Shop Drawing Submittal by the Owner's designated representative, or if the Contractor fails to submit Shop Drawings, the Contractor shall assume all responsibility for supplying such materials and taking such actions as to satisfy the full intentions of the Specification without claim for additional compensation. This shall include providing any incidental equipment, Installation Materials and labor needed in order to result in a complete and operable system, even if such equipment, materials, or labor are not listed in this Specification. Exceptions include Owner-requested changes, unexpected field issues due to work by other trades, or schedule changes initiated by others.
4. Cabling, Equipment, and Installation

a. Providing all cable in conduits for the specified systems. Place pull string in all conduits after cable installation is complete to allow for future cable installation.
b. Providing station cables for connection of IP-enabled audiovisual equipment to associated data network outlets, including but not limited to presenter's computers, production computers, laptop connections, control system processors, codecs, and displays. This applies to all equipment installed by the Contractor, including Owner-Furnished (OFCI) items. Coordinate station cable requirements with the greater building-wide structured cabling system.
c. Coordinating and providing cable labels as stipulated by the Owner and/or specified herein.
d. Furnishing and/or installing all equipment as specified.
e. Installing Owner furnished equipment as specified.
f. Providing speakers as complete assemblies with back boxes, grilles, tile bridges, wall mounts, hanging hardware and other installation hardware as required.
g. Coordinating with the Architect and Owner on final color selection, and/or the painting of any exposed loudspeakers and any/all exposed system components to match the room's aesthetics and finishes.
h. Coordinating with local entities as necessary (manufacturer, Owner, SBE, FCC, etc.) to determine final channel selection for all wireless devices and resolve conflicts where they may occur.
i. Providing to the Owner, upon completion, all accessories and ancillary items included with the manufacturer's equipment but not used for the physical installation of the device. This shall include all user manuals, remote controls, batteries, tools, installation hardware, carrying cases, protective covers, loose cables, etc. Batteries shall be provided for all battery-operated devices, even if not included by the manufacturer.
j. Furnishing all lifts, ladders, scaffolding or other resources as needed for proper safe installation. Coordinating with other trades as needed.
k. Interconnecting all components, both internal and external to rack cabinets.
l. Ensuring that all cabling, equipment, and terminations are installed in accordance with accepted industry standards, approved Shop Drawings, manufacturer's recommendations and as stipulated herein.
m. Providing cable management hardware as required including that required internal to rack cabinets; that required between pieces of equipment not housed in rack cabinets; and that required to extend cabling from rack cabinets and equipment to the greater facility cabling infrastructure.
n. Providing equipment mounting hardware as required including that required for mounting equipment behind flat panel displays; that required to mount equipment within equipment racks; that required for other locations where equipment will be housed.
o. Providing custom cover plates, wall plates, I/O connection plates, floor box insert plates as required. Coordinate with the Architect and/or Owner on the final selection of finishes.
p. Ensuring that all equipment, with the exception of portable equipment, is firmly fastened or attached in place. A safety factor of at least five shall be utilized for all brackets, fasteners, and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.
q. Ensuring that all equipment mounting styles and locations comply with the current ADA Standards for Accessible Design. If any device or location specified herein is found to be in conflict, a confirming RFI should be issued prior to relocating.
r. Providing all projector mounts, including guy wires, clamps, or support assemblies back to structural members. Obstructions vary from room to room; Contractor must pay close attention to this issue on a room-by-room basis.

s. Field verifying all projector locations and resolving any obstruction conflicts for optimal performance. The Contractor shall reference the infrastructure drawings for screen sizes and field verify measurements to confirm throw distances to determine the appropriate lens required prior to procurement.

t. Providing all projector lenses as required.

u. Mounting / aligning the projectors so that digital keystone correction is not required. Optical lens shift shall be employed, only, if necessary, to align the image with the image area. Where possible all projectors mounted below the ceiling shall be mounted and adjusted to be perpendicular to the screen surface.

v. Coordinating with the General Contractor and/or Electrical Contractor on the audiovisual control system connection to the projection screens, as required

w. Performing final adjustments to motorized projection screens provided by Others to include:

1) Screen travel limits as required optimizing the amount of black drop in conjunction with projection system geometry, field conditions and manufacturer recommendations. Refer to the Drawings for specified dimensions.

2) Tab-tension systems (where specified) to ensure a flat projection surface free of wrinkles, waves or other anomalies which might indicate that the tensioning cables require adjustment.

x. Providing a list of all Owner Furnished Contractor Installed equipment to the Owner including a date when all equipment must be received to ensure the installation is completed on time.

y. Providing any/all patching, caulking, fire stopping, and painting required to restore damaged finishes during installation.

5. Furniture

a. Providing audiovisual lecterns and technical furniture as specified.

b. Coordinating with the Consultant, Architect and Owner on the final selection of all technical furniture including design details (make/model), available options, dimensions, cable management needs, color, and finish.

c. Coordinating with furniture manufacturer or others who are providing all necessary furniture/millwork modifications (“cut-outs” or other) as required allowing for a neat and professional installation of integrated technology system components. This includes but is not limited to: integrated table/lectern “cubbies”, table-top microphones, cable management grommets, etc., and providing manufacturers’ cutout templates to others when requested.

d. Coordinating with the furniture manufacturer, Owner, and Architect on cable management, thermal management, and equipment installation requirements in all spaces so equipped and as outlined in ‘Installation Practices’. Providing manufacturer’s product cut sheets and/or equipment samples where they may be needed to assist in the design by Others towards integrating such equipment into furniture systems or architectural features.

6. Coordination with Owner’s Network

a. Securing from Owner private IP addresses for use by Ethernet equipped audiovisual devices. No Ethernet equipped device shall be connected to Owner’s network without the express permission of Owner. This shall include but is not limited to configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup and authorization.

b. Confirming with the Consultant that coordination with the Owner regarding Ethernet equipped audiovisual devices as outlined in ‘Submittals – Software’.

7. Programming and Software

a. Developing and installing all custom control system programming code as required and/or as specified herein.
b. Developing and installing all custom DSP programming code as required and/or as specified herein.
c. Providing Control System design submittals and two Control System design revisions as outlined in 'Submittals – Software'.
d. Providing centralized media control systems including GUI (Graphical User Interface) and code development in order to satisfy the guidelines outlined herein.
e. Developing Control System help-desk and system administrator functionality as defined herein.
f. Coordinating with the Electrical Contractor and/or others on the control system interfaces to mechanical systems including motorized screens, as specified.
g. Coordinating with the Electrical Contractor and/or others on the low voltage control system interfaces to facility lighting where specified.
h. Providing the executable (uncompiled) programming control code as defined herein.
i. Developing and installing all custom software for DSP devices as required to optimize system performance.
j. Configuring all installed components including the assignment of device host name, configuration of network settings, configuration of user and administrative access names and passcodes, and configuration of all settings required for proper operation within the specified system.
k. Installing, configuring, and testing all manufacturer provided software applications included with the specified equipment.
l. Coordinating Audio DSP settings with Consultant for the purposes of integrating any necessary recalls into the control software.
m. Coordinating with Consultant to communicate any conditions or circumstances that do not satisfy the functionality described herein.
n. Loading and testing any control programming code updates prior to Substantial Completion and during the Warranty period.

8. Testing, Training, Acceptance, and Warranty
   a. Ensuring that all individual components function as intended by this Specification.
   b. Ensuring that the entire audiovisual systems function as intended by this Specification.
   c. Testing, adjusting, and fine-tuning the completed systems and components.
   d. Coordinating and participating in a Systems Performance Verification review with the Owner and/or Consultant.
   e. Coordinating and conducting an acceptance walk-through and sign-off session with the Owner and/or Consultant.
   f. Providing "sign-off" documents for each space and/or space type as defined herein.
   g. Conducting training in systems operation for the Owner's designated representative(s).
   h. Providing a warranty service contract as defined herein.

C. Work Excluded: Work not included under this contract unless noted otherwise shall be:

1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, and floor boxes.
2. Providing lighting fixtures, lighting dimming systems, lighting controllers, and lighting system low voltage AV interfaces at the dimmer side.
3. Providing millwork except where otherwise specified herein.
4. Providing wall or ceiling mounted projection screens.

5. Providing recessed wall boxes for video cameras.
6. Providing blocking as required to support wall-mounted audiovisual components.
7. Providing window treatments and motorized shade system low voltage AV interfaces at the controller side.
8. Providing telecommunications structured cabling systems, including horizontal and backbone cabling and termination, voice and data face plates, associated racks and cabinets, raceway, and cable management.

1.11 JOB CONDITIONS

A. Space Conditions:

1. Architectural reference drawings provided to the Contractor for bidding purposes may not reflect construction site as-built conditions. It shall be the responsibility of the Contractor to field-verify all site conditions relevant to his/her work.
2. The Contractor shall verify dimensions of equipment, equipment arrangements, space availability (including any millwork or cabinetry provided by others) and provide systems that work within the constraints of the space available. The Contractor shall notify the Consultant of any situation where space constraints are a problem, prior to the submission of shop drawings or the ordering or purchase of equipment. The Contractor shall bear the expense of providing alternate equipment, which will work within the available space, if space availability problems are discovered after shop drawings are submitted and approved.
3. If new or changed space condition issues are identified by the Contractor or others after the approval of shop drawings, the Contractor shall provide a proposed solution for the identified issue. The proposed solution shall include any potential impact to cost and/or schedule. Proposed solutions will be reviewed and approved by the Owner, Architect and/or Consultant, or alternate solutions will be recommended.
4. Drawings indicate locations of equipment and components. Changes in the location, and offsets of same to accommodate building conditions, and coordination with the work of other trades shall be made prior to initial installation, without additional cost to the Owner.
5. The Contractor shall ensure during installation that access is provided to equipment and components requiring operation, service, or maintenance within the life of the system.
6. It shall be the responsibility of the Contractor to identify any condition where the recommended environmental and/or electrical operating parameters for specified equipment/products cannot be assured. Should such condition exist, it shall further be the responsibility of the Contractor to notify the Architect and Consultant of any such condition.

B. Conduit and Cabling Pathways

1. The Contractor shall review and verify all conduit, boxes, and other cabling pathways as indicated in the infrastructure Reference Drawings and provided by others. This review shall include the drawings as well as as-built conditions on site.
2. The Contractor shall notify the Consultant, General Contractor, and Architect of any deficiencies, issues, or incorrect installations on site that may impact the installation of the audiovisual systems cabling or equipment as specified.
3. Failure to perform this review will result in a revised cabling approach to be designed, proposed, and implemented by the Contractor, with any additional costs borne by the Contractor.

1.12 LAWS AND REGULATIONS

A. All equipment, cabling, materials, and installation methodology shall conform to the requirements of the National Board of Fire Underwriters, the current published edition of the National Electrical

Code, and all other applicable laws and regulations. The Contractor shall obtain and pay for any additional permits and inspections required by all legal authorities and agencies having jurisdiction over the Contractor's work.

1.13 QUALITY ASSURANCE

A. Unless otherwise stated, all equipment for this installation will be new, less than one year from the date of manufacture, and without blemish or defect.

1. All electrical, electronic, and optical equipment provided by the Contractor shall be a product of companies regularly engaged in the manufacture of electrical, electronic, or optical equipment.
2. All equipment must be purchased from a manufacturer-approved distributer or reseller. Purchase of equipment from a non-approved reseller is prohibited.
3. The equipment shall be the latest model or type offered which meets the applicable specifications at the time of the submittal. Discontinued items replaced by newer models or versions are prohibited from use in the project. It shall be the Contractor's responsibility to provide the Consultant with information regarding discontinued products listed in the specification. If a product listed is discontinued prior to installation, the Contractor shall submit a substitution request.
    a. Request shall include name of material, product, or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.
    b. Contractor shall assume and bear all responsibility for coordinating and/or performing related changes in the Work necessitated by such substitution. This includes, but is not limited to, changes to other related audiovisual components, Installation Materials, architectural integration details, software programming, and required infrastructure.
    c. The Contractor shall receive written response within 5 working days of receipt of the Substitution Request by the Owner/Consultant.
4. Where applicable, all equipment must have the manufacturer's latest firmware version installed prior to Testing and Systems Performance Verification.

B. Quality of workmanship and fabrication of all equipment and components, which are custom fabricated shall be comparable to professional equipment produced by specialized manufacturers of the trade involved and shall be verified by observation. Only firms having 10 years' experience in all aspects of the fabrication and installation of similar systems shall be allowed to perform the work.

C. The work specified herein, and in each of the allied sections, shall be accomplished by a single Audiovisual Contractor experienced in the design, fabrication, installation, checkout, and warranty contract management of systems such as those described in each section.

1. The Audiovisual Contractor shall have complete responsibility for the systems described herein and shall be the single contract point for the Architect, the Consultant and/or the Owner with respect to all work specified herein.
2. The Contractor shall maintain the same project manager and field supervisor throughout the installation, and where practical, maintain the same installers.

D. The Contractor shall supply and install any incidental equipment needed in order to result in a complete and operable system without claim for additional payment, even if such equipment is not listed in this Specification.

E. All work related to this Specification shall be completed in a professional manner by fully qualified workers.

1.14 RELIABILITY

A. General: The systems are designed to provide professional quality operation over a period of several years without the need for continual maintenance. Equipment that has a high failure rate is not acceptable for installation as part of the systems.

B. Warranty: The Bidder shall make known, in writing, at time of Bid any exceptions that might exist between conditions described herein and Bidder's policy of warranty. After acceptance of bid, all conditions and requirements of warranty described herein shall apply.

1. The Contractor shall guarantee all equipment, materials, and labor for a period of 1 year from the date of Substantial Completion.
2. Bidders shall maintain permanent fabrication, service, and support facilities within (100) miles of the Project site during the Work and Warranty period.
3. During the warranty period, within 24 hours of notification, the Contractor shall answer all service calls and requests for information.
4. During the warranty period, within 96 hours of original notification, the Contractor shall provide emergency service to restore operation of the system, replacing defective materials, repairing faulty workmanship, making temporary repairs, and providing loaner equipment as necessary, all at no charge.
5. The Contractor shall notify the Owner before any service call whether such call is or is not covered under warranty. The Owner may be billed for non-warranty calls. The Contractor shall notify the Owner of any service call or work to be performed for which charges may be incurred before such work commences.
6. Improper functioning, for warranty purposes, means failure of the system to meet the intentions of the specification because of internal defects. It does not include Owner caused malfunctions such as re-adjustment of the controls, re-tuning of the system, or injury to the system beyond normal wear. Nor does the warranty cover paint, exterior finishes, fuses, lamps (including projection lamps) or associated labor, unless the damage or failure results from defective materials or workmanship covered by the warranty.
7. The Contractor shall take such actions at the time of installation to ensure that all equipment is installed in accordance with the manufacturer recommended environmental and electrical operating conditions and requirements. After installation, the Contractor shall be responsible for the repair or replacement of said equipment that the Contractor installs which fails due to environmental or electrical conditions, even if not covered by the manufacturer's warranty. The Contractor shall not be held responsible for damages due to changes in environmental conditions, which occur after the date of Substantial Completion.
8. Unless otherwise directed, the Contractor shall activate all manufacturer warranties in the Owner's name. The start date of the warranties shall be the date of Substantial Completion.
9. If the Contractor has modified certain components, the manufacturer warranty may be void. In this case, the Contractor is responsible for providing warranty coverage equal to that of the manufacturer.
10. Certain subsystems and system components may require installation by authorized representatives in order for the complete manufacturer warranty to apply. If this pertains to any subsystem or component for this project, it is the Contractor's responsibility to make arrangements for the complete manufacturer warranty to apply. These arrangements are to be at no additional cost to the Owner.
11. As part of the Bid Response, the Contractor shall provide the Owner with a proposal to extend the Warranty to cover Year 2, Year 3, and Year 4 of operation. These offerings are to include all parts and all labor; all conditions and restrictions listed above apply.

1.15 SUBSTITUTIONS

A. Where Bidding Documents refer to any items, materials, products, and equipment by means of one or more manufacturer's trade name, catalog reference or similar means of identification of manufacturer, such reference establishes standard of required quality, appearance, dimension, or function. It is not an intention of this specification to limit or restrict Bid Responses to those containing products by specific manufacturers, but rather to set a baseline of operational performance and functionality that all Bid Responses must meet or exceed.

1. Request shall include name of material, product, or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.

2. Bidder shall assume and bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and has included such costs in the Bid.

3. Burden of proof of merit of proposed substitution is upon Bidder.

B. Some manufacturer's names and product descriptions used in this specification are product specific with no substitutions allowed. These “Brand Specific” products are required to meet compatibility with the Owner’s existing systems and to maintain continuity of support. Refer to Section 274116.01 - Audiovisual Systems Appendices for a listing of Brand Specific products.

C. All approved substitutions shall be communicated by Addenda. No Bidder shall rely upon approvals made in any other manner.

D. No substitutions will be considered after award of Contract, unless otherwise approved by Owner.

1.16 SUBMITTALS

A. General:

1. The Consultant shall review the Submittals and Shop Drawings listed below. Submittal and Shop Drawing approval shall be based on conformance to the Specification and adherence to the design intent of the Specification. The Consultant’s approval of the Contractor’s Submittal shall not constitute a certification of accuracy or completeness in regard to equipment, quantities, installation techniques and details, control system software programming, audio DSP software programming, equipment interoperability, safety factors, scheduling, coordination with other trades, or any other aspects of the work which are the responsibility of the Contractor. The Consultant shall perform no more than two reviews per submittal listed below. The Contractor shall be responsible for providing any incidental equipment, Installation Materials and labor needed in order to result in complete and operable systems, even if such equipment, materials, or labor are not listed in this Specification.

2. The Contractor shall maintain a Master Set of this entire Specification, including all drawings and addenda, at the site at all times during the installation. Any deviations from the Specification made during the installation shall be marked on this Master Set. The Master Set along with all relevant support documentation shall be provided as part of the As Built submittal in the format outlined under Final Documentation.

B. Submittal Format:

1. All documents, configuration files and drawings shall be submitted in the following format:
   a. Electronically in PDF format.
   b. Executable configuration file (where applicable).
   c. Other formats may be acceptable upon prior approval by the Consultant and/or Owner.
   d. All .PDF files shall be submitted at the documents’ native scale. For example, a PDF created from a drawing whose native format was standard ‘E’ size (42”x30”) shall be

created at 42”x30” (full size) to ensure that there is no loss of resolution should the file be viewed or printed at a later date by the Owner.

C. Schedule:

1. The Contractor shall obtain from the Owner, Architect, or Consultant a project master timeline schedule showing projected dates when the relevant areas will be available to the Contractor for the on-site installation.
2. Within 15 days of notification of contract award, the Contractor shall provide a schedule of major project milestones to the Owner, Architect, or Consultant. The schedule shall show the following milestones, but may include others as required for overall site-work coordination:
   a. Shop Drawings and Submittals
   b. Order and receipt of materials
   c. In-shop testing to validate software functionality prior to on-site installation.
   d. Delivery of materials to the work site for installation by Others
   e. Delivery of major system components to the work site
   f. Receipt of Owner furnished equipment for installation by the Contractor
   g. Control systems GUI requirements meeting with Owner
   h. Development and submittal of control system GUI submittals
   i. Control System Control Surfaces / GUI Prototype Submittal review meeting with Owner
   j. Development and submittal of DSP submittals
   k. 50% completion of work by area
   l. 95% completion of work by area
   m. Installation of control system code
   n. 100% completion of work by area
   o. Testing and debugging on-site
   p. Final punch list
   q. Submittal of Final Documentation
   r. Training
3. If the Contractor feels that he will have any problems with meeting the scheduled project milestone deadlines, he must inform the Owner, Architect, and Consultant at the earliest possible opportunity.

D. Progress Reports

1. Contractor shall submit a brief Progress Report via e-mail to the Owner and General Contractor. The Progress Reports should be concise, utilizing bullet points or other efficient format.
2. The reports shall be submitted by noon on Fridays at the following intervals:
   a. After contract award, while working off-site: every two weeks
   b. While working on-site: every week.
3. Progress Reports shall list the following information in three sections:
   a. Progress: List the tasks accomplished since the previous report. This is to include both completed tasks and work-in-progress.
   b. Work Planned: List the tasks scheduled for the time period extending until the next report. This section should also include both completed tasks and work-in-progress.
   c. Issues. List any factors that are delaying progress or have the potential to delay progress that involve the Owner, Architect and/or Consultant.

1) Provide a proposed solution for each issue listed. The proposed solution shall include any potential impact to cost and/or schedule. Proposed solutions will be reviewed and approved by the Owner, Architect and/or Consultant, or alternate solutions will be recommended.
2) For equipment related issues, include a manufacturer's service ticket number, service log number, or similar means of documenting communications between the Contractor and manufacturer.

E. Shop Drawings

1. The Contractor must receive written approval from the Owner or an authorized representative of the Owner, in writing, prior to purchasing, fabricating, or installing any equipment or materials. Approval to proceed will be given based upon Shop Drawings.
2. The Shop Drawings shall indicate complete details of work to be performed.
3. The Contractor shall provide one electronic copy (two copies, if printed) of the Shop Drawings each to the Owner and to the Consultant for review and approval.
   a. Drawings shall include a title block naming the Project, Consultant, and Contractor, shall include a drawing title, drawing number, revision number if applicable and date.
   b. Unless otherwise agreed to in writing, Contractor shall meet with the Owner and Owner's designated representative to review the Shop Drawing submittal. The Contractor shall be prepared to review the functional capabilities and characteristics of the systems for compliance with Owner requirements.
4. The Shop Drawings listed below are required of the Contractor. Submit all Shop Drawings complete as a single submission. Isolated items will not be accepted, except with prior approval.
   a. System Signal Flow – Complete functional system signal flow drawings of all systems described herein and meeting the functions indicated in the Specification. System Signal Flow drawings to illustrate and identify each major component indicating signal flow; signal type and equipment interconnectivity; all used and unused input/output connections for all devices; connector types; specific manufacturer and model number labels for each component; device host name labels for each component connecting to any IP network; physical location callout indicating the components physical location (i.e. equipment rack #, lectern, wall mounted, etc.); cable fan-outs; wire/cable tags; 70 volt loudspeaker tap settings; amplifier/loudspeaker zone assignments; and other details as needed to accurately document the signal interconnectivity of the systems.
   b. IP Network Diagram – Complete functional network diagram of all network components required to support the systems described herein and meeting the functions indicated by this Specification. Network Diagram to illustrate and identify each major component including all switch accessories, uplink ports noted with bandwidth capacity, stacking cable connections noted with backplane bandwidth capacity, power supplies noted with PoE capacities per switch or switch stack, and other details as needed to accurately document the signal interconnectivity of the systems.
   c. Cabling Schedule – Document complete wire run information, including the cable type, cable marker identifier, and origination and destination location and connector types for each cable. Wire run information shall be conveyed:
      1) Within the System Signal Flow drawings, and/or
      2) A separate list containing all wire run information
   d. Examples representative of the Contractor's final cable marking technique for each cable type.
   e. Loudspeaker Layouts – Scaled ceiling and/or floor plan drawings showing loudspeaker locations, including coverage patterns for ceiling-mounted loudspeakers. Loudspeaker

zone groups shall be identified such that they are relatable to the System Signal Flow drawings.

f. Loudspeaker Mounting Details – Scaled drawings of complete loudspeaker mounting details, hardware, and support surfaces, including details on all load requirements, safety factors, safety cables and structural materials.

g. Projector Mounting Details – Scaled drawings of complete projector mounting details, hardware, and support surfaces, including details on all load requirements, safety factors, structural materials, and any required safety cables.

h. Microphone Layouts - Scaled ceiling and/or floor plan drawings showing microphone locations and orientation within tables or fixed in ceilings and planned position of steerable microphone lobes if applicable.

i. Optical Systems – The Contractor shall be responsible for field verification of the on-site conditions and submit scaled drawings to verify that the proposed projection devices, lenses, and related optical systems will provide the desired image size without distortion, vignetting or any other image aberrations.

j. Panels – Scaled drawings of interconnect panels, control surfaces, and other custom interfaces.

k. Peripheral Equipment – Scaled drawings of mounting arrangements of any peripheral equipment, which may be included in this Specification.

l. Equipment Rack Layouts – Fully detailed rack drawings indicating equipment orientation within the equipment rack.

m. Technical Furniture – Scaled drawings of all technical furniture indicating the furniture dimensions, materials, finishes, equipment locations and orientation within the furniture, cable management accommodations, and all other details necessary to convey the physical and functional aspects of the furniture as it will be installed in each individual room space.

n. Others, as may be required by the Architect, Consultant or Owner.

1) Inquire with the Architect and Consultant whether submissions of finishes/materials which will be visible to the public are required and submit accordingly.

2) Typical sample items of interest include: receptacles and controls with associated trim plate and each type of loudspeaker baffle and/or grille.

5. Approval: The Contractor shall receive written response indicating approval to proceed, or changes required to the Shop Drawings submittal, within 10 working days of receipt of the submittal by the Owner/Consultant.

6. Modifications: The Contractor shall be responsible for updating the Shop Drawing package throughout the course of the project to document any Owner-requested changes, approved product changes, changes due to field conditions, or any other changes to the approved Shop Drawing package. Drawing modifications may be reviewed by the Consultant as-required, and the Contractor shall make current Shop Drawings available to the Consultant within seven calendar days of request.

F. Bill of Materials

1. The Contractor shall submit a comprehensive Bill of Materials concurrently with the Shop Drawing submittal.

2. The Bill of Materials shall be submitted electronically in Microsoft Excel format, unless an alternate format is approved in writing by the Consultant, Architect, or Owner.

3. The Bill of Materials shall be organized by room or system type, with a separate spreadsheet tab for each.

4. The Bill of Materials submittal shall contain at a minimum the following fields for each item: Quantity, Make, Model, Description, Color/Finish (if applicable). Items that are Owner

Furnished should be identified as such. Additional columns may be added for notes or other supplemental information as needed.

G. Owner Furnished Contractor Installed Equipment

1. The Contractor shall submit a comprehensive list of all equipment that shall be provided by the Owner for installation by the Contractor.

H. Product Cut Sheets: Unless otherwise agreed to in writing, the Contractor shall prepare a package of product cut sheets for review with the Owner at the time of the Shop Drawings review meeting. The package shall include manufacturer's cut sheets for all user interfaces, all exposed items not mounted in equipment racks, and all items requiring color or finish selection. The Product Cut Sheets package is not a formal submittal to be reviewed by the Consultant and is not a means for proposing product substitutions. Requested substitutions shall be submitted via to Owner and GC via project RFI process and include drawings, performance and test data, and other information necessary to demonstrate that the substitution will meet all intentions of the Specification.

I. Cabling: The Contractor shall submit specifications for each cable type to be used for the project.

1. The Contractor shall receive written approval from the Owner or an authorized representative of the Owner, in writing, prior to purchasing or installing any cabling.

2. The Contractor shall verify colors for all cabling that will be exposed or visible as part of the Submittal process.

J. Wireless Frequency Table: The Contractor shall submit a table of wireless devices including wireless microphones and intercom transceivers. Each device shall be listed individually along with the manufacturer recommended frequency setting per the location of the installation.

K. Network Coordination

1. The Contractor shall provide a private wired control network that shall function independently of the Owner's network.
    a. The Contractor shall coordinate with the Owner and verify which system components, if any, shall be connected to the Owner's network.

2. The Contractor shall work with the Owner's IT department to identify all PoE, VLAN, firewall and other networking requirements to provide a fully functioning AV system. The Contractor shall generate a schedule of all AV components that will be connected to the building LAN and submit it to the Owner's IT department for implementation.

3. The Contractor shall, as required, obtain from the Owner's IT department blocks of static IP addresses sufficient for current system implementation as well as future system growth.

4. The Contractor shall develop a device host naming scheme in coordination with the Owner's IT department to be assigned to each IP enabled device.

5. The IP Addressing schedule shall list, at minimum, for each connected device:
    a. Product make and model
    b. LAN port connection location
    c. VLAN Assignment – If applicable
    d. Assigned Static or DHCP Reserved IP address
    e. Product MAC address
    f. Device Host Name

6. The IP Addressing schedule shall be submitted electronically in Microsoft Excel .xls format, compatible with Windows 10 or newer operating systems, unless an alternate format is approved in writing by the Consultant or Owner.

7. Approval: The Contractor shall receive written response indicating approval to proceed, or changes required to the IP Addressing Schedule, within 10 working days of receipt of the submittal by the Owner/Consultant.

L. Software: The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all customized software applications prior to installation, including but not limited to:

1. Audio Digital Signal Processing (DSP):
   a. The Contractor's Audio DSP submittal shall communicate the internal signal flow, preliminary setup and the configuration of the Audio DSP processors that is required to meet the AV systems functional and performance requirements. Final level settings and internal preset configurations shall be the Contractor's responsibility during system setup and commissioning.
   b. Format: The preferred Audio DSP Systems submittal is the manufacturer's DSP software configuration files. If requested, the submittal may be provided in the form of signal flow drawings.
   c. Audio DSP Software Configuration File Submittal Format:
      1) Provide the manufacturer's software configuration files, custom designed for each unique system type, compatible with Windows 10 or newer operating systems.
      2) DSP configuration files shall include custom labeling of all internal DSP device inputs and outputs provided with labeling capability. Labeling of the external hardware interface points shall match the externally connected devices as shown in the signal flow drawings.
      3) The Contractor shall provide one copy of the electronic files to the Owner and one to the Consultant for review.
   d. Audio DSP Signal Flow Drawing Submittal Format:
      1) Provide block diagram signal flow drawings, custom designed for each unique system type and include at minimum the following information:
         a) The audio DSP manufacturer make and model.
         b) The system names and/or locations (room names) that will be served by the audio DSP device.
         c) The names of all internal DSP components.
         d) The names of all internal inputs and outputs.
         e) The names of all external input and output connections.
         f) Show interconnectivity between the internal components and I/O's (indicating DSP internal signal flow).
      2) DSP signal flow submittals may be sized to match the AV signal flow drawings, in the form of JPEG image files (maximum 1920x1080 pixels) or PDF files.
      3) The Contractor shall provide one copy each of the submittal to the Owner and to the Consultant for review.
   e. The Contractor shall receive written response indicating approval to proceed, or changes required to the DSP submittal, within 10 working days of receipt of the submittal by the Owner/Consultant.

2. Control System Control Surfaces / GUI Prototype submittal
   a. The intent of the Control System Control Surfaces / GUI Prototype Submittal is to create a base level collaboration process whereby the Programmer can solicit direction from the Owner and Consultant towards a mutually agreeable design. Unless otherwise agreed to in writing the Contractor shall meet with the Owner and Owner's designated representative to review the Control System Control Surfaces / GUI Prototype Submittal. The Contractor shall be prepared to review the functional capabilities as well as the

aesthetic characteristics of the control surfaces for compliance with Owner preferences and standards.

b. Where Owner control surface or GUI standards are lacking, the Contractor shall provide:
   1) Preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Programmer should make the preliminary layouts with a monochrome, basic, wireframe style to clearly demonstrate the functionality of control surface. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The Programmer should include suggestions for color schemes and graphic styles where applicable. The touch panel control surface submittal shall be created utilizing a collaborative, browser based application allowing for live review and comment by the Owner and Consultant, such as InVision or Moqups (UX design software).
   2) JPEG images (or PDF format file) of the finished look of all interface elements including but not limited to menu bars, buttons, down/up states of buttons, labels, bar graphs, timers, video windows, etc.
   3) A sample touch panel page as a separate file, or in a PDF format so that all parties understand the finished aesthetic.

c. Where Owner control surface or GUI standards are made available, the Contractor shall provide:
   1) Preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Programmer shall develop the preliminary layouts utilizing the Owner's standards. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The touch panel control surface submittal shall be created utilizing UX design software for live review and comment by the Owner and Consultant.

d. The Contractor shall receive written response indicating approval to proceed, or changes required to the control surfaces layouts, within 10 working days of receipt of the submittal by the Owner/Consultant.

3. Control System Control Surfaces/GUI Submittal
   a. The Contractor shall generate a revised control surfaces layout submittal to include the additions, changes or revisions generated by the prototype submittal review as well as to integrate the graphic style into the design. The form and quantity of the submittal shall be as complete as possible and ready to be programmed unless otherwise directed. The touch panel control surface submittal shall be created utilizing UX design software for live review and comment by the Owner and Consultant.
   b. If the revised control surfaces submittal reflects those additions, changes or revisions called for in the prototype submittal review, the Contractor shall receive written approval to proceed within 10 working days of receipt of the submittal by the Owner/Consultant.

4. Post-Integration Control Surfaces Adjustments
   a. If so, requested by the Owner or Owner's representative, and within 90 days of Substantial Completion, the Contractor shall be prepared to make one visit to the site to make final minor adjustments to the control system code or programming without additional compensation. This could include, but may not be limited to, renaming, or changing the size or location of buttons, page flip calls, or adjustments to code to provide a fully functioning system. If engraved control system panels require modification at a cost to the Owner, such cost information must be submitted to the Owner for approval prior to any work being performed.
   b. The Contractor shall be responsible for ensuring that any changes to the control system or control surfaces that are made post integration are appended to the Final System Documentation.

M. Cable Testing

1. The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all cable test reports prior to Final Testing and System Performance Verification. Test reports shall include testing of all systems cabling and shall include:
   a. Loudspeaker line testing:
      1) Low impedance loudspeaker lines:
         a) Impedance at 1000Hz.
         b) Polarity of installed loudspeakers.
      2) 70 volt loudspeaker lines:
         a) Watts load at 1000Hz.
         b) Polarity of installed loudspeakers.
   b. Analog audio microphone and line level cable testing:
      1) Continuity of each conductor.
      2) Signal loss.
      3) Signal polarity.
      4) Shielding.
   c. UTP, STP, F/UTP and S/FTP cable testing:
      1) Category 5, 5e and 5e+ cables:
         a) ANSI/TIA-568.2-D Category 5e Permalink test.
         b) ANSI/TIA-568.2-D Category 5e Channel test.
      2) Category 6 and 6+cables:
         a) ANSI/TIA-568.2-D Category 6 Permalink test.
         b) ANSI/TIA-568.2-D Category 6 Channel test.
      3) Category 6a and 7a cables:
         a) ANSI/TIA-568.2-D Category 6a Permalink test.
         b) ANSI/TIA-568.2-D Category 6a Channel test.
      4) Shield test (required for shielded cables only).
      5) Nominal Velocity of Propagation test.
      6) Testing to be performed using a Fluke DSX-5000, or equal.
   d. 2K HDMI and Digital Signal cable testing:
      1) Wire test function.
      2) Testing to be performed using a Quantum Data 780a, or equal.
   e. 4K HDMI and Digital Signal cable testing:
      1) Wire test function.
      2) Testing to be performed using a Quantum Data 780b, or equal.
   f. Digital video coaxial cable testing:
      1) EDH, CRC & Jitter tests
      2) Eye pattern measurement

N. Preliminary As-Built Drawing Submittal

1. Upon completion of the work, and prior to Final Testing and System Performance Verification, the Contractor shall condense the Master Set along with any Shop Drawings into a single "As Built" drawing set. Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.

O. Final Documentation Submittals

1. Within 30 calendar days following Substantial Completion, the Contractor shall prepare and submit a Final Documentation set to the Consultant. The Final Documentation Submittal shall include any and all adjustments or changes identified during the Preliminary As-Built Drawing Submittal review. All documentation shall list the Owner, Project Name, Consultant, and Contractor. Any documentation appended and reissued during the Warranty period shall also include this information.
2. Format: All documents and drawings shall be submitted in the following format:
   a. Electronically in PDF format, submitted on indexed and searchable CDROMs.
   b. Other formats may be acceptable upon prior approval by the Consultant and/or Owner.
   c. All .PDF files shall be submitted at the documents' native scale. For example, a PDF created from a drawing whose native format was standard 'E' size (42"x30") shall be created at 42"x30" (full size) to ensure that there is no loss of resolution should the file be viewed or printed at a later date by the Owner.
3. Printed submittals
   a. If requested, provide (2) printed copies of all documents and drawings. The documentation shall be bound in three ring binders with covers and spines listing the Owner, Project Name, Consultant, and Contractor.
4. Documentation: The Final Documentation Submittal shall include:
   a. As-Built Drawings: The as-built drawings must reflect all changes to the system(s) made after the original bid documentation.
      1) The size of the as-built drawings shall be identical to the original drawings provided to Contractor.
      2) As-Built drawings shall conform to all of the requirements listed under "Submittals / Shop Drawings" listed above.
      3) Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.
      4) The Contractor shall include any additional drawings which are necessary to properly document the as-built systems, but not included in the bid documents, including:
         a) Rack elevations
         b) Custom panel details
         c) Patch bay layouts
         d) Cable pull lists
      5) Submission of digital As-Built drawings files, which are generated by the Contractor based on drawing files provided by the Consultant under separate agreement, shall be subject to submission by the Contractor as defined under said agreement.
   b. A schedule of IP and MAC Addresses for all Ethernet enabled AV devices, organized by room name and number.
   c. A complete cable testing schedule.
   d. A listing of each supplied item with manufacturer, model number and serial number, organized by room name and number.
   e. Operator's manuals for each piece of equipment supplied by the Contractor.
   f. Quick Reference Guides
      1) The Contractor shall develop system operating instructions for the operations of all contractor-fabricated devices and installed equipment items as part of the work. These operating instructions shall include detailed descriptions of how to operate the system as a whole. Component manuals are not acceptable to meet this requirement unless approved by the Owner and Consultant.

2) Quick Reference Guides shall be one page (front and back as necessary) heat-laminated cards or tents providing simplified instructions for operation of all major system functions.
3) Content of the quick reference guide shall focus on the controls and must include high quality graphics / photos of the controls themselves with explanations and step by step instructions.
4) Pages shall be appropriately sized for the content required. (Half or other sized pages are appropriate for simple rooms.)
5) Described functions shall include as a minimum:
   a) Power on/off
   b) Source selection
   c) Volume control
   d) Connection of auxiliary sources
   e) Other functions as appropriate for the system, such as lighting and shade control.
   f) Coordinate with the Owner and the Audiovisual Consultant regarding additional content desired. For example, the Owner may wish to include instructions for contacting local support personnel.

g. Software
1) Where custom software is developed by the Contractor as part of this project, the system source code, passwords, and any associated related files, referenced files, and development software (and all relevant documentation and license) used to compile, develop, and build, etc. the executable code must be provided. The source code should be well documented in accordance with industry software engineering practices.
2) The software developer shall retain intellectual property rights; the Owner shall have a license for perpetuity for use as it applies solely to this project, including the right to modify/enhance. The software code may not be sold or used, in part or in whole, in any other project or application other than that intended by this specification, in part or in whole, by the Owner or any other party.
3) If a Subcontractor is used to write the software, the Contractor shall include, as part of the Final Documentation submittal, a signed letter on Subcontractor letterhead, granting the Owner ownership, use, and modification rights of the code and documentation as defined herein. The software shall be provided to the Owner on CD-ROM, inserted into a plastic sleeve appropriate for each media type, and included in the binders.
4) The Owner may supply the Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents, and business information and plans that have been authored or pre-owned by the Owner. All such intellectual property shall remain the exclusive property of the Owner and shall not be used by the Contractor for any purposes other than those associated with delivery of the systems specified herein.

h. Warranty Statement: A statement on the Contractor's letterhead listing the official start and end dates for the Contractor's warranty on all equipment, materials, and labor used in the project. The start date shall correspond with the established Substantial Completion date, and the end date shall be based on the timeframe of warranty coverage purchased by the Owner as part of the contract.

5. Delivery
a. If the Final Documentation submittal is determined by the Consultant to be complete and accurate, the Consultant will approve the submittal and forward the Final Documentation package to the Owner.

b. If the Final Documentation Submittal is determined by the Consultant to not be complete and/or inaccurate, the Consultant will return the package to the Contractor with a written listing of the required modifications. Upon completion of all of the required modifications, the Contractor shall resubmit the Final Documentation to the Consultant for approval. The Final Documentation Submittal, and therefore the project, shall not be considered to be complete until all required documentation modifications have been made and approved by the Consultant on behalf of the Owner.

1.17 TESTING AND SYSTEMS PERFORMANCE VERIFICATION

A. Final Tests

1. System Performance Verification Scheduling
   a. Upon approval of the Contractor's test report and receipt of the “Systems Performance Verification Request” form, the Contractor shall assist the Consultant in final system tests. The Contractor shall allow four (4) days to perform the tests at a time that is mutually acceptable to the Contractor and Consultant. The Contractor's representatives assisting in the performance of these tests shall be thoroughly familiar with the details of the system and shall include the field supervisor responsible for installing, testing, control system programming, audio DSP programming, and commissioning the system.
2. System Performance Verification
   a. All control system, DSP and device programming shall be completed and in working order prior to the System Performance Verification.
   b. A physical inventory shall be taken of all equipment on site and justified against the Contractor’s Bill of Materials submittal and the original Bidding Equipment Lists.
   c. The Consultant shall require tests completed by the Contractor which demonstrate the operation of all system components and to determine that the systems meet the criteria as outlined in ‘Performance Standards’.
   d. The Contractor shall supply test equipment to be used during the System Performance Verification. The test equipment shall be present, in working order and connected prior to the System Performance Verification.
      1) Video Test Equipment
         a) Computer video signal generator(s) capable of outputting all signal types included in the system design. (Extron VTG 400DVI & Marshall Electronics V-SG4K-HDI or equivalent)
         b) Digital discs including both program content and test signals. DVD and Blu-Ray discs are both required.
         c) Adapters and interconnect cabling as necessary to complete testing.
      2) Audio Test Equipment
         a) Analog Audio Signal Generator, Impedance Meter and Line Analyzer: NTi MR-PRO (or equivalent).
         b) Condenser microphone: Shure SM86 (or equivalent).
         c) Active speaker: Fostex 6301NE (or equivalent).
         d) Digital Audio Signal Analyzer: NTi DL1 (or equivalent).
         e) Hardware-based Acoustic Analyzer: NTi AL1 or NTi XL2 (or equivalent).
         f) Software-based Acoustic Analyzer: Smaart with reference microphones and all necessary accessories (or equivalent).
         g) Compact Discs (CD’s) including both program content and test signals.
         h) Media as necessary to test all playback and recording functions of the system. I.E., compact flash card, MP3 Player, USB media.
         i) Adapters and interconnect cabling as necessary to complete testing.

3) Video and Audio Teleconferencing:
   a) Contractor shall coordinate a test call with a far-end site scheduled for the time the Consultant is performing the Systems Performance Verification.

e. Contractor shall have tools available on the day of the System Performance Verification for system inspection and adjustments.

f. Contractor shall coordinate with Owner so that all spaces are unlocked and available for inspection.

g. Preliminary As-Built documentation shall be available for reference and inspection.

3. Punch List Report and Correction
   a. Following the completion of the Systems Performance Verification, the Owner and/or Consultant will issue a punch list report to the Contractor, identifying omissions, adjustments, and corrections to the work necessary to meet the requirements of the Specification.
   b. The Contractor shall correct all punch list items resulting in fully functional systems that meet all requirements of the Specification and can be utilized by the Owner as-intended.

1.18 SUBSTANTIAL COMPLETION

A. The project shall be deemed substantially complete by the Consultant and/or Owner at the stage in the progress of the work where the systems are sufficiently complete in accordance with the Specification so that the Owner can utilize the systems for their intended use.

1.19 TRAINING

A. The Contractor shall provide a total of thirty-five (35) hours of on-site training for the Owner's staff at a time that is mutually agreeable for the Owner and Contractor.

1. Session quantity and length shall be coordinated with Owner once project is substantially complete
2. The Owner may choose to have the sessions spread out over several different days as agreed upon during training coordination.
3. Address in the training the general configuration of the system, basic functionality, correct operation procedures, routine maintenance, and upkeep.
4. If desired by the Owner, sessions shall be video/audio recorded at high quality by the Contractor. The Contractor shall provide the Owner with full copies of the training sessions in a mutually agreed upon format.

1.20 EVENT TECHNICAL SERVICE

A. In addition to the training listed above, the Contractor shall provide a total of eight (8) hours of on-site technical assistance for an Owner-defined event. It is expected that this event will occur within the first 60 days after Substantial Completion.

1.21 FINAL ACCEPTANCE

A. Final Acceptance shall be granted by the Owner based on the successful completion of the following activities:

1. All items required to obtain Substantial Completion have been achieved.
2. Any punch list corrections not required to obtain Substantial Completion have been completed by the Contractor and accepted by the Owner and/or Consultant.
3. The Contractor's Final Documentation Submittals have been reviewed by the Consultant and deemed to be complete and have been delivered to the Owner.

4. The Contractor has provided all required training for the Owner as defined herein.
5. Any remaining items required by the Specification, but not listed above, have been completed by the Contractor.

1.22 SUBMISSION FOR PUBLICATION

A. Prior written consent from the Owner is required before submitting any information about this project for publication or award. This shall include, but not be limited to, photographs, descriptions, drawings, renderings, equipment lists, or any other information regarding the project. If written consent is provided by the Owner, any submission for publication or award must properly credit the Owner, Architect, and Consultant.

PART 2 - PRODUCTS

2.1 APPROVED CABLING

A. The following table lists cabling products and types that have been pre-approved for use. This is not an all-inclusive list of the cabling products and types required to complete this project. The Contractor shall reference the cabling products in this table as a baseline of performance for each cable category. The Bidder or Contractor may submit cable part numbers, models, and manufacturer's product other than those listed in this table for consideration and approval per the substitution procedures defined in this Specification.

Type/Application	Description	Manufacturer	Model No.	Comment
Microphone or Line Level Audio	22 AWG STP	Belden	9451	or equal
Microphone or Line Level Audio – Multi Pair (2)	22 AWG STP	Belden	1814R	or equal
Microphone or Line Level Audio – Multi Pair (4)	22 AWG STP	Belden	1815R	or equal
Microphone or Line Level Audio – Multi Pair (8)	22 AWG STP	Belden	1817R	or equal
Microphone or Line Level Audio – Multi Pair (12)	22 AWG STP	Belden	1818R	or equal
Microphone or Line Level Audio – Multi Pair (16)	22 AWG STP	Belden	1819R	or equal
Microphone or Line Level Audio – Multi Pair (24)	22 AWG STP	Belden	1821R	or equal
Microphone or Line Level Audio – Multi Pair (32)	22 AWG STP	Belden	1823R	or equal
Audio – Coax - Digital	19 AWG Coax	Belden	1694F	or equal
Audio Line – Digital Ready – Single Pair	24 AWG STP	Belden	1800B	or equal
Digital Audio – CAT6	23 AWG UTP	Belden	4812	or equal
Loudspeaker or LV Power Supply, 10 AWG	10 AWG UTP	Belden	5T00UP	or equal
Loudspeaker or LV Power Supply, 12 AWG	12 AWG UTP	Belden	5000UE	or equal
Loudspeaker or LV Power Supply, 14 AWG	14 AWG UTP	Belden	5100UE	or equal
Loudspeaker or LV Power Supply, 16 AWG	16 AWG UTP	Belden	5200UE	or equal
Loudspeaker or LV Power Supply, 18 AWG	18 AWG UTP	Belden	5300UE	or equal
Digital Video (Up to 6GHz)	20 AWG Coax	Belden	1505A	or equal
Digital Video (Up to 12GHz)	18 AWG Coax	Belden	4694R	or equal

Type/Application	Description	Manufacturer	Model No.	Comment
HDBaseT Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
HDBaseT Unshielded CAT6A	4-Pair CAT6A U/UTP 625 MHz	Belden	10GX12	or equal
4K Ultra-High-Definition Media Cable, Shielded	4-Pair F/UTP	Belden	2183R	or equal
USB Extension Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
Control (RS-232/422)	2-Pair 24 AWG Stranded TC	Belden	8102	or equal
Control (RS-232/422)	3-Pair 24 AWG Stranded TC	Belden	8103	or equal
Control (RS-232/422)	4-Pair 24 AWG Stranded TC	Belden	8104	or equal
Ethernet Control Unshielded CAT5e	4-Pair CAT 5e U/UTP 200 MHz	Belden	1583A	or equal
Fiber Optic Cable, Multi-mode	2 Strand MM OM4 Fiber Riser Cable	Belden	FI4D002R9	or equal
Fiber Optic Cable, Multi-mode	6 Strand MM OM4 Fiber Riser Cable	Belden	FI4D006R9	or equal
Fiber Optic Cable, Multi-mode	12 Strand MM OM4 Fiber Riser Cable	Belden	FI4D012R9	or equal
Fiber Optic Cable, Multi-mode	24 Strand MM OM4 Fiber Riser Cable	Belden	FI4D024R9	or equal
Fiber Optic Cable, Multi-mode	2 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D002P9	or equal
Fiber Optic Cable, Multi-mode	6 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D006P9	or equal
Fiber Optic Cable, Multi-mode	12 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D012P9	or equal
Fiber Optic Cable, Multi-mode	24 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D024P9	or equal
SMPTE 311M HDTV Cable	1 Channel SMTE 311M HDTV Fiber Cable	Belden	7804R	or equal
SMPTE 311M HDTV Cable	3 Channel SMPTE 311M HDTV Fiber Cable	Belden	7824R	or equal
AMX DXLink Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
AMX DXLink Unshielded CAT6A	4-Pair CAT6A U/UTP 625 MHz	Belden	10GX12	or equal
AMX AXLink Cable	22AWG Shielded Pair 18AWG Power Pair	Belden	1502R	or equal
Crestron DM 4K Ultra Cable Shielded CAT7a	4-Pair 7a S/FTP 1000 MHz	Crestron	DM-CBL-ULTRA-NP	or equal
Crestron DM 4K Ultra Cable Shielded CAT7a	4-Pair 7a S/FTP 1000 MHz, Low Smoke	Crestron	DM-CBL-ULTRA-LSZH	or equal
Crestron DM 8G+ Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Crestron	DM-CBL-8G-NP	or equal

Type/Application	Description	Manufacturer	Model No.	Comment
Crestron Fiber Optic Cable, Multimode	8G Multimode Fiber Optic Cable, 50/125 x4	Crestron	CRESFIBER-8G-NP	or equal
Crestron Fiber Optic Cable, Singlemode	8G Singlemode Fiber Optic Cable, x2 zip-cord construction plenum/non-plenum	Crestron	CRESFIBER-8G-SM-P	or equal
Crestron (Cresnet) Cable	2-18 AWG UTP with 2-22 AWG STP	Crestron	CRESNET-NP	or equal
Extron XTP/DTP Shielded CAT6+	4-Pair CAT6+ SF/UTP 475 MHz	Extron	XTP DTP 24	No Known Equal
Wireless Microphone Antenna Extension	RG213/U	Belden	8267	or equal
Ampetronic Hearing Loop Copper Foil Tape	18mm x 0.25mm Single Conductor	Ampetronic	FB 1.8	No Known Equal
Ampetronic Hearing Loop Direct Burial Cable	1.0mm dia. (18 AWG) Single Conductor, Buriable	Ampetronic	DBC 1.0	No Known Equal
Ampetronic Hearing Loop Direct Burial Cable	2.5mm dia. (10 AWG) Single Conductor, Buriable	Ampetronic	DBC 2.5	No Known Equal
Williams Sound Hearing Loop Copper Foil Tape	0.75 in. x 0.010 in. Single Conductor	Williams Sound	PLW F	or equal
Williams Sound Hearing Loop Cable	18 AWG Single Conductor	Williams Sound	PLW 037	or equal
Williams Sound Hearing Loop Cable	14 AWG Single Conductor	Williams Sound	PLW 014	or equal

B. Environmental Suitability: The cabling listed above is all Indoor rated (non-plenum). The Contractor is responsible for providing equivalent cabling that is appropriate for the environment in which it is installed.

1. All cables running below slab on grade or in an outdoor setting shall be Outdoor rated.
2. All cables being installed within a plenum environment must be Plenum rated.

C. All connections between mobile equipment and connection panels must be prefabricated, stage-grade cabling.

2.2 EQUIPMENT

A. Bidding Equipment List

1. Bidding Equipment Lists are provided to the Contractor for use in preparing the bid response. These lists include major system components and peripherals but should not be considered to be all inclusive. The complete equipment package bid response will take into account this document, all drawings, written addenda, any or all drawing additions or reissues, as well as implied system operability.
2. Bidding Equipment Lists are included as an Appendix in this specification.

B. Connectors, Adapters and Assemblies

1. Field terminated connectors shall be compatible and approved for use for a specific cable type and application by the cable and equipment manufacturer.
2. Connectors shall be manufactured by Neutrik, Switchcraft, AMP, Amphenol, Kings, Canare, Crestron, Extron, or equal.

3. Manufacturer constructed cable adapters and assemblies shall be provided by Crestron or Extron or be of equal quality and durability.

C. Panels, Plates and Keypads

1. The Contractor shall provide a cover panel for all junction boxes which comprise the audiovisual infrastructure (wall, floor, and ceiling). This includes pull boxes, splice boxes and unused or abandoned junction box locations.
2. Custom Fabricated Panels and Plates
   a. Submit custom panel designs per Submittal requirements prior to fabrication or purchase.
   b. Custom panels and plates shall be machined aluminum, nominal thickness 0.125”, with beveled edges and a brushed, anodized finish. Confirm with the Architect required finish color for each panel location. Use of the pull-box manufacturer’s construction cover shall not be permitted.
   c. All panel connectors shall be labeled with engraved lettering, minimum 0.10” letter height, and provided with contrasting paint fill.
   d. Panels and plates for non-gang pull boxes shall extend past the height and width of the pull box by a minimum of one-half inch on each side.
   e. Cable access holes in cover plates shall not capture the cables and shall have a protective grommet to prevent cable damage.
3. Manufactured I/O Panels, Control Panels, Keypads and Plates
   a. Submit proposed panel designs per Submittal requirements prior to purchase.
   b. Panel functionality shall be as defined in the Specification.
   c. Coordinate color and style with the Architect and/or Consultant.
4. Abandonment Cover Plates at Future Use, Unused or Abandoned Audiovisual Junction Box Locations
   a. Submit proposed abandonment plate selections per Submittal requirements prior to fabrication or purchase.
   b. Contactor shall coordinate with the Architect and/or Consultant regarding the style, finish, and paint color of abandonment cover plates.
   c. Cover plates for standard gang junction boxes shall match the manufacturer style and color of architectural cover plates used elsewhere on the project.
   d. For non-standard gang junction box locations provide the box manufacturer’s paintable abandonment finish plate.
   e. At non-standard gang sized junction box locations where a manufacturer’s abandonment finish plate is not available, a custom, paintable abandonment plate shall be provided. Custom abandonment plates shall be sized to extend past the height and width of the box by a minimum of one-half inch on each side to mask any gap between the box edge and wallboard.

D. AV Rack Accessories

1. Provide manufacturers’ rack mount adapters where available.
2. Where manufacturers’ rack mount adapters are not available, provide Middle Atlantic Products RSH4S-series custom rack shelf adapters, with –C clamping option as appropriate, or equal.
3. Blank rack panels: Flanged steel with black textured powder coat finish, Middle Atlantic Products, SB-series, or equal.
4. Vented rack panels: Middle Atlantic Products black powder coat finish VT-series, or equal.
5. Rack screws, lacer bars and accessories: Middle Atlantic Products, or equal.

6. Rack Drawers: Middle Atlantic Products, black textured powder coat finish, TD-series, or equal.
7. Rack ID Panel: Include single space (1 RU) rack ID panel, Panelcrafters, Inc. Part# NV5-RHIM-RJ-RevH at the top of each equipment rack, or group of racks per the Bidding Equipment Lists. Panel shall be digitally printed with logo and contact information for Consultant and Contractor.
8. Confirm with the Owner any requirements for security-type rack rail screws, prior to rack fabrication and assembly. Rack rail security screws shall be Middle Atlantic Products, approved style, and installation/removal tool type, or equal.
9. Where locking doors are provided, confirm with the Owner any requirements for keying and, if requested, provide locks keyed alike at no additional cost, if available.

E. AV Rack Power Distribution Equipment

1. Where the Technical Power supply to the rack is IG (isolated ground), provide a power distribution system within the rack that maintains the integrity of the IG system.
2. Where 20A power is specified, ensure that all power distribution products are rated for 20A.
3. Vertical power strips: Middle Atlantic Products PDT-series, or equal.
4. Rack rail power strips: Middle Atlantic Products PD-series, or equal.
5. Provide a sufficient number of AC convenience outlets to accommodate all installed equipment plus an extra 20% spare capacity.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. General

1. All equipment shall be installed in accordance with this Specification, approved Shop Drawings, and manufacturer's recommendations.
2. All equipment with the exception of portable equipment shall be firmly fastened or attached in place. A safety factor of at least five shall be utilized for all brackets, fasteners, and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.
3. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.
4. The Contractor shall ensure that all equipment is installed such that proper cooling and ventilation is provided.
5. All equipment shall be installed in a manner, which prevents hum, RF/EMI/EMF interference, and mechanical vibration based noises (e.g., fan mounts, etc.)
6. Projectors, lenses, and mirrors shall be solidly mounted and braced so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.
7. All equipment that includes keyed locks shall be keyed alike, per equipment category. This includes, but is not limited to equipment racks, lecterns, other technical furniture, security mechanisms, etc. The Contractor shall coordinate with the Owner on keying preferences before ordering equipment.
8. All equipment shall be protected from construction dust and debris until the date of Substantial Completion.

9. All equipment shall be protected from theft, damage, or vandalism until the date of Substantial Completion.
10. Any equipment designed for use by end-users in the facilities must be installed with theft deterrence/protection mountings and fasteners. Any tools required to mount/un-mount this equipment must be furnished to the Owner at the date of Final Acceptance.

B. Furniture

1. The Contractor shall ensure that equipment or mounting hardware is compatible with and suitable for installation in furniture specified by the Architect, Consultant, or Furniture Supplier. It shall further be the Contractor's responsibility to ensure that such coordination with the Architect, Consultant, or Furniture Supplier occurs. The Contractor shall exchange with and follow such Shop Drawings as to ensure that dimensions and structural supports are adequate for the installation of specified equipment. In addition, the Contractor shall confirm that the furniture accommodates the audiovisual equipment's' environmental and electrical operating parameters. It is the Contractor's responsibility that the request and delivery of such critical coordination information is satisfactorily executed. In as much as the Contractor has control over the delivery of such information, he shall deliver it as requested by the Architect, Consultant, or Furniture Supplier.

C. Equipment Racks and Equipment Rack Cable Management

1. Racks shall be installed in such a way so as to permit access to all equipment for service.
2. Racks are considered complete components and should be completely assembled and tested at the Contractors facility prior to onsite installation.
3. All equipment in racks shall be fitted with vent panels and/or fans as required to provide ventilation and cooling according to equipment manufacturer's recommendations.
4. Unused front facing rack spaces shall be fitted with blank rack panels.
5. Adjacent racks shall be bolted together with appropriate ganging hardware.
6. Use rear and mid rails for intermediate terminations. Maintain accessibility to the rear of the equipment.
7. Mid rails must be used to support equipment weighing more than 50 pounds.
8. As a general practice, all power cables, control cables, and high-level cables shall be dressed to the left rear of an equipment rack. Audio and video cables shall be dressed to the right rear of the rack. Audio, video, and control cables shall be bundled separately and spaced not less than three (3) inches apart.
9. Internal equipment rack cabling shall be supported by lacing strips, support brackets, or other cable management systems as required to ensure that all cabling is supported in both the vertical and horizontal planes within the rack.
10. With the exception of ganged equipment rack assemblies, cabling routed between equipment racks or pieces of equipment exterior to equipment racks, or extending to the greater facility cabling infrastructure, shall be completely protected, end-to-end, by a raceway, wire-way, or duct appropriately sized for the cable run.
11. Cabling between rolling pieces of equipment not housed in rack cabinets or a rolling equipment rack and any device to which it is connected, shall be protected by a split-loom corrugated tubing wrap or other such flexible cable management system appropriately sized for the cable run.
12. Any controls not to be adjusted by the user and accessible from the front of the equipment rack must be furnished with security panels.
13. Devices installed behind flat panel displays shall be mounted near the edge of the displays for easy physical access and for easy visual verification of indicator lights.

D. Video Displays

1. All permanently mounted projectors shall be installed with the center line of the projector perpendicular to the projection screen. All projected images shall be squarely converged to the projection screen. Keystone or geometric correction shall not be employed without the written consent of the Consultant.
2. Turn off or disable all eco, green or energy saving modes on all flat panel and projector displays where displays are to be controlled by an external control system
3. Video settings should be adjusted on all flat panel displays to optimize color and contrast. Settings should be identical between multiple displays within the same room, area, or room type. Any dynamic contrast modes within flat panel displays shall be disabled.

E. Video Cameras

1. Configure all video cameras with proper output resolution, network settings, physical positioning, and white balancing. White balancing of cameras shall occur after the camera is installed, the room finishing is complete with the room lighting and shades properly set.
2. Program no less than four presets for all PTZ cameras.
3. Prior to installation, the Contractor shall work in close coordination with the Owner to determine the optimal locations for all video cameras to ensure that the camera positions meet the requirements of the Owner for the field of view.
4. If so, requested by the Owner or Owner's representative, and within 90 days of Substantial Completion, the Contractor shall be prepared to make one visit to the site to make adjustments to the locations of the video cameras within accessible ceilings without additional compensation. If camera placement is required in an inaccessible ceiling or wall and will incur a cost to the Owner for finishing, painting, cable pathways, mounting, etc., such cost information must be submitted to the Owner for approval prior to any work being performed.
5. The Contractor shall be responsible for modifying and reissuing any items within the Final Documentation package that have been impacted by post integration camera adjustments.

F. Cabling

1. All cabling and termination shall be executed in adherence to standard industry practices and as outlined in:
   a. AV Installation Handbook: Best Practices for Quality Audiovisual Systems: AVIXA/InfoComm International, latest edition.
   b. Philip Giddings - Audio Systems Design and Installation: Boston Focal Press, latest edition.
   c. Kenneth T. Deschler - Cable System Design and Installation: McGraw-Hill, Inc. latest edition.
2. Cable Length Verification: Cable lengths where given in the Specification, for bulk or manufactured cable assemblies, have been provided to assist the Contractor in the bidding process. Cable run lengths, where specified, are end-point-to-end-point estimates and include consideration for tails. Estimates may be based upon cable tray systems; raceways, conduit runs, and furniture layouts indicated on construction drawings and may vary from the actual installed cable pathways. It is responsibility of the Contractor to field verify required cable lengths for bulk cable or manufactured cable assemblies prior to ordering.
3. Cable Installation
   a. Non-contiguous cable support mechanisms such as hangers, rings, and hooks shall not be spaced farther than four (4) feet apart. All manufactured raceways used for cables shall be installed according to the raceway manufacturer's specifications

b. Cable runs shall be supported with devices designed for this purpose and are to be installed independent of any other structural component.
c. Cables routed vertically up walls, or between floors as vertical riser, shall be supported with clamps or other mechanisms. These supports shall occur at least three times per floor.
d. The Contractor shall maintain, or where not already existing, provide through penetration fire stop systems to prevent the spread of fire through openings made in fire-rated walls or floors to accommodate penetrating items such as conduit, cables, or other pathway. Fire stop shall restore floor and wall to the original fire rated integrity. The fire stop systems and products shall have been tested in accordance with the procedures of U.L. and material shall be U.L. classified as materials for use in through-penetration fire stops.
e. The fire stop system shall comply with the NEC and with NFPA 101-Life Safety Code (latest edition) and shall be made available for inspection by the local inspection authorities prior to cable system acceptance. The Contractor shall be responsible for verifying the fire rating of all walls and floors affected by his/her work.
f. Cables shall not be exposed to paint, paint remover, water, or any liquids which may degrade the performance of the cable, void the manufacturer's warranty, alter the flame and/or smoke characteristics of the cable, or obscure the flame rating designations printed on the jacket. Cables exposed to paint, paint remover, water, or any liquid shall be replaced by the Contractor.
g. Cable pulling tension may not exceed manufacturer recommendations. Where cable-pulling lubricant is used, the lubricant must be compatible (non-damaging) with the conduit and cable sleeve materials and must not harden over time to prevent future pulls.
h. Cable stapling of any recognized media type shall not be permitted.
i. Cables shall be dressed in conveniently sized bundles and either laced or banded. Lacing or banding shall not be so tight as to deform cable bundles.
j. Cabling installed with a bend radius less than that recommended by the cabling manufacturer is not acceptable.
k. Cables and bundles terminating at equipment or connector panels shall be supported so as not to put strain on connections or connectors.
l. All cabling between mobile equipment and connection panels must be prefabricated, tactical cabling.
m. All cabling between network ports, jacks, patch panels and equipment must utilize prefabricated CAT6a, or better as required by the application, patch cables of appropriate length.
n. All cables, with the exception of video or pulse cables, which must be cut to an electrical length, shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior approval of the Consultant.
o. Cabling for equipment mounted in drawers or on slides shall be provided with a service loop of appropriate length. A cable management support for the service loop shall be provided to prevent the service loop travel from interfering with the operation of the drawer or slide or snagging on adjacent cabling.
p. Microphone level, line level, loudspeaker level, and video lines shall be run in separate conduits, trough, raceway divider, and cable bundles. Low voltage DC and control may be run along with any but microphone or line level audio runs.

4. Termination
   a. All termination components must meet or exceed all specifications for given media type and application as described in this document and system drawings.
   b. Crimp on connectors shall be installed only on the appropriate size cable using the manufacturer recommended crimp tool and die set.

c. Connections to electronic devices providing screw terminals shall be terminated using the appropriate gauge insulated spade or ring crimp terminal connector and crimp tool.

d. All mechanical solder-on connectors shall be attached to cable ends using rosin core solder.

e. Audio signal cable shields shall be protected with the appropriate gauge Teflon or heat-shrinkable tubing. The jacket end of each audio cable shall be fitted with the appropriate gauge heat shrinkable tubing to provide additional protection to the base of the shield or shield foil. This also applies to the inside of mechanical connectors and cables that terminate at partitioned barrier strips.

5. Analog Audio Microphone and Line Level Systems

a. General

1) All analog audio microphone and line level cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified, and documented.

b. Test for continuity of each conductor, polarity, signal loss and proper shield grounding and integrity.

c. Testing to be performed using an NTi MR-PRO Audio Generator and Impedance Meter, or equal.

6. Analog Audio Loudspeaker Line Level Systems

a. General

1) All analog audio loudspeaker line level cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified, and documented.

b. Test for continuity, polarity, impedance, signal loss and (if required) proper shield grounding and integrity.

c. Low impedance loudspeaker lines:

1) Test impedance at 1000Hz.

2) Test polarity of installed loudspeakers.

d. 70 volt loudspeaker lines:

1) Test watts load at 1000Hz.

2) Test polarity of installed loudspeakers.

e. Testing to be performed using an NTi MR-PRO Audio Generator and Impedance Meter, or equal.

7. Category Cabling and Connectors for AV Systems

a. General

1) All category cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. Cables shall be bundled in groups of 24 cables maximum. The category cabling system shall be tested, verified, and documented to meet the ANSI/TIA-568.2-D Standard, including all applicable Addenda.

b. Digital Media Distribution Systems
   1) AV Contractor provided signal distribution equipment that requires RJ-45 style connectors at room boundary wall panel or floor box panel connections, with the exception of those connecting a piece of AV equipment to the Owner's LAN, shall be color-coded Neutrik EtherCON CatX rated shielded panel connectors and DM compliant shielded CatX rated inline connectors in the appropriate color-coded Neutrik EtherCON connector carrier and specified to keep the CatX rating of the signal cable. Manufacturer approved RJ45 cable connectors shall be used at all manufacturer equipment connections. All wires within the cable must be connected and shielded.
   2) Each digital AV over RJ-45 receptacle, permanently installed cable, equipment cord, patch cord and patch panel will be of a color or have markings that are non-standard with the voice/data system and be plainly and permanently labeled "AV ONLY".

c. AV Control Ethernet Systems
   1) AV Contractor provided network equipment and connections for AV equipment control over Ethernet: all RJ-45 style room boundary wall panel or floor box panel connections provided by the AV Contractor shall be mechanically keyed with color-specific positive and negative keying features to prevent unintentional mating with unlike keyed or non-keyed patch cables.
   2) Each digital AV permanently installed category cable, equipment cord patch cord and patch panel will be of a color or have markings that are non-standard with the voice/data system and be plainly and permanently labeled "AV ONLY – NOT DATA".

d. Category Cabling Systems Installation and Testing
   1) Where indicated, the Contractor will be required to provide a dedicated system of category cabling to support the transmission of digital AV signals. Depending upon the application, the cabling system topology may be point-to-point or be comprised of a system of work area outlets terminated at patch panels.
   2) The Contractor shall test, verify, and document the length, wire map and transmission performance of each Channel Link (Permanent Link + Station Cables) using a Fluke DSX-5000 Cable Analyzer System, including DSX-5000 Versiv Mainframe and Remote, LinkWare PC Software, CAT 6A/Class EA Permanent Link Adaptors and CAT 6A/Class EA Channel Adapters. This tester shall be used during testing of this project. Included features shall include the ability to integrate with labeling and cable management software, which yields downloadable 606-A cable IDs, ensuring data accuracy. Channel tests are the only acceptable test format for testing Category cabling. Link tests will not be sufficient.
   3) All category cable Channel and Permanent Links shall be tested to prove compliance with the current industry standard, ANSI/TIA-568.2-D, and any subsequent addenda. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-C including applicable Technical Service Bulletins and amendments. The appropriate level III tester shall be used to verify each individual type of category cabling systems.
   4) Category 5, 5e and 5e+ testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 5e parameters from 1 – 100 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.
   5) Category 6 and 6+ testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 6 parameters from 1 – 250 MHz. Testers shall be loaded with the most recent test values per the above referenced standard.

The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.

6) Category 6A and 7a testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 6A parameters from 1 – 500 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.

8. Digital Video Cable Installation and Testing:
   a. General
      1) All digital video cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified, and documented.
   b. When issues (such as cable length) compromise specifications or the integrity of the AV system, active cable equalization, twisted pair extenders, or fiber-optic extenders shall be employed as appropriate.
      1) When using twisted pair extenders, the type of cable used, and its shielding must comply with the extender manufacturer's recommendations for optimum performance.
      2) When using products that draw power from the +5V line, the system must be configured to ensure that source power is not overdrawn.
   c. The bend radius of each cable shall not be less than the minimum recommended by the cable manufacturer.
      1) System interconnects shall not exceed the minimum required for system functionality.
      2) Cable splices, joiners, and gender changers shall not be used.
   d. Test for continuity of each conductor, signal loss and proper shield grounding and integrity.
   e. Perform EDH, CRC & Jitter tests.
   f. Perform Eye Pattern Measurement test.
   g. Testing to be performed using a Phabrix SxE, or equal.

G. Labels / Wire Markers

1. For cable labeling, reference ANSI/INFOCOMM Standard F501.01:2015, Cable Labeling for Audiovisual Systems (CLAS)
2. Except where otherwise indicated, all rack-mounted equipment, switches, controls, and interface panels shall be clearly labeled.
   a. Panels and plates shall be a minimum 1/8" thick anodized aluminum etched and epoxy filled unless otherwise specified.
   b. Rack mounted equipment shall be labeled with engraved and filled plastic laminate. Where appropriate, the function of, or the input, output, or loudspeaker(s), served by each device shall be indicated. Other methods of labeling rack mounted equipment may be accepted pending prior approval by the Consultant and/or Owner.
   c. All cables shall be permanently identified at each end by machine printed cable markers.
      1) Every cable shall have a unique tag number identifier for each cable. The Contractor shall include this unique tag number on the As-Built signal flow documentation.
      2) Cable markers shall be placed two (2) inches from where the cable exits the strain relief of the connector, but never within a cable bundle.

3) Each cable marker shall include, in addition to the unique tag number identifier, the device host name of the origination and destination equipment termination at each cable end (see example below).

A107 DVD-RM#-# AUDIO IN L RTR-RM#-# AUDIO OUT 12L	**A107** RTR-RM#-# AUDIO OUT 12L DVD-RM#-# AUDIO IN L
(DVD WIRE END)	(ROUTER WIRE END)

H. Grounding

1. To avoid system noise, data errors, safety hazards, and equipment damage, all devices and cabling shall be installed using a consistent grounding scheme.
2. This section offers guidelines for grounding and shielding methodology. Grounding and shielding methodology may need to be augmented or modified for certain pieces of equipment or interconnections in order to meet the requirements of other sections of this specification. The Contractor shall be responsible for making necessary alterations in accordance with industry practices and such that the Performance Standards detailed in 'Performance Standards' are met.
   a. Grounding and shielding systems shall be executed in adherence to standard industry practices and as outlined in:
      1) AV Installation Handbook: Best Practices for Quality Audiovisual Systems – Second Edition: AVIXA/InfoComm International, 2009
      2) Basics of Audio and Visual Systems Design handbook: Section 10, "Technical Power and Grounding Systems" – Revised Edition: AVIXA/InfoComm International 2003
   b. Ground conductors referred to in this section shall be 10AWG insulated solid copper cable. Ground conductors shall be terminated using a closed ring lug, of proper size for each application, which shall be connected to system electronic components and the equipment rack master bus using nuts, bolts, and lock washers.
   c. Under no circumstances shall an AC neutral conductor be used to ground equipment.
   d. Power Distribution within Equipment Racks
      1) Active components having a grounded AC line cord shall be grounded using the supplied AC line cord connected to the equipment rack power distribution system. Removing the ground pin from a 3-conductor equipment power cord, or the use of ground defeat plugs is prohibited.
   e. Interconnection
      1) All audio interconnections with cable lengths greater than 10 feet shall use balanced (differential) signaling.
      2) All connectors used on system I/O panels shall be electrically isolated from the panel and provide a pass through (uninterrupted) ground connection.
      3) All audio signal cable shields shall be grounded only at the output connection of each device. Signal cable shields, both connected to devices and floating, shall be protected by the appropriate gauge heat shrinkable tubing. Cable shields at the input connector end of the cable shall be folded back over the cable jacket and covered with heat-shrinkable tubing. Do not cut off unused shields.
      4) Microphone cable shields shall be connected at both ends.
      5) Coaxial video and RF shields shall be connected at both ends.

I. Pull Strings

1. A nylon pull string shall be left in every conduit. In the event additional cables are pulled in after the initial cable pull, a nylon pull string shall be pulled with the added cable.

3.2 CONTROL SYSTEM SOFTWARE DESIGN & DEVELOPMENT

A. Control System Overview

1. Crestron control system processors shall provide local audiovisual systems and supplemental architectural device control for each of the controlled spaces.
2. Crestron touch panels, button panels and software applications shall be provided as the human interface devices for each of the control systems.
3. Crestron new meta-control software and database servers shall provide asset management, control scheduling, help desk, messaging, system administration and reporting functionality for the local audiovisual control systems.
4. Crestron new room scheduling software and database servers shall provide room availability, room scheduling and meeting notifications for the room scheduling display system.

B. Meta Control System

1. Where specified, the Contractor shall integrate the control systems into a new Crestron server-based meta-control system to utilized by the Owner to provide capabilities that include Asset Management and Scheduling, Control System Help Desk and Messaging, and System Administration and Reporting.
2. The Contractor shall secure private IP addresses from the Owner for use by Ethernet equipped control system processors and control panels. The Contractor shall coordinate with the Owner, or representative of the Owner, to develop the required services, determine system user level access rights, and to establish control system network standards for TCP/IP addressing.
3. Meta control server software shall feature multiple user-access levels, assignable to any number of user logon accounts. Less-restricted accounts will be assigned to system administrators and security personnel, enabling them to monitor overall and equipment-specific status, take direct control over any control processor or control panel and generate statistical usage reports. More restricted accounts will be assigned to typical end users or presenters, enabling them to schedule a room, make equipment reservations, and specify the equipment “environment” for a room prior to the start of a meeting.
4. Crestron control system processors and associated control panels will provide local control for all of the spaces. Each processor shall be equipped with either integral Ethernet port(s) and/or Ethernet expansion cards and memory expansion as required to support their operation. A connection between each processor and the building LAN will provide communications between the device and the Meta Control System.
5. Meta Control functionality shall include, but not be limited in the ability to:
   a. View real-time power status for all A/V systems facility-wide.
   b. Manually turn on/off A/V systems power in any room.
   c. Schedule A/V systems power on/off for individual rooms.
   d. Provide real-time status of video projector lamps.
   e. Provide self-generated equipment failure notifications.
   f. Create a database of equipment for asset management, tracking, and maintenance.
   g. Create reports, either scheduled or on-demand, indicating room and equipment usage.
   h. Provide Help Desk functions including chat and service notifications sent via e-mail.
6. Meta Control configuration shall comply with the following manufacturer Reference Guides:
   a. Crestron Reference Guide: Crestron Fusion Software Configuration (7908C)
   b. Crestron Reference Guide: Crestron Fusion Software SSI Module Programming (7898D)

7. Control system processors shall feature password protected remote login capability via a web-based interface, enabling the end user to directly monitor and control the processor via the LAN.

C. Room Scheduling Display System

1. Where a separate Room Scheduling Display System is specified, the meta control server and database server shall provide software or software plug-in functionality to provide at each individual room display:
   a. Interactive room schedule and availability
   b. Interactive local room booking
   c. Digital signage display

D. Graphical User Interface / Touch Panels

1. General
   a. The following guidelines are not intended to limit the creativity of the Programmer when designing the software nor are they all-inclusive. Rather, they are concepts and guidelines to ensure that a fully functional, easy to operate control system for the Owner is provided.
   b. The Control System shall employ an easy to use, intuitive, touch panel graphical user interface. Touch panel control shall be icon based and utilize graphical representations that mimic the actual device for all devices under control. In every case where the device under control offers feedback, the Control System shall provide indication on the touch panel(s) of individual component control state conditions.
   c. A “Quit”, “System Shutdown” or similar button shall be available from the Main Menu. When the User has selected this button, a confirmation screen indicating that the shutdown sequence has been selected, and a message will pop-up reminding the User to remove all media such as DVD or Blu-Ray discs. A second button press shall be required to initiate the power down sequence. If a lamp-based component such as a video projector has a significant cool down and warm-up time between its on and off state, the warning should indicate that this particular device will be unavailable for a specified period of time. This might be done using a graphical representation of a clock, a countdown timer, bar graph, etc.
   d. All pages shall maintain a consistent graphical “look and feel.”
   e. The opening page should have, at a minimum, an Owner logo, a large button to start the system, and the ability to control the lighting system (and motorized shades if so equipped) without powering up the entire system.
   f. After system start-up, the primary page or main menu in each presentation space shall display (at a minimum) a room identifier; all relevant input sources grouped together, all environmental controls grouped together, a quit option, a date icon displaying the current date, and a clock indicating current local time
   g. The AV Contractor will determine with the Owner those control panels requiring passwords and limited access.
   h. Each touch panel shall provide a method for service personnel to access detailed system information and configuration menus. This information might be accessed by service personnel via a hidden button and/or by entering a password. Configuration menus should include lowering projector lifts to the service position, projector zoom and focus, and other control functions useful to service personnel.
   i. The information page should include the following: “System Designed by NV5. ph.(412)-323-8580 http://www.NV5.com/tech”; “System Installed by _____, ph. (xxx) xxx-xxxx, and website address; “Programming Supplied by _____“Program Name”; “Compiler Version X.0”; “Panel File #” ; and other relevant system software information.

2. Video Preview Function

a. Where specified components permit, a video preview function shall be provided on the touch panel.
b. The video preview function shall operate such that, when any video source is selected, its output will be automatically routed to a video preview window on the touch panel.
c. Touching the video preview window on the touch panel will toggle the video display between a predetermined sized video window and full screen display on the touch panel.
d. Control buttons for the selected video source device shall always be present below the video preview window and/or overlaid onto the full screen display.
e. Switching and control shall be such that a user may preview and cue video on the touch panel from a selected video source device at the same time that program material is running, uninterrupted, on the systems primary display device and sound reinforcement system.
f. Pressing a video source device button followed by pressing a 'display' (or similarly labeled) button will route the source's video signal to the primary display.

3. Audio Control
a. A volume control icon shall be available to the User at any time there is an audio enabled system.
b. Program audio: provide both levels up/down and mute controls.
c. Speech audio: provide both levels up/down and mute controls separate from the Program audio.
d. Microphone levels: when multiple microphone level control is required, provide a separate gain and mute control for each microphone in the mix. Microphone mix controls shall be on a separate, password protected setup page.
e. A clearly visible mute button with positive feedback to an on/off indicator on the touch panel shall also be included.
f. The AV Contractor shall set the system's master gain control such that the user has a reasonable range of audio level, but the maximum level is set below that which could allow the user to inadvertently cause harm to system components or cause feedback in the system.
g. The control system shall automatically reset the audio levels to an indexed preset level each time the system is shut down or restarted.
h. Pressing a video source device button followed by pressing a 'display' (or similarly labeled) button will route the source's video signal to the primary display. The source device's audio will be simultaneously routed to the room's sound reinforcement system (audio follow).
i. In systems with multiple assignable video displays:
1) The video preview window shall include a button, or buttons, representing each assignable video display connected to the system. Where touch panel size permits, this should take the form of a graphical representation of the room with a display assignment button showing the relative location of each display.
2) Pressing a video source device button followed by pressing a display assignment button will route the source's video signal to that display. This process can be repeated to assign a single video source to multiple displays.
j. In systems with multiple assignable video displays and a single sound reinforcement system:
1) A method shall be provided by which users may select which video source's audio signal is to be routed to the room's sound reinforcement system (audio break away).
k. In systems with multiple assignable video displays and a multiple sound reinforcement system:

1) A method shall be provided by which users may select which video source's audio signal is to be routed to each sound reinforcement system (audio break away). An example might be a room with a projection screen that also contains multiple collaboration pods served by flat panel displays with integral loudspeakers.

4. Lighting Control
   a. Touch panel layouts will include lighting preset recalls in each room. A minimum of eight scene presets should be provided. For lighting zones where a dimming system is employed, the touch panel shall include "Brighter" and "Dimmer" or "Plus" and "Minus" buttons allowing the User to increase or decrease the level of lighting for any given preset.
   b. If so, requested by the Owner, an Auto-Lights feature may also be provided for all or select spaces. The Auto-Lights feature, when enabled, would recall a specific lighting preset when, for instance, projection or video conferencing is called for.

E. Controlled Devices

1. Where specified components permit, the Control System shall provide positive feedback of individual component control-state conditions to the touch panel. For example, the touch panel page to control a Blu-Ray or DVD player shall have a status window indicating the status of the device (such as "Play Mode") or the absence of media (such as "No Disc"). If environmental controls are triggered with a particular device, the trigger for that environmental control should be feedback from the device rather than a simple button push. For example, if the control system is to automatically lower the lights when the DVD player is placed in "Play" mode, the control system should not directly trigger the lighting preset from the "Play" button press, but rather by first confirming that a disc is present in the player and that the player is in fact in "Play" mode.
2. Where specified, the AV Contractor shall provide a Control System interface to mechanical or electronic devices such as screens, window shades, or room lighting. Wherever such operation is available at the mechanical device under control, a stop or halt button shall always be provided in addition to buttons to drive normal equipment operation.
3. Remote power relays, when employed, shall be used to switch AC power to those devices whose power on/off function is otherwise not controllable. When such devices are audio power amplifiers, the Contractor shall program system control such that the audio power amplifiers are the last components to turn on during power up, and the first devices to turn off during power down.
4. If so, requested by the Owner, all or select control system processors shall be programmed with an Auto Shutdown feature. Auto Shutdown will automatically power down a system at a given time unless overridden by the local User or System Administrator. The Auto Shutdown feature shall function as follows: For any given room, when Auto Shutdown is set to "On", the system will power down at a time specified by the Owner, 10:00 PM for example. Ten minutes prior to the specified time, the touch panel shall display a warning message and beep indicating that the system will shut down unless the local defeat button on the panel is pressed within the ten-minute time limit. Pressing the local defeat button will delay the Auto Shutdown sequence by one-hour, or other set length of time as requested by the Owner. Fifty minutes after the one-hour delay button has been pressed, the warning message and beep indicating that the system will shut down unless the local defeat button on the panel is pressed within the ten-minute time limit will appear. This sequence shall continue so long as the operator continues to press the delay button.
5. Resident PCs should be connected to constant power sources, not switched power, and should never be powered down from the control system.
6. If a device can play multiple types of media, has bi-directional communication with the control system, and its API permits, the system shall read the media type and adjust the screen options as appropriate for the playback option selected. For example, if a particular DVD

player is able to play both DVDs and CDs and has RS-232 control, the system shall display different options when a DVD is detected by the unit versus when a CD is detected by the unit (such as a video preview window and the ability to route the signal to a display device versus just audio playback transport controls). In this example, “graying out” the inappropriate button for options is acceptable.

7. For a video projector with an automatic set-up, auto image adjust or similar button, control of this feature should be provided on every logical page, such as VGA analog input pages.
8. For devices that require keypad-style dialing, such as audio or video conferencing, mimic a telephone keypad display to allow dialing from the touch panel. Provide a display above the keypad to display the number being dialed. This should be similar to an LCD screen on a desktop telephone with a small LCD screen above the keypad, which indicates the key-presses of the number dialed. If a “9”, an access code or other prefix is required to dial an outside line, leave this prefix as a default. Provide a backspace key to modify dialed numbers. Provide a button to provide dial tone, a button to dial the number, and a button to terminate the call (similar to a cell phone).
9. For systems involving a video projector or similar display device, control the power to these devices separately. Users should be able to operate audio only playback devices, or control lighting or room dimming systems without automatically powering the projectors. If the system is initially started without projection, and the user subsequently attempts to project a source, the system should then ask if the user would like to power-up the projector(s) and if selected, display a progress bar during the warm-up process and then return to the current touch panel page.

F. Videoconferencing and Cameras

1. The AV Contractor shall establish 4-6 go-to camera presets and provide a simple scheme whereby the User may easily recall these presets during a presentation. The Contractor shall determine all camera presets in coordination with the Owner. The setup of the camera presets shall be on a password protected technician’s page, with provisions for naming each preset with variable text. This will allow the Owner to use descriptive text for preset labeling rather than simple numbering.
2. Manual camera control functions shall include zoom, pan, and tilt. For camera zoom, indicate the lens control with a “Plus/Minus” or similar graphical icon based labels. For pan and tilt functions, use left, right, up, and down directional arrows mimicking the manufacturer handheld remote.

3.3 PERFORMANCE STANDARDS

A. Audio

1. Speech Signal
   a. The system shall provide a speech signal in the audience seating area that meets or exceeds the following requirements:
      1) Frequency response within ±3 dB from 500 Hz to 15,000 Hz.
      2) Overall SPL variance of ±3 dB.
      3) Measured Alcons of 10% or lower.
      4) Minimum average SPL of 87 dB Z-weighted (flat), with 10 dB of undistorted headroom available.
2. Music Signal
   a. The system shall provide a music signal in the audience seating area that meets or exceeds the following requirements:
      1) Frequency response within ±3 dB from 200 Hz to 17,000 Hz.
      2) Overall SPL variance of ±3 dB.

3) Minimum average SPL of 93 dB Z-weighted (flat), with 10 dB of undistorted headroom available.

B. Video

1. Digital Video
   a. Based on the connectivity requirements provided by the AV systems design, the Contractor shall test the digital video system to ensure that it meets the following standards, as applicable:
      1) Single-link DVI
      2) Dual-link DVI
      3) HDMI (Latest Standard)
      4) DisplayPort (Latest Standard)
      5) Thunderbolt (Latest Standard)
      6) Mini DisplayPort (Latest Standard)
      7) USB-C (Latest Standard)
2. Digital Visual Interface (DVI)
   a. The Contractor shall test the video system to ensure that it meets the Engineering Standards of Version 1.0 of the Digital Visual Interface DVI specification document as released by Digital Display Working Group (DDWG), April 1999, which applies to digital and analog video signals with DVI connectivity. This Performance Standard applies mainly to DVI-D and DVI-I digital video connectivity. For DVI-A or DVI-I analog video connectivity, refer also to the Analog VGA Video paragraph herein.
   b. At the points of interconnection, the input and output impedance of each link shall be balanced to ground, nominally 100 ohms ± 10 ohms.
   c. Single link DVI shall support up to and including:
      1) 4.95 Gbps data rate
      2) 1920x1200 @60Hz resolution
      3) 60Hz vertical frequency
   d. Dual link DVI shall support up to and including:
      1) 10.2 Gbps data rate
      2) 2560x1600 @60Hz resolution
      3) 60Hz vertical frequency
   e. The proper shape of the digital video's RGB channels, or "eye pattern", as it appears on an oscilloscope, must be maintained. Refer to the DVI specification document by DDWG for required eye opening values and minimum standards for signal integrity
3. High-Definition Multimedia Interface (HDMI)
   a. The Contractor shall test the video system to ensure that it meets the Engineering Standards of the most recent HDMI Specification as administered by HDMI Licensing, LLC.
   b. At the points of interconnection, the input and output impedance of each link shall be balanced to ground, nominally 100 ohms ± 10 ohms.
   c. The proper shape of the digital video's RGB channels, or "eye pattern", as it appears on an oscilloscope, must be maintained. Refer to the HDMI Specification by HDMI Licensing, LLC for required eye opening values and minimum standards for signal integrity.
4. Display Port

a. The Contractor shall test the video system to ensure that it meets the Engineering Standards of the most recent DisplayPort Standards as administered by the Video Electronics Standards Association (VESA).
b. At the points of interconnection, the input and output impedance of each link shall be balanced to ground, nominally 100 ohms ± 10 ohms.
c. System shall support up to and including:
   1) 10.8 Gbps data rate
   2) 2560x1600 @60Hz resolution
   3) 60Hz vertical frequency
d. The proper shape of the digital video's RGB channels, or "eye pattern", as it appears on an oscilloscope, must be maintained. Refer to the DisplayPort Standards by VESA for required eye opening values and minimum standards for signal integrity.

5. High-Bandwidth Digital Content Protection (HDCP)
   a. All digital video sources, sinks, and repeaters shall comply with the most recent Digital Content Protection LLC specifications.
   b. All digital video sources, sinks, and repeaters shall scan for the presence of HDCP and if present, perform all HDCP stages according to the HDCP specification, with no more than 5 seconds total time delay between source selection or input and video appearing:
      1) Authentication and Key Exchange – Keys are exchanged and verified. The hardware will store / cache the Key Selection Vector (KSV) k_m to speed up video switching.
      2) If receiver is a repeater, data about downstream devices is sent to transmitter.
      3) Information is sent to transmitter every two seconds during entire HDCP session to ensure encryption is in sync between all transmitter/receiver pairs in the tree.
   c. The distribution system shall authenticate all cached KSVs with each source up to the source's KSV limit, so that authentication does not need to be re-started each time content is routed to a new output.
   d. The distribution system shall not send a source more KSVs than it supports.
6. Extended Display Identification Data (EDID)
   a. All system components generating or accepting certain digital video signals shall provide the following information within the EDID transmission.
      1) Product make, model, and serial number
      2) Current EDID version and revision
      3) Maximum image size
      4) A table of supported input/output resolutions and timings
      5) 3D support status for each input/output
      6) Supported color formats
      7) Supported audio formats for each input/output
7. Serial Bus Communications
   a. Based on the connectivity requirements provided by the AV systems design, the Contractor shall test all serial bus communications links to ensure that they meet the following standards, as applicable:
      1) USB 2.0 and 3.0
      2) IEEE-1394b
      3) Thunderbolt v1.2
8. Digital AV Over Category Cabling Systems:
   a. UTP, STP, F/UTP and S/FTP cables installed for digital AV systems shall meet the following performance standards:

1) Category 5, 5e and 5e+ cables:
   a) ANSI/TIA-568.2-D Category 5e Permalink Specifications.
   b) ANSI/TIA-568.2-D Category 5e Channel Specifications.
2) Category 6 and 6+cables:
   a) ANSI/TIA-568.2-D Category 6 Permalink Specifications.
   b) ANSI/TIA-568.2-D Category 6 Channel Specifications.
3) Category 6a and 7a cables:
   a) ANSI/TIA-568.2-D Category 6A Permalink Specifications.
   b) ANSI/TIA-568.2-D Category 6A Channel Specifications

b. Cable performance definitions
1) NEXT: Near-End Crosstalk
2) PSNEXT: Powersum Near-End Crosstalk
3) ACRF: Attenuation to Crosstalk Ratio, Far-End
4) PSACRF: Powersum Alien Crosstalk Ratio, Far-End
5) ELFEXT: Equal-Level Far-End Crosstalk
6) PSELFEXT: Powersum Equal-Level Far-End Crosstalk
7) PSANEXT: Powersum Alien Near-End Crosstalk
8) PSAACRF: Powersum Insertion Loss to Alien Crosstalk Ratio, Far-End

c. Test Results
1) Submission: Prior to Final Testing and Systems Performance Verification, the Contractor shall submit a copy of all applicable test results to the Owner/Technology Consultant in both electronic (file) and paper form.
2) Category cables: The test results submitted for category cables shall include the following:
3) Graphical/numerical data: Both graphical data plots and numerical data are required for the test parameters listed above.
4) The Category Cable Certification reports shall have complete testing of Permanent Links and Channel Links at frequency increments up to 500MHz as indicated in ANSI/TIA-568.2-D and shall include the following:
   a) Cable/Faceplate Number -- matching faceplate numbers on patch panels
   b) Test Date
   c) Cable Length
   d) Wire-Map
   e) Return Loss
   f) Insertion Loss
   g) NEXT Loss
   h) PSNEXT Loss
   i) ACRF
   j) PSACRF
   k) Propagation Delay Skew
   l) PSANEXT (Category 6A only)
   m) PSAACRF (Category 6A only)
5) Provide Category Cable Certification report and include as a minimum the following information:
   a) Test equipment make and model number.
   b) Test equipment calibration date.

C. Optical Systems

1. Reference ANSI/INFOCOMM Standard 3M-2011, Projected Image System Contrast Ratio
2. All video projection systems shall meet the following performance standards:
   a. The total averaged light output from a video projector, in ANSI lumens, shall be tested by the Contractor and certified to be within ±15% of that specified by the projector manufacturer.

3.4 SYSTEM SETUP, TUNING AND TESTING

A. The Contractor shall install, configure, adjust, program, and calibrate all components in order to optimize the performance of all individual subsystems and the system as a whole

B. Once the system is installed, the Contractor shall complete the following preliminary tests.

1. Equipment Racks
   a. Unless otherwise agreed in writing, equipment rack(s) shall be completely assembled, tested, and programmed in the Audiovisual Contractor's shop. No rack assembly shall be performed at the project site. After the equipment racks are tested the Audiovisual Contractor shall notify the Owner's Representative in writing that the equipment rack assemblies are ready for observation and approval. Allow adequate time for any modifications necessary to satisfy the contract drawings and specifications.
2. Device Configuration
   a. Configure all devices as necessary for a complete and working system and as directed by the Owner or Consultant.
   b. Apply User and Admin security settings, username and passwords as directed by the Owner or Consultant
   c. Configure all networked devices in coordination with the Owner and/or Consultant including the assignment of IP address, subnet, gateway, VLAN, security settings, and host names.
   d. Apply host name for all devices within each device’s setup utility.
   e. Verify all networked devices are configured and registered to their respective network and free of any device to device communication errors and are reachable from the necessary devices.
   f. Verify all networked devices are registered to each manufacturers’ respective software or web-based configuration tool.
   g. Set EDID settings, color space and output resolution settings per the project designated video image resolution.
3. Network Configuration
   a. Coordinate with the Owner’s IT Department to provide required Firewall coordination, Internet services, VoIP phone provisioning, Email and Calendar credentials. DHCP Server, DNS Server, and/or Fully Qualified Domain Name (FQDN) as required to support the system functions indicated within the Specification.
   b. Coordinate with the Owner’s IT Department to ensure proper configuration of the network to support the system functions indicated within the Specification. Verify available network bandwidth within the Owner’s network switches, switch stacks and uplinks. Verify proper network settings per device manufacturers requirements including IGMP, Designated Querier, VLan, PoE, and QoS.
4. Audio
   a. Prior to the termination of audio amplifiers to speakers, the Contractor shall measure the resistance of the speaker line with reference to ground to determine that no short circuits or paths to ground exist in the line. The Contractor shall connect the speaker to the cable

and measure the impedance of each speaker line using a 1,000Hz signal applied to the line. The Contractor shall submit a list, to the Consultant, by cable number, of the impedance of each speaker line. This test shall be performed with the amplifier disconnected from the speaker line and the speaker connected to the speaker line.

b. Verify all loudspeakers are working.

c. Verify that the system meets all Performance Standards as outlined in 'Performance Standards'.

d. Verify that all equipment, panels, and cables are labeled correctly.

e. Verify each item of equipment is functioning as intended.

f. Verify the installation is the same as specified.

g. Loudspeaker Installation:

1) Verify the aiming and positioning of all loudspeakers with the Consultant.

2) If the Consultant has developed an EASE software model, obtain the coverage plots from the Consultant and confirm the performance of the loudspeaker system meets or exceeds the coverage indicated in such model.

h. Microphone Installation:

1) Verify proper positioning of all ceiling and table mounted microphoned

2) Configure steerable microphone array lobes to provide uniform and even coverage of all areas designated as participant seating areas or presentation areas while avoiding areas susceptible to noise transmission such as HVAC registers, glass walls, doorways and divisible walls as required.

5. Additional Audio System Processing Adjustments

a. Where applicable, the Contractor shall program the DSP system to include filters adjusted such that the loudspeaker zone(s) affected by same are measured to exhibit uniform (flat) frequency response (less than +/- 3 dB) at the listening location for the frequencies the transducer is designed/intended to address. The exception to this rule shall be in speech reinforcement systems where additional adjustments shall be made to ensure maximum gain with minimum feedback.

b. Measurements utilized for determining filter adjustments shall be made on axis with respect to a single transducer (representative of the zone) in its intended field of coverage. Loudspeaker cross-over filters shall be provided first for all actively crossed transducers per loudspeaker manufacturer's instructions. Additional filters will still be required to achieve uniform frequency response measured at the various listening locations.

c. For loudspeaker zones of small transducers, utilize high-pass filters first and foremost and then utilize parametric EQ filters to flatten the measured response.

d. The Contractor shall program the DSP system to include delay settings adjusted so that the direct sound from the main loudspeaker clusters and the delay zone transducers in question arrives simultaneously at the listening plane served by the delay zone transducers.

e. The Consultant may request additional filters and delay (as required) to address 'tuning preferences', but such 'tuning preferences' shall not be considered as part of the base line requirements for determining substantial completion of the audio system. Flat frequency response and time alignment of the direct sound from the loudspeakers will be considered a base line requirement for determining substantial completion of the audio system.

f. Dante Audio Network

1) Configure Dante network within Dante Controller or if specified within the project, Dante Domain Manager labeling all devices as their product host names and labeling

all utilized audio channels. All unused channels shall retain their respective channel number.

2) Properly designate and configure a master clock source and latency settings.
3) Route audio as required.

6. Computer Configuration – OFCI (Owner Furnished Contractor Installed)
   a. The Contractor shall be responsible for coordinating with the Owner regarding the specific requirements of Owner furnished computers and/or servers as applicable to meet the functional requirements of the audiovisual systems as specified.
   b. Coordination shall ensure that the computers and/or servers meet the recommended hardware configuration required by the Audiovisual Systems as well as for all software applications, including any software provided as part of this Specification, Owner furnished software integral to the functionality of the audiovisual system, and custom software that is developed through a 3rd-party for use within the audiovisual system.
   c. Contractor coordination with the Owner on the requirements of OFCI computers shall include but may not be limited to:
      1) Form factor
      2) Firmware
      3) Operating System (OS)
      4) Memory
      5) Hardware versus firmware, versus OS, versus software compatibility
      6) Video output quantity and type
      7) Audio output quantity and type
      8) Network connection(s) quantity and type
      9) USB port quantity and type
      10) Power supply(s)
      11) Display type, resolution, size, and quantity
      12) Peripherals, including but not limited to:
         a) Keyboard
         b) Mouse
         c) Cameras
         d) Microphones
         e) USB enabled devices
         f) Others as specified
   d. The Contractor shall further coordinate with the Owner’s IT department to:
      1) Install and configure the furnished computer hardware to function within the audiovisual system as intended by this Specification. This includes but is not limited to the configuration of the following:
         a) Display Settings
         b) Audio settings
         c) Network settings
         d) USB devices and drivers
         e) Others as specified
      2) Install and configure any software provided as part of this Specification.
      3) Configure any Owner provided software that is integral to the functionality of the audiovisual system.

e. The Contractor shall provide to the Owner a date by which all computers must be available to the Contractor for final installation and configuration.

7. Computer Configuration - Utility and Administrative Computers
   a. The Contractor shall be responsible for the configuration of the Owner or Contractor provided computer(s) specified to provide utility and administrative functions of the audiovisual systems. The Contractor shall load and configure software and install peripherals that are necessary for those computers to function per the Specification. This includes but is not limited to the configuration of the following:
      1) Display Settings
      2) Audio settings
      3) Network settings
      4) USB peripherals
      5) Any software required to configure and/or service any specified audiovisual components
      6) Owner furnished software that is integral to the functionality of the audiovisual system
      7) Configuration of the computer's web browser with bookmarked addresses of any system devices which have available web portals for configuration and operation.
      8) Other adjustments that may be necessary to ensure that the computers, software, and peripherals function together and as part of the larger AV System as required by the Specification.
8. Analog VGA Video, RGB Video, RGBS Video, RGBHV Video
   a. To establish that the facility cabling, and terminations meet the specifications defined in 'Performance Standards', a video test signal shall be applied to each input cable and passed through the system switching and distribution networks with test patterns observed at each system display.
   b. Test signals shall be generated using an Extron VTG 400DVI programmable video and audio test generator (or equal).
   c. The following test patterns (at a minimum) shall be observed:
      1) Circles – no visible deviation from image geometry and linearity
      2) Safe area – no visible horizontal or vertical over or under scan
      3) Focus – proper image delineation in all areas
      4) Coarse Crosshatch – no vertical or horizontal bowing
      5) Fine Crosshatch – no vertical or horizontal bowing
      6) PLUGE – properly set black level (brightness) and display gain (contrast)
      7) 32-Level Split Grayscale – even transition from black to white, no color shift
      8) SMPTE Color Bars with PLUGE pattern – no color or pattern deviations
      9) Flat Field – uniform white field with no color, hot or dark spotting
      10) Hum Bar Detect – no visible hum bars
9. DVI, HDMI, DisplayPort, Mini DisplayPort, and Thunderbolt Digital Video
   a. To establish that the facility cabling, and terminations meet the specifications defined in 'Performance Standards', a video test signal shall be applied to each input cable and passed through the system switching and distribution networks with test patterns observed at each system display.
   b. Test signals shall be generated using a Quantum Data 780 (or equal).
   c. Execute at a minimum, the following functional sink tests:
      1) HDCP verification
      2) EDID emulation

3) Video pattern testing. The following test patterns (at a minimum) shall be observed:
   a) Circles – no visible deviation from image geometry and linearity
   b) Safe area – no visible horizontal or vertical over or under scan
   c) Focus – proper image delineation in all areas
   d) Coarse Crosshatch – no vertical or horizontal bowing
   e) Fine Crosshatch – no vertical or horizontal bowing
   f) PLUGE – properly set black level (brightness) and display gain (contrast)
   g) 32-Level Split Grayscale – even transition from black to white, no color shift
   h) SMPTE Color Bars with PLUGE pattern – no color or pattern deviations
   i) Flat Field – uniform white field with no color, hot or dark spotting
   j) Hum Bar Detect – no visible hum bars

d. Execute at a minimum, the following functional source tests:
   1) Status bar showing HDMI In
   2) View incoming video
   3) Monitor incoming audio
   4) EDID emulation

10. High-Bandwidth Digital Content Protection (HDCP)
    a. Use a Quantum Data QD-882EA video test generator or similar to verify a “Pass” test that HDCP is performing to specification for source tests using a sink emulator and/or protocol analyzer; and sink devices using source emulators or protocol generators including the following parameters:
       1) Protocol adherence
       2) Audio/Video Format Switching
       3) Media Switching
       4) Force AVMUTE
       5) Link Integrity (Pj) Check Repeat Rate
       6) Pj Mismatch Response
       7) Number of Keys (source test with sink emulator)

11. Extended Display Identification Data (EDID)
    a. The Contractor shall ensure that all devices capable of generating or accepting EDID information have been updated with the latest version of the EDID standard.
    b. The Contractor shall modify all EDID tables to ensure that the highest common resolution is used by each device within a given system.
    c. The Contractor shall modify the EDID tables to include the most common computer/laptop resolutions used within the facility. Coordination with the Owner shall be required.
    d. The Contractor shall ensure that EDID information is maintained thought the signal chain and that intermediary devices that pass or modify the EDID information conform to the other requirements stated within this Specification.

12. Computer / Video Display Devices
    a. The Contractor shall optimize display equipment for the following minimum standard scan rates and resolutions:
       1) NTSC / 480p
       2) HDTV: 720p/60, 1080i/60, and 1080p/60
       3) XGA: 1024 x 768, 60 Hz, 70 Hz, 72 Hz and 75 Hz.
       4) WXGA: 1280 x 800 / 1360 x 768 / 1366 x 768, 60 Hz.

5) WXGA+: 1440 x 900, 60 Hz.
6) SXGA: 1280 x 1024, 60 Hz.
7) SXGA+: 1400 x 1050, 60 Hz.
8) WSXGA+: 1680 x 1050, 60 Hz.
9) UXGA: 1600 x 1200, 60 Hz and 75 Hz.
10) WUXGA: 1920 x 1200, 60 Hz.
11) UHD: 3840 X 2160, 60 Hz.
12) 4K: 4096 X 2160, 60 Hz.

13. Control
    a. Upon completion of installation, the Contractor shall test each function of each control station, push-button panel, touch screen panel, computer control interface, and all components connected to or interfaced to the Control System to verify proper operation and that each switch and indicator operates as intended.
14. Systems Overview
    a. In addition, the Contractor shall:
        1) Verify each item of equipment is functioning as intended.
        2) Verify the installation is the same as specified.

END OF SECTION 274116

SECTION 274116.01 – AUDIOVISUAL SYSTEMS APPENDICES

PART 1 - APPENDIX A

1.1 LIST OF DRAWINGS

Drawing No.	Description
AVS00	AUDIOVISUAL SYSTEMS COVER SHEET
AVS01	AUDIOVISUAL SYSTEMS - SY01, SY02, SY03, SY04, SY05, SY06, SY07, SY08
AVS02	AUDIOVISUAL SYSTEMS - SY09
AVS03	AUDIOVISUAL SYSTEMS - SY10, SY11
AVS04	AUDIOVISUAL SYSTEMS - SY12
AVS05	AUDIOVISUAL SYSTEMS - SY13, SY14, SY15
AVS06	AUDIOVISUAL SYSTEMS - SY16, SY17, SY18
AVS07	AUDIOVISUAL SYSTEMS - SY19
AVS08	AUDIOVISUAL SYSTEMS - SY20
AVS09	AUDIOVISUAL SYSTEMS - SY21, SY22, SY23
AVMS01	AUDIOVISUAL SYSTEMS - MED SIM - MSY01, MSY02, MSY03
AVMS02	AUDIOVISUAL SYSTEMS - MED SIM - MSY04, MSY05
AVMS03	AUDIOVISUAL SYSTEMS - MED SIM - MSY06, MSY07, MSY08
AVMS04	AUDIOVISUAL SYSTEMS - MED SIM - MSY09, MSY10
AVMS05	AUDIOVISUAL SYSTEMS - MED SIM - MSY11
AVMS06	AUDIOVISUAL SYSTEMS - MED SIM - MSY12 - SHEET 1
AVMS07	AUDIOVISUAL SYSTEMS - MED SIM - MSY12 - SHEET 2
AVMS08	AUDIOVISUAL SYSTEMS - MED SIM - MSY13
AVMS09	AUDIOVISUAL SYSTEMS - MED SIM - MSY14, MSY15
AVMS10	AUDIOVISUAL SYSTEMS - MED SIM - MSY16 - SHEET 1
AVMS11	AUDIOVISUAL SYSTEMS - MED SIM - MSY16 - SHEET 2
AVMS12	AUDIOVISUAL SYSTEMS - MED SIM - MSY17
AVMS13	AUDIOVISUAL SYSTEMS - MED SIM - MSY18, MSY19, MSY20
AVMS14	AUDIOVISUAL SYSTEMS - MED SIM - MSY21
AVMS15	AUDIOVISUAL SYSTEMS - MED SIM - MSY22
AVMS16	AUDIOVISUAL SYSTEMS - MED SIM - MSY23
AVMS17	AUDIOVISUAL SYSTEMS - MED SIM - MSY24
AVMS18	AUDIOVISUAL SYSTEMS - MED SIM - MSY25

1.2 REFERENCE DRAWINGS

A. The following drawings have been included for the Bidders reference in bidding the work called for by the Contract Documents. Reference drawings may not reflect as-built conditions. It shall be the responsibility of the Contractor to field verify all site conditions.

Drawing No.	Description
T0.01	TECHNOLOGY INFRASTRUCTURE LEGENDS AND SYMBOLS
T0.02	TECHNOLOGY INFRASTRUCTURE SCHEDULES AND NOTES
T1.12	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA B PLAN
T1.24	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA C PLAN
T1.25	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AEA D PLAN
T1.26	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA E PLAN
T1.27	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA C PLAN
T1.28	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA D PLAN
T1.29	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA E PLAN
T1.31	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA C PLAN
T1.32	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA D PLAN
T1.33	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA E PLAN
T1.34	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA C PLAN
T1.35	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA D PLAN

Drawing No.	Description
T1.36	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA E PLAN
T1.37	TECHNOLOGY INFRASTRUCTURE FIFTH FLOOR AREA D PLAN
T1.38	TECHNOLOGY INFRASTRUCTURE FIFTH FLOOR AREA E PLAN
T1.41	TECHNOLOGY INFRASTRUCTURE SIXTH FLOOR AREA D PLAN
T1.42	TECHNOLOGY INFRASTRUCTURE SIXTH FLOOR AREA E PLAN
T1.43	TECHNOLOGY INFRASTRUCTURE SEVENTH FLOOR AREA D PLAN
T1.44	TECHNOLOGY INFRASTRUCTURE SEVENTH FLOOR AREA E PLAN
T1.45	TECHNOLOGY INFRASTRUCTURE EIGHTH FLOOR AREA D PLAN
T1.46	TECHNOLOGY INFRASTRUCTURE EIGHTH FLOOR AREA E PLAN
T2.12	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA B RCP
T2.24	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA C RCP
T2.25	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AEA D RCP
T2.26	TECHNOLOGY INFRASTRUCTURE FIRST FLOOR AREA E RCP
T2.27	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA C RCP
T2.28	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA D RCP
T2.29	TECHNOLOGY INFRASTRUCTURE SECOND FLOOR AREA E RCP
T2.31	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA C RCP
T2.32	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA D RCP
T2.33	TECHNOLOGY INFRASTRUCTURE THIRD FLOOR AREA E RCP
T2.34	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA C RCP
T2.35	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA D RCP
T2.36	TECHNOLOGY INFRASTRUCTURE FOURTH FLOOR AREA E RCP
T2.37	TECHNOLOGY INFRASTRUCTURE FIFTH FLOOR AREA D RCP
T2.38	TECHNOLOGY INFRASTRUCTURE FIFTH FLOOR AREA E RCP
T2.41	TECHNOLOGY INFRASTRUCTURE SIXTH FLOOR AREA D RCP
T2.42	TECHNOLOGY INFRASTRUCTURE SIXTH FLOOR AREA E RCP
T2.43	TECHNOLOGY INFRASTRUCTURE SEVENTH FLOOR AREA D RCP
T2.44	TECHNOLOGY INFRASTRUCTURE SEVENTH FLOOR AREA E RCP
T2.45	TECHNOLOGY INFRASTRUCTURE EIGHTH FLOOR AREA D RCP
T2.46	TECHNOLOGY INFRASTRUCTURE EIGHTH FLOOR AREA E RCP
T5.01	TECHNOLOGY INFRASTRUCTURE ROOM ELEVATIONS
T5.02	TECHNOLOGY INFRASTRUCTURE ROOM ELEVATIONS
T5.03	TECHNOLOGY INFRASTRUCTURE ROOM ELEVATIONS
T5.04	TECHNOLOGY INFRASTRUCTURE ROOM ELEVATIONS
T5.05	TECHNOLOGY INFRASTRUCTURE ROOM ELEVATIONS
T6.03	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.04	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.05	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.06	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.07	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.08	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T6.09	TECHNOLOGY INFRASTRUCTURE ROOM RISERS
T70.1	TECHNOLOGY INFRASTRUCTURE DETAILS
T7.02	TECHNOLOGY INFRASTRUCTURE DETAILS
T7.03	TECHNOLOGY INFRASTRUCTURE DETAILS
T7.04	TECHNOLOGY INFRASTRUCTURE DETAILS

PART 2 - APPENDIX B

2.1 SUMMARY OF AUDIOVISUAL SYSTEMS POST BID SUBMITTALS

Description	Deadline
Schedule	Within 15 days of notification of contract award
Progress Reports	While working off-site: every two weeks While working on-site: every week.
Shop Drawings	Prior to equipment and materials purchase, fabrication, or installation
Bill of Materials	Prior to equipment and materials purchase, fabrication, or installation
Audio Digital Signal Processing (DSP)	Per Contractor's published schedule
Control System Control Surfaces / GUI Prototype submittal	Per Contractor's published schedule
Control System Control Surfaces/GUI Submittal	Per Contractor's published schedule
Preliminary As-Built Drawing Submittal	Prior to Final Testing and System Performance Verification
Final Documentation	Within 30 days of Substantial Completion
Post-Integration Control Surfaces Adjustments	Within 90 days of Substantial Completion

PART 3 - APPENDIX C: PRE-BID FORMS

3.1 CONTRACTOR QUALIFICATION REQUIREMENTS

Corporate Profile

Location of Corporate Head-quarters	
Number of Offices & Loca-tions	
Location of Office Assigned to this Project	

Staffing

Total Number of Employees	
Number of Design Staff	
Number of Installation Staff	
Number of Project Manage-ment Staff	
Number of Software Pro-gramming Staff	

Project Key Personnel

Project Executive	
Project Manager	
Systems Engineer/Designer	
Lead Installer	
Control Systems Programmer	
Audio DSP Programmer	
Commissioning Agent	
Trainer	

Project Executive Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

Project Manager Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

* The assigned Project Manager shall have at least 5 years experience with audiovisual projects of similar scope & scale.

Systems Engineer/Designer Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
Crestron DM-NVX and DM-NVX-N certification numbers and expiration dates	

* The assigned Systems Engineer/Designer shall have at least 5 years experience with audiovisual projects of similar scope & scale.

Lead Installer Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
AVIXA/InfoComm International CTS-I certification or NSCA EST-L2 (Electronic Systems Technician) certification, number, and expiration date	
Crestron DM-NVX and DM-NVX-N certification numbers and expiration dates	

Control Systems Programmer Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
Crestron Certified Programmer, Crestron DM-NVX and DM-NVX-N certification number and expiration date	

Audio DSP Programmer Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
QSC Q-SYS Level Two Training, certification number and expiration date	

Commissioning Agent Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

Trainer Resume

Name	
Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

Resources

Manufacturers' Line Card for products Company is an authorized distributor or dealer. Include authorization date	Provide this as an attachment
List of Manufacturers' Technical Certifications or Designations	
List of Manufacturers' for Whom the Company is an Authorized Service Center	Provide this as an attachment
List of Computer Software and/or Systems that Will Be Used on the Project	
List of Contractor Owned Test Equipment. Include Manufacturer, Model, and Software Version	

PART 4 - APPENDIX D: POST-AWARD FORMS

4.1 PROGRESS REPORT FORM

Project Name:	
Date:	
From:	

Progress (Tasks accomplished since the previous report; both completed tasks and work-in-progress.)

Work Planned (Tasks scheduled for the time period extending until the next report)

Issues (Factors delaying progress or have the potential to delay progress involving the Owner, Architect and/or Consultant.)

4.2 SYSTEMS PERFORMANCE VERIFICATION REQUEST FORM

Contractor:	
Project:	

The Contractor requests a Systems Performance Verification appointment by completing this form and returning it to NV5. By signing below, the Contractor indicates that

1. The work on this contract, as defined in the Audiovisual Systems Specification, is complete and ready for the Consultant's final Systems Performance Verification.
2. All required field tests have been performed and project documentation is on-site.
3. A computer/video signal generator or generators, capable of outputting all signal types included in the system designs, will be available onsite at the time of Systems Performance Verification.
4. Physical media (DVD, Blu-Ray disc, etc.) will be available onsite to verify the performance of all applicable source devices.

Any incomplete items, deviations, or exceptions to the requirements of the Audiovisual Systems Specification shall be listed by the Contractor below, or provided as an attachment:

If the Contractor's work is found to be incomplete, and subsequent visits to the site by the Consultant are required by the Owner, the Owner may elect to have the Consultant's travel costs, billable time, and all other related travel expenses be deducted from the Contractor's final payment.

By signing below, Contractor verifies that the job site is ready for final Systems Performance Verification and accepts the conditions of this agreement.

Signature: _____ Print Name: _____

Title: _____Date: _____

PART 5 - APPENDIX E: BIDDING EQUIPMENT LISTS

5.1 BIDDING EQUIPMENT LISTS

A. Bidding Equipment Lists can be found on the following pages.

B. Bidding Equipment Lists show quantities per room. The quantity of rooms for each system type is listed at the top of each page.

C. Bidding Equipment Lists include manufacturers and model numbers where appropriate. Additional identification or ordering information may vary according to supplier, and the Bidder shall cross-reference with an individual supplier if required.

D. Some manufacturer's names and product descriptions used in this specification are product specific with no substitutions allowed. The items listed as “Brand Specific” in this specification must be the manufacturer and type specified. These specific products are required for compatibility with the Owner’s existing systems and to maintain continuity of support. The Brand Specific Products specified for this project include those by:

1. Crestron
2. CAE Healthcare Simulation

5.2 MASTER QUOTE NUMBERS

A. As a convenience to the Contractor in preparing the bid response, Master Quote numbers have been provided for several equipment groups. Where given, Master Quote numbers or other quotation numbers have been provided for bidding purposes only. It shall be the responsibility of the Contactor to verify that they have received the latest versions of the Master Quotes prior to bidding, and to establish the accuracy of the quotes prior to ordering.

1. Nanolumens – Master Quote # 202110-10856

5.3 MANUFACTURER CONTACT INFORMATION

A. The following contact information is provided as a convenience for bidding purposes.

CAE Healthcare Simulation	Andrew Carson andrew.carson@cae.com
Nanolumens	Geoff Berkeley GBerkeley@nanolumens.com

5.4 KEYED BIDDING NOTES

A. **OFCI (Owner Furnished Contractor Installed)**

B. **OFOI (Owner Furnished Owner Installed, or Provided by Others)**

C. **Included with above package**

D. **Coordinate stock color/finish with architect**

E. **Custom painted. Coordinate with architect**

F. **Field verify prior to submittals**

G. **Special or noteworthy installation requirements – Refer to System Description for details**

H. **Reference manufacturer’s Master Quote**

END OF SECTION 274116.01

Louisiana State University
Interim Hospital - Simulation Center

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1019**					
Type : **SY01**					
Name : **65" Portrait Mode Digital Signage (Main Concourse)**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	2	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**2**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	2	A
Rack, Panels, Misc.					
4			Installation Materials as Defined in AV Systems Specification	Lot	
5			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
6			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
7			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
8			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
9			Control System Accessories as Needed	Lot	
10			Power Supplies and Power Distribution as Needed	Lot	
11			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Louisiana State University
Interim Hospital - Simulation Center

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :	**1019, 2087, 3043, 4131, 5002, 6002, 7002, 8002**				
Type :	**SY02**				
Name :	**49" Portrait Mode Digital Signage (Elevator Lobby)**				
Rm Qty :	**8**				
Display Devices					
1	NEC	M491	**49" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
Rack, Panels, Misc.					
4			Installation Materials as Defined in AV Systems Specification	Lot	
5			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
6			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
7			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
8			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
9			Control System Accessories as Needed	Lot	
10			Power Supplies and Power Distribution as Needed	Lot	
11			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Louisiana State University
Interim Hospital - Simulation Center

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1000**					
Type : **SY03**					
Name : **86" Digital Signage (Lobby)**					
Rm Qty : **1**					
Display Devices					
1	NEC	V864Q	86" Ultra High Definition Professional Display	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
Rack, Panels, Misc.					
4			Installation Materials as Defined in AV Systems Specification	Lot	
5			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
6			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
7			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
8			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
9			Control System Accessories as Needed	Lot	
10			Power Supplies and Power Distribution as Needed	Lot	
11			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Louisiana State University
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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **4107**					
Type : **SY04**					
Name : **49" Digital Signage (Testing Lab Reception)**					
Rm Qty : **1**					
Display Devices					
1	NEC	M491	**49" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
Rack, Panels, Misc.					
4			Installation Materials as Defined in AV Systems Specification	Lot	
5			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
6			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
7			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
8			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
9			Control System Accessories as Needed	Lot	
10			Power Supplies and Power Distribution as Needed	Lot	
11			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Louisiana State University
Interim Hospital - Simulation Center

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2090**					
Type : **SY05**					
Name : **55" Digital Signage (Corridor)**					
Rm Qty : **1**					
Display Devices					
1	NEC	M551	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
Rack, Panels, Misc.					
4			Installation Materials as Defined in AV Systems Specification	Lot	
5			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
6			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
7			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
8			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
9			Control System Accessories as Needed	Lot	
10			Power Supplies and Power Distribution as Needed	Lot	
11			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Louisiana State University
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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1019**					
Type : **SY06**					
Name : **55" Digital Signage and Collaboration (Main Concourse)**					
Rm Qty : **1**					
Display Devices					
1	NEC	M551	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	4	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**4**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	4	A
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	4	-
Rack, Panels, Misc.					
5			Installation Materials as Defined in AV Systems Specification	Lot	
6			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
7			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
8			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
9			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
10			Control System Accessories as Needed	Lot	
11			Power Supplies and Power Distribution as Needed	Lot	
12			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1130**					
Type : **SY07**					
Name : **55" Digital Signage and Collaboration (Reception)**					
Rm Qty : **1**					
Display Devices					
1	NEC	M551	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Rack, Panels, Misc.					
5			Installation Materials as Defined in AV Systems Specification	Lot	
6			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
7			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
8			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
9			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
10			Control System Accessories as Needed	Lot	
11			Power Supplies and Power Distribution as Needed	Lot	
12			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :	**2080, 4208, 5008, 6008, 7008, 8008**				
Type :	**SY08**				
Name :	**65" Digital Signage and Collaboration (Communal Space)**				
Rm Qty :	**6**				
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Rack, Panels, Misc.					
5			Installation Materials as Defined in AV Systems Specification	Lot	
6			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
7			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
8			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
9			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
10			Control System Accessories as Needed	Lot	
11			Power Supplies and Power Distribution as Needed	Lot	
12			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1001**
Type : **SY09**
Name : **Multi-Purpose**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	Nanolumens	Engage	Engage Series LED Videowall Package - 2.5mm pixel pitch - with Controller and Processor	1	F,H
Source Devices					
2	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
Signal Processing, Routing, and Distribution					
3	Crestron	DM-NVX-E760	DM NVX 4K60 4:4:4 HDR Network AV Encoder with DM Input (PoE++/UPOE)	2	-
4	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
5	Crestron	HD-TX-101-C-1G-E-X-T	DM Lite - HDMI over CATx Transmitter, Wall Plate	2	D
6	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
7	**Contractor Selected/ Owner Approved**	**24-Port Data Patch Panel**	**Contractor Selected, Owner Approved 24-Port Data Patch Panel, Comply w/ University Standards**	**1**	**-**
8	Owner Furnished	Owner Furnished	24 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Speech Reinforcement System/Audio Conferencing					
9	Shure	SLXD4D	UHF Frequency Agile Wireless Microphone Dual Channel Receiver	1	-
10	Shure	SLXD1	Digital Wireless Bodypack Transmitter	1	-
11	Shure	WL185	Cardioid Lavalier Microphone	1	-
12	Shure	SLXD2/SM58	Cardioid Dynamic Wireless Microphone Transmitter	1	-
13	Shure	UA834WB	In-line Antenna Amplifier for Remote Mounting (470-902 MHz)	1	-
14	Shure	UA221	Passive Antenna Splitter/Combiner Kit	1	-
15	Shure	SBC203	Dual Battery Charger for SB903 Battery	1	-
16	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
17	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	2	-
18	Shure	SM-58	Cardioid Dynamic Microphone	1	-
Sound Reinforcement System					
19	JBL	Control 67P/T	6.5" 2-way Pendant Loudspeaker w/70V Transformer	10	D
20	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
21	Crestron	AMP-2210T	2-CH, 210W per @4ohm, 120W per @8ohm, 120W per @70V, Amplifier	1	-
Control System					
22	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
23	Crestron	CP4N	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1001**
Type : **SY09**
Name : **Multi-Purpose**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
24	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
25	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
26	Middle Atlantic	RLNK-P920R-SP	9 Outlet, 20A Surge Protection PDU w/ RackLink	1	-
27	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
28			Installation Materials as Defined in AV Systems Specification	Lot	
29			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
30			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
31			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
32			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
33			Control System Accessories as Needed	Lot	
34			Power Supplies and Power Distribution as Needed	Lot	
35			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2020, 2022**

Type : **SY10**

Name : **Fresh Tissue Lab A & B**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	NEC	V864Q	86" Ultra High Definition Professional Display	4	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**4**	**-**
Source Devices					
3	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	2	-
4	Owner Furnished	AIO PC	Owner Furnished All-In-One PC (OFCI)	2	A
Video Capture, Streaming and Conferencing					
5	Vaddio	RoboShot 20 UHD OneLink HDMI	UHD PTZ Camera - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	4	-
Signal Processing, Routing, and Distribution					
6	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	8	-
7	Crestron	HD-TX-101-C-1G-E-X-T	DM Lite - HDMI over CATx Transmitter, Wall Plate	2	D
Speech Reinforcement System/Audio Conferencing					
8	Shure	SLXD1	Digital Wireless Bodypack Transmitter	2	-
9	Shure	WL185	Cardioid Lavalier Microphone	2	-
10	Shure	UA834WB	In-line Antenna Amplifier for Remote Mounting (470-902 MHz)	2	-
11	Shure	SBC10-903	Single Battery Charger for SB903 Battery	2	-
12	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	2	-
13	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	2	-
Sound Reinforcement System					
14	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	16	D
Control System					
15	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D
Rack, Panels, Misc.					
16	Middle Atlantic	C5-FF27-3	C5-Series Frame, (3) Bay, 27"D	2	D
17			Installation Materials as Defined in AV Systems Specification	Lot	
18			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
19			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
20			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
21			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
22			Control System Accessories as Needed	Lot	

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2020, 2022**					
Type : **SY10**					
Name : **Fresh Tissue Lab A & B**					
Rm Qty : **1**					
23			Power Supplies and Power Distribution as Needed	Lot	
24			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2002**					
Type : **SY11**					
Name : **Classroom/Conference**					
Rm Qty : **1**					
Display Surfaces					
1	Generic	Projection Screen	Projection Screen per Infrastructure Reference Drawings	1	-
Display Devices					
2	Christie	DHD850-GS	7,200 ANSI Lumen, 1-Chip DLP, Laser-Phosphor Light Source, Bold Color, 1920x1080, Lens Not Included	1	D
3	Contractor Select	Contractor Select Zoom Lens	Contractor Selected Projector Lens for Above	1	F
4	Chief	Projector Ceiling Mount	Contractor Selected Projector Ceiling Mount	1	D
5	Owner Furnished	Owner Furnished	Computer Monitor (OFCI)	1	A
Source Devices					
6	Owner Furnished	Instructor Workstation	Owner Furnished Instructor's Workstation PC (OFCI)	1	A
7	Owner Furnished	KM	USB Keyboard & Mouse	1	-
8	Crestron	FT2-500-MECH-ACUSB-x	FlipTop FT2 Series, 500 Size, Mechanical, with an AC Power Module and USB Charger Module	1	D
9	Crestron	FT2A-PLT-BLANK-10	Blank Insert for FT2 Series, Pack of 10	1	-
Video Capture, Streaming and Conferencing					
10	Vaddio	RoboShot 20 UHD OneLink HDMI	UHD PTZ Camera - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	1	-
11	Vaddio	AV Bridge 2x1	2x1 HD Video and Audio to USB Bridge for Web Conferencing, HDMI pass-thru and 4x4 Dante Audio Matrix	1	-
Signal Processing, Routing, and Distribution					
12	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
13	Crestron	DM-NVX-351	DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing	1	-
Speech Reinforcement System/Audio Conferencing					
14	Shure	Microflex MXA910	Ceiling Microphone Array, Dante	1	D
Sound Reinforcement System					
15	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	4	D
Control System					
16	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
17	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
Rack, Panels, Misc.					
18	Middle Atlantic	L5 Series Lectern	Lectern (coordinate with owner and archtect for configuation and finish)	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2002**					
Type : **SY11**					
Name : **Classroom/Conference**					
Rm Qty : **1**					
19			Installation Materials as Defined in AV Systems Specification	Lot	
20			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
21			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
22			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
23			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
24			Control System Accessories as Needed	Lot	
25			Power Supplies and Power Distribution as Needed	Lot	
26			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2046**					
Type : **SY12**					
Name : **AV Equipment Room**					
Rm Qty : **1**					
Video Capture, Streaming and Conferencing					
1	Sonic Foundry	Mediasite	Rich Media Capture Device (OFCI)	3	A
Signal Processing, Routing, and Distribution					
2	Crestron	DM-NVX-E760	DM NVX 4K60 4:4:4 HDR Network AV Encoder with DM Input (PoE++/UPOE)	2	-
3	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	5	-
4	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	6	-
5	**Contractor Selected/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**1**	**-**
6	**Contractor Selected/ Owner Approved**	**24-Port Data Patch Panel**	**Contractor Selected, Owner Approved 24-Port Data Patch Panel, Comply w/ University Standards**	**1**	**-**
7	Owner Furnished	Owner Furnished	24 Port Managed Switch with PoE+ Ports (OFCI)	1	A
8	Owner Furnished	Owner Furnished	48 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Speech Reinforcement System/Audio Conferencing					
9	Shure	SLXD4	UHF Frequency Agile Wireless Microphone Single Channel Receiver	2	-
10	Shure	UA221	Passive Antenna Splitter/Combiner Kit	1	-
Sound Reinforcement System					
11	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
12	QSC Audio	Core 8 Flex	8 Flex I/O Audio DSP with VOIP, AES67, DANTE, USB and QSYS	1	-
13	Crestron	AMP-2210T	2-CH, 210W per @4ohm, 120W per @8ohm, 120W per @70V, Amplifier	1	-
14	Crestron	AMP-X50MP	2-Ch 25W @ 8Ohm, 1-Ch 50W @ 70V Compact Amplifier	1	-
Control System					
15	Crestron	CP4N	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet	1	-
16	Crestron	CEN-IO-COM-102	Wired Ethernet Module w/2 COM Ports	1	-
17	Crestron	MPC4	4-Series Integrated Controller, (1) RS-232, (4) IR, (2) Relay, (2) Digital, Cresnet, LAN	1	-
Rack, Panels, Misc.					
18	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
19	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
20	Middle Atlantic	RLNK-P920R-SP	9 Outlet, 20A Surge Protection PDU w/ RackLink	1	-
21	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
22			Installation Materials as Defined in AV Systems Specification	Lot	
23			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
24			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2046**					
Type : **SY12**					
Name : **AV Equipment Room**					
Rm Qty : **1**					
25			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
26			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
27			Control System Accessories as Needed	Lot	
28			Power Supplies and Power Distribution as Needed	Lot	
29			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3036**					
Type : **SY13**					
Name : **Group Fitness**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Signal Processing, Routing, and Distribution					
5	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
6	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
7	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
8	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
9	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
10	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
11	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	4	D
Control System					
12	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
13	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
14	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
15	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
16			Installation Materials as Defined in AV Systems Specification	Lot	
17			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
18			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
19			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
20			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
21			Control System Accessories as Needed	Lot	
22			Power Supplies and Power Distribution as Needed	Lot	
23			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **3036**
Type : **SY13**
Name : **Group Fitness**
Rm Qty : **1**

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3037**					
Type : **SY14**					
Name : **Group Fitness**					
Rm Qty : **1**					
Display Surfaces					
1	Generic	Projection Screen	Projection Screen per Infrastructure Reference Drawings	1	-
Display Devices					
2	Christie	DHD850-GS	7,200 ANSI Lumen, 1-Chip DLP, Laser-Phosphor Light Source, Bold Color, 1920x1080, Lens Not Included	1	D
3	Contractor Select	Contractor Select Zoom Lens	Contractor Selected Projector Lens for Above	1	F
4	Chief	Projector Ceiling Mount	Contractor Selected Projector Ceiling Mount	1	D
Source Devices					
5	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
6	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Signal Processing, Routing, and Distribution					
7	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
8	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
9	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
10	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
11	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
12	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
13	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	6	D
Control System					
14	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
15	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
16	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
17	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
18			Installation Materials as Defined in AV Systems Specification	Lot	
19			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
20			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
21			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3037**					
Type : **SY14**					
Name : **Group Fitness**					
Rm Qty : **1**					
22			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
23			Control System Accessories as Needed	Lot	
24			Power Supplies and Power Distribution as Needed	Lot	
25			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **3039**
Type : **SY15**
Name : **Spinning**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Surfaces					
1	Generic	Projection Screen	Projection Screen per Infrastructure Reference Drawings	1	-
Display Devices					
2	Christie	DHD850-GS	7,200 ANSI Lumen, 1-Chip DLP, Laser-Phosphor Light Source, Bold Color, 1920x1080, Lens Not Included	1	D
3	Contractor Select	Contractor Select Zoom Lens	Contractor Selected Projector Lens for Above	1	F
4	Chief	Projector Ceiling Mount	Contractor Selected Projector Ceiling Mount	1	D
Source Devices					
5	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
6	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Signal Processing, Routing, and Distribution					
7	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
8	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
9	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
10	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
11	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
12	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
13	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	4	D
Control System					
14	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
15	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
16	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
17	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
18			Installation Materials as Defined in AV Systems Specification	Lot	
19			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
20			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
21			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3039**					
Type : **SY15**					
Name : **Spinning**					
Rm Qty : **1**					
22			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
23			Control System Accessories as Needed	Lot	
24			Power Supplies and Power Distribution as Needed	Lot	
25			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3040**					
Type : **SY16**					
Name : **Small Group**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
Signal Processing, Routing, and Distribution					
5	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
6	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
7	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
8	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
9	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
10	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
11	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	2	D
Control System					
12	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
13	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
14	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
15	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
16			Installation Materials as Defined in AV Systems Specification	Lot	
17			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
18			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
19			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
20			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
21			Control System Accessories as Needed	Lot	
22			Power Supplies and Power Distribution as Needed	Lot	
23			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **3040**
Type : **SY16**
Name : **Small Group**
Rm Qty : **1**

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3038**					
Type : **SY17**					
Name : **Pin-Loaded Machines/Cardio**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	3	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**3**	**-**
Source Devices					
3	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
Signal Processing, Routing, and Distribution					
4	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
5	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
6	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
7	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
8	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
9	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
10	JBL	Control 64P/T	Compact Full Range Pendant Loudspeaker	36	-
Control System					
11	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	3	D
Rack, Panels, Misc.					
12	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
13	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
14			Installation Materials as Defined in AV Systems Specification	Lot	
15			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
16			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
17			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
18			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
19			Control System Accessories as Needed	Lot	
20			Power Supplies and Power Distribution as Needed	Lot	
21			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **3038**
Type : **SY17**
Name : **Pin-Loaded Machines/Cardio**
Rm Qty : **1**

End of System

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Audiovisual Systems Bidding Equipment List

Number : **3044**
Type : **SY19**
Name : **AV Equipment Room**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Source Devices					
1	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
2	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
3	Owner Furnished	CATV Tuner	CATV Tuner (OFCI)	3	A
Signal Processing, Routing, and Distribution					
4	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	5	-
5	**Contractor Selected/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**1**	**-**
6	Owner Furnished	Owner Furnished	48 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Sound Reinforcement System					
7	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
8	LEA Professional	Connect 168D	8-CH, 160W per channel @4ohm, 8ohm, 70V and 100V. Internal DSP with Crossovers and Dante.	1	-
Control System					
9	Crestron	CP4N	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet	1	-
Rack, Panels, Misc.					
10	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
11	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
12	Middle Atlantic	RLNK-P920R-SP	9 Outlet, 20A Surge Protection PDU w/ RackLink	1	-
13	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
14			Installation Materials as Defined in AV Systems Specification	Lot	
15			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
16			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
17			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
18			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
19			Control System Accessories as Needed	Lot	
20			Power Supplies and Power Distribution as Needed	Lot	
21			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **3034**					
Type : **SY18**					
Name : **Cardio**					
Rm Qty : **1**					
Source Devices					
1	QSC Audio	Axon DBU	USB/Bluetooth network audio interface	1	-
Signal Processing, Routing, and Distribution					
2	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
Speech Reinforcement System/Audio Conferencing					
3	Shure	SLXD14/153T	Wireless System with SLXD1 Bodypack Transmitter and MX153T Earset Headworn Microphone	1	-
4	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
5	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
6	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
7	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	5	D
Control System					
8	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
Rack, Panels, Misc.					
9	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
10	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
11			Installation Materials as Defined in AV Systems Specification	Lot	
12			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
13			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
14			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
15			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
16			Control System Accessories as Needed	Lot	
17			Power Supplies and Power Distribution as Needed	Lot	
18			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **4000**
Type : **SY20**
Name : **Testing Lab**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	NEC/Sharp	M431	**43" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN,Integrated Speakers**	3	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**3**	**-**
Source Devices					
3	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	3	A
Video Capture, Streaming and Conferencing					
4	Axis	P3247LV	Network Camera	41	-
5	Axis	TP3201	Network Camera Recessed Mount	41	-
6	Axis	TP3901	Microphone Kit	41	-
Speech Reinforcement System/Audio Conferencing					
7	Shure	SLXD4	UHF Frequency Agile Wireless Microphone Single Channel Receiver	1	-
8	Shure	SLXD1	Digital Wireless Bodypack Transmitter	1	-
9	Shure	WL185	Cardioid Lavalier Microphone	1	-
10	Shure	UA834WB	In-line Antenna Amplifier for Remote Mounting (470-902 MHz)	1	-
11	Shure	UA221	Passive Antenna Splitter/Combiner Kit	1	-
12	Shure	SBC10-903	Single Battery Charger for SB903 Battery	1	-
13	Contractor Select	Rack Mount for Above	Contractor Selected Rack Mount for Above	1	-
14	Shure	SB903	Lithium-Ion Rechargeable Battery (Spare)	1	-
Sound Reinforcement System					
15	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
16	LEA Professional	Connect 168D	8-CH, 160W per channel @4ohm, 8ohm, 70V and 100V. Internal DSP with Crossovers and Dante.	1	-
17	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	49	D
18	JBL	Control 24CT	4" Ceiling Loudspeaker w/70V Transformer	7	-
Control System					
19	Crestron	CP4N	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet	1	-
20	Owner Furnished	Owner Furnished	10 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Rack, Panels, Misc.					
21	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
22	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
23	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
24			Installation Materials as Defined in AV Systems Specification	Lot	
25			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **4000**					
Type : **SY20**					
Name : **Testing Lab**					
Rm Qty : **1**					
26			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
27			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
28			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
29			Control System Accessories as Needed	Lot	
30			Power Supplies and Power Distribution as Needed	Lot	
31			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

Number : **4332, 4432, 5134, 5234, 6133, 6233, 7132, 7233, 8133, 8233**

Type : **SY21**

Name : **Large Conference Room**

Rm Qty : **10**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	NEC	V864Q	86" Ultra High Definition Professional Display	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	Instructor Workstation	Owner Furnished Instructor's Workstation PC (OFCI)	1	A
4	Owner Furnished	Wireless Keyboard/Mouse	Wireless Keyboard and Mouse	1	-
5	Crestron	FT2-500-MECH-ACUSB-x	FlipTop FT2 Series, 500 Size, Mechanical, with an AC Power Module and USB Charger Module	1	D
6	Crestron	FT2A-PLT-BLANK-10	Blank Insert for FT2 Series, Pack of 10	1	-
Video Capture, Streaming and Conferencing					
7	Marshall Electronics	CV610-U3-V2	Compact USB 3.0/2.0 PTZ 10x Optical Zoom AF Camera	1	-
Signal Processing, Routing, and Distribution					
8	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
9	Crestron	DM-NVX-351	DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing	1	-
Speech Reinforcement System/Audio Conferencing					
10	Shure	Microflex MXA910	Ceiling Microphone Array, Dante	1	D
11	Shure	Intellimix P300	Audio Conferencing Processor	1	-
Sound Reinforcement System					
12	Crestron	AMP-X50MP	2-Ch 25W @ 8Ohm, 1-Ch 50W @ 70V Compact Amplifier	1	-
13	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	2	D
Control System					
14	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D
15	Crestron	MPC4	4-Series Integrated Controller, (1) RS-232, (4) IR, (2) Relay, (2) Digital, Cresnet, LAN	1	-
16	Owner Furnished	Owner Furnished	10 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Rack, Panels, Misc.					
17	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
18	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
19	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
20			Installation Materials as Defined in AV Systems Specification	Lot	
21			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
22			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **4332, 4432, 5134, 5234, 6133, 6233, 7132, 7233, 8133, 8233**					
Type : **SY21**					
Name : **Large Conference Room**					
Rm Qty : **10**					
23			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
24			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
25			Control System Accessories as Needed	Lot	
26			Power Supplies and Power Distribution as Needed	Lot	
27			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :	**2014, 6102, 6202, 7155, 7255, 8156**				
Type :	**SY22**				
Name :	**Small Conference Room**				
Rm Qty :	**6**				
Display Devices					
1	NEC	M551	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	Instructor Workstation	Owner Furnished Instructor's Workstation PC (OFCI)	1	A
4	Owner Furnished	Wireless Keyboard/Mouse	Wireless Keyboard and Mouse	1	-
5	Crestron	FT2-500-MECH-ACUSB-x	FlipTop FT2 Series, 500 Size, Mechanical, with an AC Power Module and USB Charger Module	1	D
6	Crestron	FT2A-PLT-BLANK-10	Blank Insert for FT2 Series, Pack of 10	1	-
Video Capture, Streaming and Conferencing					
7	Logitech	Meetup	All-In-One Conference Camera with Microphone	1	-
Signal Processing, Routing, and Distribution					
8	Crestron	DM-TX-4KZ-100-C-1G-x-T	DigitalMedia 8G+® 4K60 4:4:4 HDR Wall Plate Transmitter	1	D
9	Crestron	DM-RMC-4KZ-100-C	4K60 4:4:4: HDR Receiver & Room Controller 100	1	-
Control System					
10	Crestron	MPC3-102-B	3-Series Media Presentation Controller	1	-
11	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
12			Installation Materials as Defined in AV Systems Specification	Lot	
13			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
14			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
15			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
16			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
17			Control System Accessories as Needed	Lot	
18			Power Supplies and Power Distribution as Needed	Lot	
19			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems Bidding Equipment List

Number : **4353**
Type : **SY23**
Name : **Distance Learning**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	NEC	V864Q	86" Ultra High Definition Professional Display	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
Source Devices					
3	Owner Furnished	Instructor Workstation	Owner Furnished Instructor's Workstation PC (OFCI)	1	A
4	Owner Furnished	Wireless Keyboard/Mouse	Wireless Keyboard and Mouse	1	-
5	Crestron	FT2-500-MECH-ACUSB-x	FlipTop FT2 Series, 500 Size, Mechanical, with an AC Power Module and USB Charger Module	1	D
6	Crestron	FT2A-PLT-BLANK-10	Blank Insert for FT2 Series, Pack of 10	1	-
Video Capture, Streaming and Conferencing					
7	Marshall Electronics	CV610-U3-V2	Compact USB 3.0/2.0 PTZ 10x Optical Zoom AF Camera	1	-
Signal Processing, Routing, and Distribution					
8	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
9	Crestron	DM-NVX-351	DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing	1	-
Sound Reinforcement System					
10	Crestron	AMP-X50MP	2-Ch 25W @ 8Ohm, 1-Ch 50W @ 70V Compact Amplifier	1	-
11	JBL	LCT-81C/T	Low-Profile Lay-In 2'x2' Ceiling Tile Loudspeaker, 200mm (8") Driver	2	D
Control System					
12	Crestron	TSW-570-x-S	5" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D
13	Crestron	MPC4	4-Series Integrated Controller, (1) RS-232, (4) IR, (2) Relay, (2) Digital, Cresnet, LAN	1	-
14	Owner Furnished	Owner Furnished	10 Port Managed Switch with PoE+ Ports (OFCI)	1	A
Rack, Panels, Misc.					
15	Middle Atlantic	RCS-1824	18RU 24" Deep Pre-Configured Rack w/Fans	1	-
16	Middle Atlantic	PWR-8-V	Essex Power Strip, (8) Outlet	1	-
17	Panelcrafters	NV5-RHIM-RevH	Rack ID Panel	1	-
18			Installation Materials as Defined in AV Systems Specification	Lot	
19			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
20			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
21			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
22			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
23			Control System Accessories as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **4353**					
Type : **SY23**					
Name : **Distance Learning**					
Rm Qty : **1**					
24			Power Supplies and Power Distribution as Needed	Lot	
25			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **1104, 1105, 1106, 1107 1108, 1109, 1110, 1113, 1115, 1116, 1117, 1118, 1119, 1120**

Type : **MSY01**

Name : **Exam**

Rm Qty : **14**

Display Devices

1	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
2	Ergotron	60-593-216	StyleView Low-Profile Vertical Lift, High Traffic Areas	1	-

Source Devices

3	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**2**	**A**
4	Owner Furnished	KM	USB Keyboard & Mouse	2	-

Video Capture, Streaming and Conferencing

5	CAE	ACC-LSEP20	Digital PTZ Camera	1	-
6	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
7	Axis	T94P01L	Recessed Mount for AXIS M55 Series	1	-
8	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-

Signal Processing, Routing, and Distribution

9	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-

Speech Reinforcement System/Audio Conferencing

10	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	1	D
11	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-

Sound Reinforcement System

12	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
13	JBL	Control 14C/T	Two-Way 4" Coaxial Ceiling Loudspeaker	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1104, 1105, 1106, 1107 1108, 1109, 1110, 1113, 1115, 1116, 1117, 1118, 1119, 1120**					
Type : **MSY01**					
Name : **Exam**					
Rm Qty : **14**					
Rack, Panels, Misc.					
14			Installation Materials as Defined in AV Systems Specification	Lot	
15			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
16			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
17			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
18			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
19			Control System Accessories as Needed	Lot	
20			Power Supplies and Power Distribution as Needed	Lot	
21			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1103, 1114**					
Type : **MSY02**					
Name : **Exam Large**					
Rm Qty : **2**					
Display Devices					
1	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
2	Ergotron	60-593-216	StyleView Low-Profile Vertical Lift, High Traffic Areas	1	-
Source Devices					
3	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**2**	**A**
4	Owner Furnished	KM	USB Keyboard & Mouse	2	-
Video Capture, Streaming and Conferencing					
5	CAE	ACC-LSEP20	Digital PTZ Camera	1	-
6	CAE	ACC-LSEP48	Optical PTZ Camera	3	-
7	Axis	T94P01L	Recessed Mount for AXIS M55 Series	1	-
8	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
Signal Processing, Routing, and Distribution					
9	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
Speech Reinforcement System/Audio Conferencing					
10	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
11	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
Sound Reinforcement System					
12	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	2	-
13	JBL	Control 14C/T	Two-Way 4" Coaxial Ceiling Loudspeaker	2	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1103, 1114**					
Type : **MSY02**					
Name : **Exam Large**					
Rm Qty : **2**					
Rack, Panels, Misc.					
14			Installation Materials as Defined in AV Systems Specification	Lot	
15			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
16			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
17			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
18			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
19			Control System Accessories as Needed	Lot	
20			Power Supplies and Power Distribution as Needed	Lot	
21			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1123**

Type : **MSY03**

Name : **Control / Monitoring - East, North & South**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Proctor Station (1)					
1	NEC	M491	**49" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	3	-
2	Chief	TS325T	Medium THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	3	-
3	NEC	EA271U-BK	27" 4K UHD Widescreen Desktop Monitor w/ USB-C	2	-
4	Chief	TS118SU	Small THINSTALL Dual Swing Arm Wall Display Mount - 18" Extension	2	-
5	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	2	A
6	HP	Z2 Mini G5	Performance Workstation, Windows 10 Pro, Intel I7, 16GB RAM, N-Vidia Quadro w/ 4 outputs	3	-
7	Owner Furnished	KM	USB Keyboard & Mouse	2	-
8	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
9	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
10	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
11	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
12	Mpow	MPBH209AH-US	EG3 Gaming Headphones, 50mm Driver, Stereo Over-Ear USB Computer Headset with Noise Cancelling Mic, Easy Volume/Mic Control for PC, Mac	1	-
13	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	2	-
14	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
15	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
16	QSC Audio	MP-A20V	2-CH, 200W @ 4/8Ohm, 70/100V Audio Amplifier	1	-
17	Crestron	TS-1070-x-S	10" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
18	Tripp-Lite	B006-VU4-R	4-Port Desktop KVM Switch	1	-
19	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
20	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
21	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
22	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
Observer Station (14)					
23	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	14	A
24	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	14	A
25	Owner Furnished	KM	USB Keyboard & Mouse	14	-
26	Mpow	MPBH209AH-US	EG3 Gaming Headphones, 50mm Driver, Stereo Over-Ear USB Computer Headset with Noise Cancelling Mic, Easy Volume/Mic Control for PC, Mac	14	-
27	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	14	D
28	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	7	-
29	MinuteMan	SNMP-NV6	Remote Power Management Adapter	7	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1123**					
Type : **MSY03**					
Name : **Control / Monitoring - East, North & South**					
Rm Qty : **1**					
Rack, Panels, Misc.					
30			Installation Materials as Defined in AV Systems Specification	Lot	
31			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
32			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
33			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
34			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
35			Control System Accessories as Needed	Lot	
36			Power Supplies and Power Distribution as Needed	Lot	
37			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1100, 1101, 1107, 1111, 1112, 1121**

Type : **MSY04**

Name : **SP Area Corridors & Reception**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Reception 1130					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	**Chief**	**Articulating Monitor Mount**	**Contractor Selected Articulating Arm Monitor Mount**	**1**	**-**
3	Owner Furnished	DMP	Digital Media Player (OFCI)	1	A
4	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
5	JBL	PSB-1	2.0 Channel Soundbar	1	-
6	JBL	Control 65 P/T	5.25" Compact Full Range Pendant Loudspeaker 8?/70v	4	-
7	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
8	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
SP Corridors					
9	CAE	ACC-LSEP48	Optical PTZ Camera	7	-
10	Axis	T94P01L	Recessed Mount for AXIS M55 Series	7	-
11	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	26	-
Student Corridors					
12	CAE	ACC-LSEP48	Optical PTZ Camera	6	-
13	Axis	T94P01L	Recessed Mount for AXIS M55 Series	6	-
14	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	26	-
Rack, Panels, Misc.					
15			Installation Materials as Defined in AV Systems Specification	Lot	
16			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
17			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
18			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
19			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
20			Control System Accessories as Needed	Lot	
21			Power Supplies and Power Distribution as Needed	Lot	
22			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1125**
Type : **MSY05**
Name : **SP Lounge**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	Ergotron	LX Desk Mount Series	Contractor Selected Articulating Arm Monitor Mount	1	-
2	NEC	V864Q	86" Ultra High Definition Professional Display	1	-
3	Chief	CSMP9X12	Component Storage Panel For Mounting Devices to the Wall Behind a Display	1	-
4	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
Source Devices					
5	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**1**	**A**
6	Owner Furnished	KM	USB Keyboard & Mouse	1	-
Video Capture, Streaming and Conferencing					
7	CAE	ACC-LSEP20	Digital PTZ Camera	2	-
8	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	1	-
9	Vaddio	RoboShot 20 UHD OneLink HDMI System	UHD PTZ Camera & Receiver - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	1	-
10	Vaddio	AV Bridge Mini	HD Video and Audio to USB Bridge for Web Conferencing	1	-
Signal Processing, Routing, and Distribution					
11	**Crestron**	**DM-NVX-360**	**DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity**	**2**	**-**
12	**Crestron**	**DM-NVX-351**	**DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing**	**1**	**-**
Speech Reinforcement System/Audio Conferencing					
13	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
14	AKG	GN30E	12" Gooseneck with XLR Connector	1	-
15	AKG	CK80	HyperCardioid Shotgun Microphone Capsule - Speech Optimized	1	-
16	Shure	QLXD14/85	Combination System w/WI185 Lavalier Element and QLXD1 Bodypack and QLXD4 Receiver	1	-
17	Shure	SBC200-US	Dual Docking Recharging Station (w/Power Supply)	1	-
18	Shure	SB900B	Lithium-Ion Rechargeable Battery	2	-
19	Shure	MXA910W-US	Microflex Advance Ceiling Array Microphone, Dante (New US Version)	1	-
Sound Reinforcement System					
20	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
21	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
22	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
23	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1125**					
Type : **MSY05**					
Name : **SP Lounge**					
Rm Qty : **1**					
Control System					
24	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
25	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D
Rack, Panels, Misc.					
26	**Middle Atlantic**	**L5 Series Lectern**	**Lectern (coordinate with owner and archtect for configuation and finish)**	**1**	**D**
27	**Crestron**	**FT2-202-MECH-X**	**Flip Top FT2 Series, 202 Size, Mechanical**	**1**	**D**
28	**Crestron**	**FT2A-PLT-PT-10**	**Cable Pass-Through Plate Modules for FT2 Series, Qty. 10**	**LOT**	**-**
29			Installation Materials as Defined in AV Systems Specification	Lot	
30			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
31			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
32			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
33			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
34			Control System Accessories as Needed	Lot	
35			Power Supplies and Power Distribution as Needed	Lot	
36			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1043, 1045, 1048, 1051, 1052**

Type : **MSY06**

Name : **Briefing Type 1**

Rm Qty : **5**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	NEC	V754Q	75" Ultra High Definition Professional Display	1	-
2	Chief	CSMP9X12	Component Storage Panel For Mounting Devices to the Wall Behind a Display	1	-
3	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
Source Devices					
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
Video Capture, Streaming and Conferencing					
6	**CAE**	**ACC-LSEP20**	**Digital PTZ Camera**	**1**	-
7	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
8	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	-
9	Crestron	UC-SB1-CAM	UC Video Conference Smart Sound Bar & Camera	1	-
10	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
11	Huddly	Canvas	Whiteboard Content Camera Kit - USB AI Whiteboard Camera with Ethernet Extender	1	-
Signal Processing, Routing, and Distribution					
12	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
13	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	4	-
Speech Reinforcement System/Audio Conferencing					
14	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
15	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
Sound Reinforcement System					
16	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
17	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
18	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
19	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
20	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1043, 1045, 1048, 1051, 1052**

Type : **MSY06**

Name : **Briefing Type 1**

Rm Qty : **5**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
21	Spectrum Industries	55497-323	3-Bay Slim Credenza with Solid Doors with CamLocks	1	-
22	Spectrum Industries	0	Vertical Rack Mount, 3U	1	-
23	Middle Atlantic	PD-915R	Horizontal Power Distribution, (9) Outlet,15A, Basic Surge	1	-
24	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
25	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
26	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
27	Crestron	FT2-202-MECH-X	Flip Top FT2 Series, 202 Size, Mechanical	2	D
28	Crestron	FT2A-PLT-PT-10	Cable Pass-Through Plate Modules for FT2 Series, Qty. 10	LOT	-
29			Installation Materials as Defined in AV Systems Specification	Lot	
30			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
31			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
32			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
33			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
34			Control System Accessories as Needed	Lot	
35			Power Supplies and Power Distribution as Needed	Lot	
36			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1148**					
Type : **MSY07**					
Name : **Briefing Type 2**					
Rm Qty : **1**					
Display Devices					
1	NEC	V754Q	75" Ultra High Definition Professional Display	1	-
2	Chief	CSMP9X12	Component Storage Panel For Mounting Devices to the Wall Behind a Display	1	-
3	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
Source Devices					
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
Video Capture, Streaming and Conferencing					
6	**CAE**	**ACC-LSEP20**	**Digital PTZ Camera**	**1**	-
7	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
8	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	**-**
9	Crestron	UC-SB1-CAM	UC Video Conference Smart Sound Bar & Camera	1	-
10	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
11	Huddly	Canvas	Whiteboard Content Camera Kit - USB AI Whiteboard Camera with Ethernet Extender	1	-
12	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
Signal Processing, Routing, and Distribution					
13	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
14	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
Speech Reinforcement System/Audio Conferencing					
15	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
16	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
Sound Reinforcement System					
17	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
18	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
19	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
20	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
21	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1148**					
Type : **MSY07**					
Name : **Briefing Type 2**					
Rm Qty : **1**					
Rack, Panels, Misc.					
22	Spectrum Industries	55497-323	3-Bay Slim Credenza with Solid Doors with CamLocks	1	-
23	Spectrum Industries	0	Vertical Rack Mount, 3U	1	-
24	Middle Atlantic	PD-915R	Horizontal Power Distribution, (9) Outlet,15A, Basic Surge	1	-
25	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
26	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
27	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
28	Crestron	FT2-202-MECH-X	Flip Top FT2 Series, 202 Size, Mechanical	1	D
29	Crestron	FT2A-PLT-PT-10	Cable Pass-Through Plate Modules for FT2 Series, Qty. 10	LOT	-
30			Installation Materials as Defined in AV Systems Specification	Lot	
31			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
32			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
33			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
34			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
35			Control System Accessories as Needed	Lot	
36			Power Supplies and Power Distribution as Needed	Lot	
37			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1123**
Type : **MSY08**
Name : **Control / Monitoring - West**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	2	A
2	LG	49UH5x	49" Professional LED Edge-Lit Display w/Built-In Speakers and Tuner, 3840x2160 Native (Latest Model)	2	-
3	Chief	TS325T	Medium THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	2	-
Source Devices					
4	Owner Furnished	KM	USB Keyboard & Mouse	2	-
5	HP	Z2 Mini G5	Performance Workstation, Windows 10 Pro, Intel I7, 16GB RAM, N-Vidia Quadro w/ 4 outputs	2	-
Video Capture, Streaming and Conferencing					
6	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
Speech Reinforcement System/Audio Conferencing					
7	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
8	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
Sound Reinforcement System					
9	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
10	Mpow	MPBH209AH-US	EG3 Gaming Headphones, 50mm Driver, Stereo Over-Ear USB Computer Headset with Noise Cancelling Mic, Easy Volume/Mic Control for PC, Mac	1	-
11	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	2	-
12	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
13	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
Control System					
14	Crestron	TS-1070-x-S	10" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1123**					
Type : **MSY08**					
Name : **Control / Monitoring - West**					
Rm Qty : **1**					
Rack, Panels, Misc.					
15	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
16	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
17	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
18	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
19			Installation Materials as Defined in AV Systems Specification	Lot	
20			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
21			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
22			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
23			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
24			Control System Accessories as Needed	Lot	
25			Power Supplies and Power Distribution as Needed	Lot	
26			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1160**					
Type : **MSY09**					
Name : **Overflow Resuscitation**					
Rm Qty : **1**					
Display Devices					
1	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
2	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
3	NEC	V864Q	86" Ultra High Definition Professional Display	1	-
4	Chief	CSMP9X12	Component Storage Panel For Mounting Devices to the Wall Behind a Display	2	-
5	NEC	M491	**49" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
6	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	2	-
Source Devices					
7	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
8	Owner Furnished	KM	USB Keyboard & Mouse	1	-
9	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	4	A
10	Ergotron	45-383-026	LX HD Sit-Stand Wall Arm (Heavy Monitor Mount)	4	D
11	Owner Furnished	Manikin	Simulation Manikin (OFOI)	4	B
12	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	**-**
Video Capture, Streaming and Conferencing					
13	CAE	ACC-LSEP20	Digital PTZ Camera	4	-
14	CAE	ACC-LSEP48	Optical PTZ Camera	8	-
15	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
16	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**2**	**A**
17	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	2	-
Signal Processing, Routing, and Distribution					
18	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
19	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	5	-
Speech Reinforcement System/Audio Conferencing					
20	Shure	MX202x/S	Hanging Mini-Condenser Super-Cardioid Mic, w/Cable, In-Line Preamp	4	D
21	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
22	CAE / Axis	P8221	Learning Space Digital Audio Interface	5	-

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1160**					
Type : **MSY09**					
Name : **Overflow Resuscitation**					
Rm Qty : **1**					
Sound Reinforcement System					
23	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	5	-
24	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
25	JBL	Control 14C/T	Two-Way 4" Coaxial Ceiling Loudspeaker	5	D
26	JBL	PSB-1	2.0 Channel Soundbar	1	-
Control System					
27	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
Rack, Panels, Misc.					
28			Installation Materials as Defined in AV Systems Specification	Lot	
29			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
30			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
31			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
32			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
33			Control System Accessories as Needed	Lot	
34			Power Supplies and Power Distribution as Needed	Lot	
35			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1057, 1058, 1059**					
Type : **MSY10**					
Name : **Ed Bed Nook, Major Resuscitation & Emergency Common**					
Rm Qty : **1**					
Display Devices					
1	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	2	A
2	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	2	-
Source Devices					
3	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	2	A
4	Owner Furnished	KM	USB Keyboard & Mouse	2	-
5	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	3	A
6	Ergotron	45-383-026	LX HD Sit-Stand Wall Arm (Heavy Monitor Mount)	3	D
7	Owner Furnished	Manikin	Simulation Manikin (OFOI)	3	B
Video Capture, Streaming and Conferencing					
8	CAE	ACC-LSEP20	Digital PTZ Camera	3	-
9	CAE	ACC-LSEP48	Optical PTZ Camera	8	-
10	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	2	-
11	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**2**	**A**
12	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	2	-
Signal Processing, Routing, and Distribution					
13	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
14	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
Speech Reinforcement System/Audio Conferencing					
15	Shure	MX202x/S	Hanging Mini-Condenser Super-Cardioid Mic, w/Cable, In-Line Preamp	3	D
16	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
17	CAE / Axis	P8221	Learning Space Digital Audio Interface	4	-
Sound Reinforcement System					
18	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	4	-
19	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
20	JBL	Control 14C/T	Two-Way 4" Coaxial Ceiling Loudspeaker	4	D

Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **1057, 1058, 1059**

Type : **MSY10**

Name : **Ed Bed Nook, Major Resuscitation & Emergency Common**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
21			Installation Materials as Defined in AV Systems Specification	Lot	
22			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
23			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
24			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
25			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
26			Control System Accessories as Needed	Lot	
27			Power Supplies and Power Distribution as Needed	Lot	
28			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1044/1046**					
Type : **MSY11**					
Name : **Classroom - Divisible**					
Rm Qty : **1**					
Display Devices					
1	Ergotron	LX Desk Mount Series	Contractor Selected Articulating Arm Monitor Mount	1	-
2	Christie	DHD850-GS	7,200 ANSI Lumen, 1-Chip DLP, Laser-Phosphor Light Source, Bold Color, 1920x1080, Lens Not Included	2	D
3	Chief	Projector Mounting Hardware	Contractor Selected Projector Mounting Hardware as Needed	2	D
4	Contractor Select	Contractor Select Extension Column	Contractor Selected Projector Extension Column for Above	2	D
5	Contractor Select	Contractor Select Projector Trim/Escutcheon Ring	Contractor Selected Projector Trim/Escutcheon Ring for Above	2	D
Source Devices					
6	Owner Furnished	Workstation - AIO	Owner Furnished All-In-One PC (OFCI)	2	A
7	Owner Furnished	KM	USB Keyboard & Mouse	2	-
8	Vaddio	RoboShot 20 UHD OneLink HDMI System	UHD PTZ Camera & Receiver - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	2	-
9	Vaddio	AV Bridge Mini	HD Video and Audio to USB Bridge for Web Conferencing	2	-
Video Capture, Streaming and Conferencing					
10	CAE	ACC-LSEP20	Digital PTZ Camera	4	-
11	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	2	-
Signal Processing, Routing, and Distribution					
12	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	**4**	-
13	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	**2**	-
14	**Crestron**	**DM-NVX-351**	**DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing**	**2**	**-**
Speech Reinforcement System/Audio Conferencing					
15	AKG	GN30E	12" Gooseneck with XLR Connector	2	-
16	AKG	CK80	HyperCardioid Shotgun Microphone Capsule - Speech Optimized	2	-
17	Shure	QLXD14/85	Combination System w/WI185 Lavalier Element and QLXD1 Bodypack and QLXD4 Receiver	2	-
18	Shure	SBC200-US	Dual Docking Recharging Station (w/Power Supply)	2	-
19	Shure	SB900B	Lithium-Ion Rechargeable Battery	4	-
20	Shure	MXA910W-US	Microflex Advance Ceiling Array Microphone, Dante (New US Version)	4	-

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1044/1046**					
Type : **MSY11**					
Name : **Classroom - Divisible**					
Rm Qty : **1**					
Sound Reinforcement System					
21	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	2	-
22	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	18	-
23	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	4	-
Control System					
24	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D
25	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	2	D
26	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	2	-
Rack, Panels, Misc.					
27	**Middle Atlantic**	**L5 Series Lectern**	**Lectern (coordinate with owner and archtect for configuation and finish)**	**2**	**D**
28	**Crestron**	**FT2-202-MECH-X**	**Flip Top FT2 Series, 202 Size, Mechanical**	**2**	**D**
29	**Crestron**	**FT2A-PLT-PT-10**	**Cable Pass-Through Plate Modules for FT2 Series, Qty. 10**	**LOT**	**-**
30	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	2	-
31	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	2	-
32			Installation Materials as Defined in AV Systems Specification	Lot	
33			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
34			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
35			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
36			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
37			Control System Accessories as Needed	Lot	
38			Power Supplies and Power Distribution as Needed	Lot	
39			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1138**					
Type : **MSY12**					
Name : **AV**					
Rm Qty : **1**					
Video Capture, Streaming and Conferencing					
1	CAE	ACC-LSEP02	LearningSpace Enterprise Package - Application Server, 2 Video Capture Servers for up to 30 devices 36TB storage (3 TOTAL), Yr1 support & Maint- incl perptual software license	1	-
2	CAE	Enterprise Connect Servers	Video Capture Server for up to 10 Streams	**17**	-
3	CAE	DCU	Digital Capture Unit, HD to IP Encoder	32	-
4	Axis	T8415	Wireless Installation Tool	1	-
Signal Processing, Routing, and Distribution					
5	Crestron	DMF-CI-8	DigitalMedia Card Chassis for DM-NVX-C & DMCF (8 Cards)	5	-
6	Crestron	DM-NVX-360C	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity - Card	32	-
7	Crestron	DM-NVX-D30C	DM 4K60 4:4:4 HDR Network AV Decoder, Card	7	-
8	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
9	Crestron	DM-NVX-E30C	DM 4K60 4:4:4 HDR Network AV Encoder, Card	1	-
10	TV-One	CorioView MWP-8H-1Y	4K Multi-Window Processor, 8 HDMI In	1	-
11	Cisco	C9300L-48PF-4X-E	Cisco Catalyst 9300L 48 Port Full PoE+, 1100w, 4x10G Uplink, Stackable, Managed Network Switch (BOD, CONFIRM W/OWNER) (OFCI)	5	A
12	Cisco	C9300L-STACK-KIT	Stack Kit for C9300L-Two Data Stack Adapters and One Data Stack Cable (OFCI)	5	A
13	Owner Furnished	Ethernet Switch	Owner Standard Ethernet Switch, 48P, PoE+ (OFOI)	3	B
14	**Contractor Select/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**8**	**-**
15	Contractor Select	Horizontal Cable Manager	Horizontal Cable Manager - Size as Needed for Capacity, Comply w/ University Standards	8	-
Speech Reinforcement System/Audio Conferencing					
16	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
Sound Reinforcement System					
17	QSC Audio	Q-SYS CORE 510i	Audio DSP Frame Core w/8 I/O Card Slots Support 128 x 128 Ch., 256 x 256 Q-SYS Channels, 16 Configurable GPIO, 64 AEC Processors	1	-
18	QSC Audio	Q-SYS CDN64	64x64 Dante Audio Bridge Card	1	-
19	QSC Audio	Q-SYS COL4	4-Channel Line Output Card	1	-
20	QSC Audio	SL-QSE-510-P	QSC Core 510 Scripting Engine Software License	1	-

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1138**					
Type : **MSY12**					
Name : **AV**					
Rm Qty : **1**					
Control System					
21	Crestron	AV4	4-Series Integrated Controller, (6) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN	1	-
22	**Crestron**	**DM-NVX-DIR-160**	**DigitalMedia NVX Director – Virtual Switching Appliance for 160 Endpoints**	**1**	**-**
Rack, Panels, Misc.					
23	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	4	-
24	Middle Atlantic	BGR-552FT-FC	BGR-Series Fan top, 552 CFM, w/Controller	4	-
25	Middle Atlantic	BGR-RR45	BGR-Series 45RU, Rear Rack Rail Kit	4	-
26	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
27	Middle Atlantic	PDT-1220C-NS	Vertical Power Distribution Strip, (12) Outlet, 20A	8	-
28	MinuteMan	ED2000RTXL2U	UPS with power conditioning 2U 2000VA/1800W 120 VAC Rack/Wall/Tower mountable	14	-
29	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	14	-
30	MinuteMan	SNMP-NV6	Remote Power Management Adapter	14	-
31			Installation Materials as Defined in AV Systems Specification	Lot	
32			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
33			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
34			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
35			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
36			Control System Accessories as Needed	Lot	
37			Power Supplies and Power Distribution as Needed	Lot	
38			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **1024/1026**

Type : **MSY13**

Name : **Conference & Flex (Divisible)**

Rm Qty : **1**

Display Devices

1	Ergotron	LX Desk Mount Series	Contractor Selected Articulating Arm Monitor Mount	2	-
2	Christie	DHD850-GS	7,200 ANSI Lumen, 1-Chip DLP, Laser-Phosphor Light Source, Bold Color, 1920x1080, Lens Not Included	2	D
3	Chief	Projector Mounting Hardware	Contractor Selected Projector Mounting Hardware as Needed	2	D
4	Contractor Select	Contractor Select Extension Column	Contractor Selected Projector Extension Column for Above	2	D
5	Contractor Select	Contractor Select Projector Trim/Escutcheon Ring	Contractor Selected Projector Trim/Escutcheon Ring for Above	2	D

Source Devices

6	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**2**	**A**
7	Owner Furnished	KM	USB Keyboard & Mouse	2	-
8	Vaddio	RoboShot 20 UHD OneLink HDMI System	UHD PTZ Camera & Receiver - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	2	-
9	Vaddio	AV Bridge Mini	HD Video and Audio to USB Bridge for Web Conferencing	2	-

Video Capture, Streaming and Conferencing

10	CAE	ACC-LSEP20	Digital PTZ Camera	4	-
11	Crestron	AM-3200	AirMedia Wireless Presentation Gateway	2	-
12	CAE	DCU	Digital Capture Unit, HD to IP Encoder	2	-

Signal Processing, Routing, and Distribution

13	Crestron	DMF-CI-8	DigitalMedia Card Chassis for DM-NVX-C & DMCF (8 Cards)	1	-
14	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	**4**	-
15	Crestron	DM-NVX-360C	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity - Card	2	-
16	Crestron	DM-NVX-E30C	DM 4K60 4:4:4 HDR Network AV Encoder, Card	**2**	-
17	**Crestron**	**DM-NVX-351**	**DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing**	**2**	**-**

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Audiovisual Systems Bidding Equipment List

Number : **1024/1026**

Type : **MSY13**

Name : **Conference & Flex (Divisible)**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Speech Reinforcement System/Audio Conferencing					
18	AKG	GN30E	12" Gooseneck with XLR Connector	2	-
19	AKG	CK80	HyperCardioid Shotgun Microphone Capsule - Speech Optimized	2	-
20	Shure	QLXD14/85	Combination System w/WI185 Lavalier Element and QLXD1 Bodypack and QLXD4 Receiver	2	-
21	Shure	SBC200-US	Dual Docking Recharging Station (w/Power Supply)	2	-
22	Shure	SB900B	Lithium-Ion Rechargeable Battery	4	-
23	Shure	MXA910W-US	Microflex Advance Ceiling Array Microphone, Dante (New US Version)	4	-
Sound Reinforcement System					
24	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	2	-
25	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	18	-
26	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	2	-
Control System					
27	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D
28	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	2	D
29	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	2	-

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1024/1026**					
Type : **MSY13**					
Name : **Conference & Flex (Divisible)**					
Rm Qty : **1**					
Rack, Panels, Misc.					
30	**Middle Atlantic**	**L5 Series Lectern**	**Lectern (coordinate with owner and archtect for configuation and finish)**	**2**	**D**
31	**Crestron**	**FT2-202-MECH-X**	**Flip Top FT2 Series, 202 Size, Mechanical**	**2**	**D**
32	**Crestron**	**FT2A-PLT-PT-10**	**Cable Pass-Through Plate Modules for FT2 Series, Qty. 10**	**LOT**	**-**
33	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	2	-
34	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	2	-
35	MinuteMan	SNMP-NV6	Remote Power Management Adapter	2	-
36			Installation Materials as Defined in AV Systems Specification	Lot	
37			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
38			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
39			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
40			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
41			Control System Accessories as Needed	Lot	
42			Power Supplies and Power Distribution as Needed	Lot	
43			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1120**					
Type : **MSY14**					
Name : **Med Mall Collab**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	3	-
2	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	3	-
3	Chief	CSMP9X12	Component Storage Panel For Mounting Devices to the Wall Behind a Display	3	-
Source Devices					
4	Owner Furnished	DMP	Digital Media Player (OFCI)	3	A
Video Capture, Streaming and Conferencing					
5	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	**-**
Rack, Panels, Misc.					
6			Installation Materials as Defined in AV Systems Specification	Lot	
7			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
8			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
9			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
10			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
11			Control System Accessories as Needed	Lot	
12			Power Supplies and Power Distribution as Needed	Lot	
13			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1021, 1022, 1023, 1025**					
Type : **MSY15**					
Name : **Lab (Med Mall)**					
Rm Qty : **4**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	Chief	LPAUx	Large FUSION Manual Height Adjustable Mobile AV Cart	1	-
Source Devices					
3	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**1**	**A**
4	Owner Furnished	KM	USB Keyboard & Mouse	1	-
5	CONTRACTOR SELECT	Contractor Select	Computer Workstation Cart	1	-
Video Capture, Streaming and Conferencing					
6	CAE	ACC-LSEP48	Optical PTZ Camera	4	-
7	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
Signal Processing, Routing, and Distribution					
8	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	**1**	-
9	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	**4**	-
10	**Crestron**	**DM-NVX-351**	**DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing**	**1**	**-**
Speech Reinforcement System/Audio Conferencing					
11	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
12	Mpow	MPBH209AH-US	EG3 Gaming Headphones, 50mm Driver, Stereo Over-Ear USB Computer Headset with Noise Cancelling Mic, Easy Volume/Mic Control for PC, Mac	1	-
13	Shure	MXA910W-US	Microflex Advance Ceiling Array Microphone, Dante (New US Version)	2	-
Sound Reinforcement System					
14	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	-
15	JBL	PSB-1	2.0 Channel Soundbar	1	-
16	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
17	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
18	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1021, 1022, 1023, 1025**					
Type : **MSY15**					
Name : **Lab (Med Mall)**					
Rm Qty : **4**					
Rack, Panels, Misc.					
19	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
20	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
21	**CONTRACTOR SELECT**	**Contractor Select**	**Computer Workstation Cart**	**1**	**-**
22			Installation Materials as Defined in AV Systems Specification	Lot	
23			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
24			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
25			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
26			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
27			Control System Accessories as Needed	Lot	
28			Power Supplies and Power Distribution as Needed	Lot	
29			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1007**					
Type : **MSY16**					
Name : **AV (Med Mall)**					
Rm Qty : **1**					
Signal Processing, Routing, and Distribution					
1	Cisco	C9300L-48PF-4X-E	Cisco Catalyst 9300L 48 Port Full PoE+, 1100w, 4x10G Uplink, Stackable, Managed Network Switch (BOD, CONFIRM W/OWNER) (OFCI)	2	A
2	Cisco	C9300L-STACK-KIT	Stack Kit for C9300L-Two Data Stack Adapters and One Data Stack Cable (OFCI)	2	A
3	**Contractor Select/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**2**	**-**
4	Contractor Select	Horizontal Cable Manager	Horizontal Cable Manager - Size as Needed for Capacity, Comply w/ University Standards	2	-
Speech Reinforcement System/Audio Conferencing					
5	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
Sound Reinforcement System					
6	QSC Audio	Q-SYS CORE 510i	Audio DSP Frame Core w/8 I/O Card Slots Support 128 x 128 Ch., 256 x 256 Q-SYS Channels, 16 Configurable GPIO, 64 AEC Processors	1	-
7	QSC Audio	Q-SYS CDN64	64x64 Dante Audio Bridge Card	1	-
8	QSC Audio	SL-QSE-510-P	QSC Core 510 Scripting Engine Software License	1	-
9	QSC Audio	Q-SYS COL4	4-Channel Line Output Card	1	-
Control System					
10	**Crestron**	**CP4N**	**4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet**	**1**	**-**

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **1007**					
Type : **MSY16**					
Name : **AV (Med Mall)**					
Rm Qty : **1**					
Rack, Panels, Misc.					
11	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
12	Middle Atlantic	BGR-552FT-FC	BGR-Series Fan top, 552 CFM, w/Controller	1	-
13	Middle Atlantic	BGR-RR45	BGR-Series 45RU, Rear Rack Rail Kit	1	-
14	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
15	Middle Atlantic	PDT-1220C-NS	Vertical Power Distribution Strip, (12) Outlet, 20A	2	-
16	MinuteMan	ED2000RTXL2U	UPS with power conditioning 2U 2000VA/1800W 120 VAC Rack/Wall/Tower mountable	2	-
17	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	2	-
18	MinuteMan	SNMP-NV6	Remote Power Management Adapter	2	-
19			Installation Materials as Defined in AV Systems Specification	Lot	
20			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
21			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
22			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
23			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
24			Control System Accessories as Needed	Lot	
25			Power Supplies and Power Distribution as Needed	Lot	
26			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2051/2064, 2053/2062, 2055/2060, 2057/2058, 2067/2065, 2071/2069**

Type : **MSY17**

Name : **Surg Sim & Control Station**

Rm Qty : **6**

Simulation Room

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	1	-
2	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
3	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Owner Furnished	KM	USB Keyboard & Mouse	1	-
6	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
7	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
8	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	1	-
9	Ergotron	24-818-211	StyleView Pole Cart	1	-
10	Ergotron	80-107-216	Mini PC Mount	1	-
11	Owner Furnished	Patient Monitor	Owner Furnished Patient Monitor (OFOI)	1	B
12	CAE	ACC-LSEP48	Optical PTZ Camera	5	-
13	Owner Furnished	Manikin	Simulation Manikin (OFOI)	1	B
14	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	5	-
15	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	6	-
16	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	3	D
17	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
18	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
19	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes

Number : **2051/2064, 2053/2062, 2055/2060, 2057/2058, 2067/2065, 2071/2069**

Type : **MSY17**

Name : **Surg Sim & Control Station**

Rm Qty : **6**

20	Owner Furnished	Owner Furnished	VoIP Desktop Phone (OFCI)	1	A
21	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
22	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
23	QSC Audio	unD4I-L	4 Channel Mic/Line In, Dante/AES67 Interface w/ Logic I/O, PoE	1	-
24	Stewart Audio	CVA16-1-CV-D	Single-Channel Dante Subcompact PoE+ Amplifier - 16W x 1 @ 70V/100V	1	-
25	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
26	JBL	Control 16C/T	Two-Way 6.5" Coaxial Ceiling Loudspeaker	2	D
27	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - Single - Sold in Pairs	1	-
28	Crestron	TSW-1070-x-S	10" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
29	Crestron	TSW-770/1070-MSMK-ANG-B-S	Multisurface Mount Kit for TSW-770 and TSW-1070 Series	1	-
30	Ergotron	MX Mini Wall Arm	Light Monitor or Tablet Mount Articulating Wall Mount Arm	1	D,E

Nurse Call

31	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	1	-
32	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
33	E-Switch	PVA Series	Illuminated Pushbutton Switch - RGB LED option - Momentary contact	2	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2051/2064, 2053/2062, 2055/2060, 2057/2058, 2067/2065, 2071/2069**

Type : **MSY17**

Name : **Surg Sim & Control Station**

Rm Qty : **6**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Control Station					
34	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
35	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
36	Owner Furnished	KM	USB Keyboard & Mouse	1	-
37	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
38	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control)	1	-
39	CAE	ACC-LSEP17	LearningSpace SIM Integration Bridge	1	-
40	CAE	DCU	Digital Capture Unit, HD to IP Encoder	2	-
41	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	4	-
42	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
43	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
44	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
45	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
46	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
47	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
48	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
49	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
50	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
51	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
52	Crestron	TS-1070-x-S	10" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
53	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
54	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
55	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
56	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :	**2051/2064, 2053/2062, 2055/2060, 2057/2058, 2067/2065, 2071/2069**				
Type :	**MSY17**				
Name :	**Surg Sim & Control Station**				
Rm Qty :	**6**				
Rack, Panels, Misc.					
57			Installation Materials as Defined in AV Systems Specification	Lot	
58			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
59			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
60			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
61			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
62			Control System Accessories as Needed	Lot	
63			Power Supplies and Power Distribution as Needed	Lot	
64			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2029**					
Type : **MSY18**					
Name : **Briefing Type 3**					
Rm Qty : **1**					
Display Devices					
1	NEC	V754Q	75" Ultra High Definition Professional Display	1	-
Source Devices					
2	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
3	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
Video Capture, Streaming and Conferencing					
4	**CAE**	**ACC-LSEP20**	**Digital PTZ Camera**	**1**	-
5	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
6	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	-
7	Crestron	UC-SB1-CAM	UC Video Conference Smart Sound Bar & Camera	1	-
8	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
9	Huddly	Canvas	Whiteboard Content Camera Kit - USB AI Whiteboard Camera with Ethernet Extender	1	-
Signal Processing, Routing, and Distribution					
10	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
11	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	4	-
Speech Reinforcement System/Audio Conferencing					
12	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
13	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
Sound Reinforcement System					
14	QSC Audio	QSYS Core Nano	Audio, Video & Control Processor (8) AEC, USB Bridge, 8x8 Dante (up to 32x32 Dante), (2) RS-232 Ports, (2) VoIP	1	-
15	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
16	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
17	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
18	Crestron	CP4N	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN, Control Subnet	1	-
19	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
20	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D

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Audiovisual Systems Bidding Equipment List

Number : **2029**
Type : **MSY18**
Name : **Briefing Type 3**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
21	Spectrum Industries	55497-323	3-Bay Slim Credenza with Solid Doors with CamLocks	1	-
22	Spectrum Industries	0	Vertical Rack Mount, 3U	1	-
23	Middle Atlantic	PD-915R	Horizontal Power Distribution, (9) Outlet,15A, Basic Surge	1	-
24	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
25	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
26	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
27	Crestron	FT2-202-MECH-X	Flip Top FT2 Series, 202 Size, Mechanical	2	D
28	Crestron	FT2A-PLT-PT-10	Cable Pass-Through Plate Modules for FT2 Series, Qty. 10	LOT	-
29			Installation Materials as Defined in AV Systems Specification	Lot	
30			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
31			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
32			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
33			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
34			Control System Accessories as Needed	Lot	
35			Power Supplies and Power Distribution as Needed	Lot	
36			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2092, 2094, 2096**					
Type : **MSY19**					
Name : **Briefing Type 4**					
Rm Qty : **3**					
Display Devices					
1	NEC	V754Q	75" Ultra High Definition Professional Display	1	-
Source Devices					
2	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
3	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
Video Capture, Streaming and Conferencing					
4	**CAE**	**ACC-LSEP20**	**Digital PTZ Camera**	**1**	-
5	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
6	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**1**	**-**
7	Crestron	UC-SB1-CAM	UC Video Conference Smart Sound Bar & Camera	1	-
8	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
9	Huddly	Canvas	Whiteboard Content Camera Kit - USB AI Whiteboard Camera with Ethernet Extender	1	-
10	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
Signal Processing, Routing, and Distribution					
11	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
12	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
Speech Reinforcement System/Audio Conferencing					
13	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
14	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
Sound Reinforcement System					
15	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
16	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
17	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
18	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
19	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2092, 2094, 2096**

Type : **MSY19**

Name : **Briefing Type 4**

Rm Qty : **3**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
20	Spectrum Industries	55497-323	3-Bay Slim Credenza with Solid Doors with CamLocks	1	-
21	Spectrum Industries	0	Vertical Rack Mount, 3U	1	-
22	Middle Atlantic	PD-915R	Horizontal Power Distribution, (9) Outlet,15A, Basic Surge	1	-
23	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
24	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
25	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
26	Crestron	FT2-202-MECH-X	Flip Top FT2 Series, 202 Size, Mechanical	1	D
27	Crestron	FT2A-PLT-PT-10	Cable Pass-Through Plate Modules for FT2 Series, Qty. 10	LOT	-
28			Installation Materials as Defined in AV Systems Specification	Lot	
29			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
30			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
31			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
32			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
33			Control System Accessories as Needed	Lot	
34			Power Supplies and Power Distribution as Needed	Lot	
35			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2116**					
Type : **MSY20**					
Name : **Briefing Type 5**					
Rm Qty : **1**					
Display Devices					
1	NEC	V754Q	75" Ultra High Definition Professional Display	1	-
Source Devices					
2	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
3	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
Video Capture, Streaming and Conferencing					
4	**CAE**	**ACC-LSEP20**	**Digital PTZ Camera**	**1**	-
5	CAE	ACC-LSEP48	Optical PTZ Camera	1	-
6	Crestron	AM-3100-WF	AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity	1	-
7	Crestron	UC-SB1-CAM	UC Video Conference Smart Sound Bar & Camera	1	-
8	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
9	Huddly	Canvas	Whiteboard Content Camera Kit - USB AI Whiteboard Camera with Ethernet Extender	1	-
10	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
Signal Processing, Routing, and Distribution					
11	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
12	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
Speech Reinforcement System/Audio Conferencing					
13	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
14	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
Sound Reinforcement System					
15	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
16	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	4	-
17	Stewart Audio	CVA40-1-CV-D	Single-Channel Dante Subcompact PoE++ Amplifier 40W x 1 @ 70V/100V (60W Port Power or Injector) Plenum Rated, Supports AES67	1	-
Control System					
18	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
19	Crestron	TSS-770-x-S	7" Room Scheduling PoE+ Touch Screen	1	D

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Audiovisual Systems Bidding Equipment List

Number : **2116**
Type : **MSY20**
Name : **Briefing Type 5**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
20	Spectrum Industries	55497-323	3-Bay Slim Credenza with Solid Doors with CamLocks	1	-
21	Spectrum Industries	0	Vertical Rack Mount, 3U	1	-
22	Middle Atlantic	PD-915R	Horizontal Power Distribution, (9) Outlet,15A, Basic Surge	1	-
23	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
24	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
25	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
26	Crestron	FT2-202-MECH-X	Flip Top FT2 Series, 202 Size, Mechanical	1	D
27	Crestron	FT2A-PLT-PT-10	Cable Pass-Through Plate Modules for FT2 Series, Qty. 10	LOT	-
28			Installation Materials as Defined in AV Systems Specification	Lot	
29			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
30			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
31			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
32			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
33			Control System Accessories as Needed	Lot	
34			Power Supplies and Power Distribution as Needed	Lot	
35			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2104 / 2108 / 2106**

Type : **MSY21**

Name : **OR Sim & Control Station**

Rm Qty : **2**

Simulation Room

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
1	**NEC**	**M651**	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	**1**	**-**
2	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
3	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Owner Furnished	KM	USB Keyboard & Mouse	1	-
6	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
7	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
8	Owner Furnished	Patient Monitor	Owner Furnished Patient Monitor (OFOI)	1	B
9	CAE	ACC-LSEP48	Optical PTZ Camera	4	-
10	Owner Furnished	Manikin	Simulation Manikin (OFOI)	1	B
11	Owner Furnished	Manikin Support Rack	Manikin Support Rack (OFOI)	1	B
12	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
13	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
14	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	3	D
15	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
16	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
17	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
18	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
19	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
20	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
21	QSC Audio	unD4I-L	4 Channel Mic/Line In, Dante/AES67 Interface w/ Logic I/O, PoE	1	-
22	Stewart Audio	CVA16-1-CV-D	Single-Channel Dante Subcompact PoE+ Amplifier - 16W x 1 @ 70V/100V	1	-
23	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
24	JBL	Control 16C/T	Two-Way 6.5" Coaxial Ceiling Loudspeaker	2	D
25	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - Single - Sold in Pairs	1	-
26	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
27	Crestron	TSW-770/1070-MSMK-ANG-B-S	Multisurface Mount Kit for TSW-770 and TSW-1070 Series	1	-
28	Ergotron	MX Mini Wall Arm	Light Monitor or Tablet Mount Articulating Wall Mount Arm	1	D,E

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2104 / 2108 / 2106**					
Type : **MSY21**					
Name : **OR Sim & Control Station**					
Rm Qty : **2**					
Nurse Call					
29	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	1	-
30	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
31	E-Switch	PVA Series	Illuminated Pushbutton Switch - RGB LED option - Momentary contact	2	-
Control Station					
32	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
33	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
34	Owner Furnished	KM	USB Keyboard & Mouse	1	-
35	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
36	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control)	1	-
37	CAE	ACC-LSEP17	LearningSpace SIM Integration Bridge	1	-
38	CAE	DCU	Digital Capture Unit, HD to IP Encoder	2	-
39	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
40	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
41	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
42	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
43	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
44	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
45	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
46	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
47	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
48	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
49	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
50	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
51	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
52	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
53	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
54	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2104 / 2108 / 2106**					
Type : **MSY21**					
Name : **OR Sim & Control Station**					
Rm Qty : **2**					
Rack, Panels, Misc.					
55			Installation Materials as Defined in AV Systems Specification	Lot	
56			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
57			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
58			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
59			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
60			Control System Accessories as Needed	Lot	
61			Power Supplies and Power Distribution as Needed	Lot	
62			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2114/2112**

Type : **MSY22**

Name : **Sim LDR & Control Station**

Rm Qty : **1**

Simulation Room

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
1	**NEC**	**M551**	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	**1**	**-**
2	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
3	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Owner Furnished	KM	USB Keyboard & Mouse	1	-
6	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
7	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
8	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	2	-
9	Ergotron	45-353-026	LX Sit-Stand Wall Mount Arm	2	D
10	CAE	ACC-LSEP20	Digital PTZ Camera	1	-
11	CAE	ACC-LSEP48	Optical PTZ Camera	3	-
12	Owner Furnished	Manikin	Simulation Manikin (OFOI)	2	B
13	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	4	-
14	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
15	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	3	D
16	CAE / Axis	P8221	Learning Space Digital Audio Interface	2	-
17	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
18	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
19	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
20	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
21	QSC Audio	A4Mio	4x4 Channel Mic/Line I/O AES67 Interface, PoE	1	-
22	QSC Audio	unD4I-L	4 Channel Mic/Line In, Dante/AES67 Interface w/ Logic I/O, PoE	1	-
23	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
24	JBL	Control 16C/T	Two-Way 6.5" Coaxial Ceiling Loudspeaker	1	D
25	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - Single - Sold in Pairs	1	-
26	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2114/2112**

Type : **MSY22**

Name : **Sim LDR & Control Station**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Nurse Call					
27	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	1	-
28	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
29	E-Switch	PVA Series	Illuminated Pushbutton Switch - RGB LED option - Momentary contact	2	-
Control Station					
30	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
31	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
32	Owner Furnished	KM	USB Keyboard & Mouse	1	-
33	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	2	A
34	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control)	2	-
35	CAE	ACC-LSEP17	LearningSpace SIM Integration Bridge	2	-
36	CAE	DCU	Digital Capture Unit, HD to IP Encoder	2	-
37	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	5	-
38	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
39	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
40	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
41	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
42	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
43	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
44	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
45	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
46	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
47	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
48	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
49	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
50	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
51	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
52	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2114/2112**					
Type : **MSY22**					
Name : **Sim LDR & Control Station**					
Rm Qty : **1**					
Rack, Panels, Misc.					
53			Installation Materials as Defined in AV Systems Specification	Lot	
54			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
55			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
56			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
57			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
58			Control System Accessories as Needed	Lot	
59			Power Supplies and Power Distribution as Needed	Lot	
60			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

Number : **2101 / 2105 / 2103, 2110 / 2112, 2113 / 2117 / 2115, 2119 / 2123 / 2121**

Type : **MSY23**

Name : **Sim & Control Station A-G**

Rm Qty : **7**

Simulation Room

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
1	**NEC**	**M551**	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	**1**	**-**
2	Chief	Articulating Monitor Mount	Contractor Selected Articulating Arm Monitor Mount	1	-
3	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
4	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
5	Owner Furnished	KM	USB Keyboard & Mouse	1	-
6	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
7	Huddly	IQ w/ Mic	Auto-Framing Web Camera w/ Built-in Microphone	1	-
8	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	1	-
9	Ergotron	45-353-026	LX Sit-Stand Wall Mount Arm	1	D
10	CAE	ACC-LSEP20	Digital PTZ Camera	1	-
11	CAE	ACC-LSEP48	Optical PTZ Camera	2	-
12	Owner Furnished	Manikin	Simulation Manikin (OFOI)	1	B
13	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
14	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
15	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
16	CAE / Axis	P8221	Learning Space Digital Audio Interface	1	-
17	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
18	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
19	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
20	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
21	QSC Audio	A4Mio	4x4 Channel Mic/Line I/O AES67 Interface, PoE	1	-
22	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
23	JBL	Control 16C/T	Two-Way 6.5" Coaxial Ceiling Loudspeaker	1	D
24	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - Single - Sold in Pairs	1	-
25	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :	**2101 / 2105 / 2103, 2110 / 2112, 2113 / 2117 / 2115, 2119 / 2123 / 2121**				
Type :	**MSY23**				
Name :	**Sim & Control Station A-G**				
Rm Qty :	**7**				
Nurse Call					
26	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	1	-
27	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
28	E-Switch	PVA Series	Illuminated Pushbutton Switch - RGB LED option - Momentary contact	2	-
Control Station					
29	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
30	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
31	Owner Furnished	KM	USB Keyboard & Mouse	1	-
32	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
33	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control)	1	-
34	CAE	ACC-LSEP17	LearningSpace SIM Integration Bridge	1	-
35	CAE	DCU	Digital Capture Unit, HD to IP Encoder	1	-
36	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	3	-
37	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
38	**Owner Furnished**	**Owner Furnished**	**VoIP Desktop Phone (OFCI)**	**1**	**A**
39	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
40	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
41	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
42	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
43	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
44	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
45	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
46	M-Audio	BX4	4.5" 2-Way Powered Desktop Studio Loudspeakers (Pair)	1	-
47	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
48	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
49	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
50	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
51	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-

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Audiovisual Systems

Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2101 / 2105 / 2103, 2110 / 2112, 2113 / 2117 / 2115, 2119 / 2123 / 2121**					
Type : **MSY23**					
Name : **Sim & Control Station A-G**					
Rm Qty : **7**					
Rack, Panels, Misc.					
52			Installation Materials as Defined in AV Systems Specification	Lot	
53			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
54			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
55			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
56			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
57			Control System Accessories as Needed	Lot	
58			Power Supplies and Power Distribution as Needed	Lot	
59			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2120**					
Type : **MSY24**					
Name : **AV**					
Rm Qty : **1**					
Video Capture, Streaming and Conferencing					
1	CAE	LearnigSpace One	Capture Appliance (Capture Server)	**17**	-
2	Owner Furnished	Owner Furnished	VoIP Phone System Media Gateway Controller (OFCI)	1	A
Signal Processing, Routing, and Distribution					
3	Cisco	C9300L-48PF-4X-E	Cisco Catalyst 9300L 48 Port Full PoE+, 1100w, 4x10G Uplink, Stackable, Managed Network Switch (BOD, CONFIRM W/OWNER) (OFCI)	8	A
4	Cisco	C9300L-STACK-KIT	Stack Kit for C9300L-Two Data Stack Adapters and One Data Stack Cable (OFCI)	1	A
5	Owner Furnished	Ethernet Switch	Owner Standard Ethernet Switch, 48P, PoE+ (OFOI)	3	B
6	**Contractor Select/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**11**	**-**
7	Contractor Select	Horizontal Cable Manager	Horizontal Cable Manager - Size as Needed for Capacity, Comply w/ University Standards	11	-
Sound Reinforcement System					
8	QSC Audio	Q-SYS CORE 510i	Audio DSP Frame Core w/8 I/O Card Slots Support 128 x 128 Ch., 256 x 256 Q-SYS Channels, 16 Configurable GPIO, 64 AEC Processors	2	-
9	QSC Audio	Q-SYS CDN64	64x64 Dante Audio Bridge Card	2	-
10	QSC Audio	SL-QSE-510-P	QSC Core 510 Scripting Engine Software License	2	-
Control System					
11	Crestron	AV4	4-Series Integrated Controller, (6) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN	2	-
12	**Crestron**	**DM-NVX-DIR-ENT**	**DigitalMedia NVX Director – Virtual Switching Appliance, Enterprise Version**	**1**	**-**

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2120**					
Type : **MSY24**					
Name : **AV**					
Rm Qty : **1**					
Rack, Panels, Misc.					
13	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	4	-
14	Middle Atlantic	BGR-552FT-FC	BGR-Series Fan top, 552 CFM, w/Controller	4	-
15	Middle Atlantic	BGR-RR45	BGR-Series 45RU, Rear Rack Rail Kit	4	-
16	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	4	-
17	Middle Atlantic	PDT-1220C-NS	Vertical Power Distribution Strip, (12) Outlet, 20A	8	-
18	MinuteMan	ED2000RTXL2U	UPS with power conditioning 2U 2000VA/1800W 120 VAC Rack/Wall/Tower mountable	17	-
19	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	17	-
20	MinuteMan	SNMP-NV6	Remote Power Management Adapter	17	-
21			Installation Materials as Defined in AV Systems Specification	Lot	
22			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
23			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
24			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
25			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
26			Control System Accessories as Needed	Lot	
27			Power Supplies and Power Distribution as Needed	Lot	
28			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2130**					
Type : **MSY25**					
Name : **Interprofessional Clinical Training Lab**					
Rm Qty : **1**					
Display Devices					
1	NEC	M651	**65" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	8	-
2	NEC	M491	**49" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	20	-
3	Wacom	DTH-2452	23.8" Full-HD Pen Display with Multi-Touch Functionality	1	-
4	Ergotron	LX Desk Mount Series	Contractor Selected Articulating Arm Monitor Mount	1	-
Source Devices					
5	**Owner Furnished**	**Workstation - AIO**	**Owner Furnished All-In-One PC (OFCI)**	**1**	**A**
6	Owner Furnished	KM	USB Keyboard & Mouse	1	-
7	Extron	Cable Cubby 1202	Cable Enclosure, Flip Top, Basic, No Power Module	1	-
8	Extron	AC+USB 314 US, Cord	Power Modules for Cable Cubby Series - US (2) AC, (1) USBC, & (1) USBA Outlets	1	-
9	Owner Furnished	Laptop	Owner Furnished Laptop (OFCI)	2	A
10	Ergotron	SV10-1100-0	StyleView Laptop Cart	2	-
11	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	TBD	A
12	Ergotron	24-818-211	StyleView Pole Cart	LOT	-
13	Ergotron	80-107-216	Mini PC Mount	LOT	-
Video Capture, Streaming and Conferencing					
14	CAE	ACC-LSEP20	Digital PTZ Camera	4	-
15	CAE	ACC-LSEP48	Optical PTZ Camera	4	-
16	**Crestron**	**AM-3100-WF**	**AirMedia Series 3 Receiver 100 w/ WiFi Network Connectivity**	**2**	**-**
17	CAE	DCU	Digital Capture Unit, HD to IP Encoder	4	-

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Audiovisual Systems Bidding Equipment List

Number : **2130**

Type : **MSY25**

Name : **Interprofessional Clinical Training Lab**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Signal Processing, Routing, and Distribution					
18	Crestron	DMF-CI-8	DigitalMedia Card Chassis for DM-NVX-C & DMCF (8 Cards)	1	-
19	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	**28**	-
20	Crestron	DM-NVX-360C	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity - Card	6	-
21	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	**4**	-
22	Crestron	DM-NVX-E760	DM NVX 4K60 4:4:4 HDR Network AV Encoder with DM Input (PoE++/UPOE)	20	-
23	Crestron	DM-TX-4KZ-100-C-1G-x-T	DigitalMedia 8G+® 4K60 4:4:4 HDR Wall Plate Transmitter	20	D
24	**Crestron**	**DM-NVX-351**	**DM 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing**	**1**	**-**
25	Cisco	C9300L-48PF-4X-E	Cisco Catalyst 9300L 48 Port Full PoE+, 1100w, 4x10G Uplink, Stackable, Managed Network Switch (BOD, CONFIRM W/OWNER) (OFCI)	2	A
26	Cisco	STACK-T1-3M	StackWise 480 Stacking Cable, 3M (OFCI)	2	A
27	**Contractor Select/ Owner Approved**	**48-Port Data Patch Panel**	**Contractor Selected, Owner Approved 48-Port Data Patch Panel, Comply w/ University Standards**	**2**	**-**
28	Contractor Select	Horizontal Cable Manager	Horizontal Cable Manager - Size as Needed for Capacity, Comply w/ University Standards	2	-

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ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **2130**					
Type : **MSY25**					
Name : **Interprofessional Clinical Training Lab**					
Rm Qty : **1**					
Speech Reinforcement System/Audio Conferencing					
29	Shure	MX202x/S	Hanging Mini-Condenser Super-Cardioid Mic, w/Cable, In-Line Preamp	4	D
30	CAE / Axis	P8221	Learning Space Digital Audio Interface	4	-
31	Mpow	MPBH209AH-US	EG3 Gaming Headphones, 50mm Driver, Stereo Over-Ear USB Computer Headset with Noise Cancelling Mic, Easy Volume/Mic Control for PC, Mac	1	-
32	Shure	QLXD124/85	Wireless Digital Microphone Single Channel Combo System w/ Handheld and Lavalier Mic	2	-
33	Shure	SBC200-US	Dual Docking Recharging Station (w/Power Supply)	2	-
34	Shure	SB900B	Lithium-Ion Rechargeable Battery	4	-
Sound Reinforcement System					
35	QSC Audio	Q-SYS Core 110f	8 Mic/Line In x 8 Line Out and 8 Flex I/O Audio DSP with POTS, VOIP, AES67 and QSYS	1	-
36	QSC Audio	SL-QSE-110-P	Q-SYS Core 110 Scripting Engine Software License, Perpetual	1	-
37	QSC Audio	Axon A4FLEX	Mic/Line Connectivity Interface, AES67	1	-
38	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
39	JBL	Control 14C/T	Two-Way 4" Coaxial Ceiling Loudspeaker	1	D
40	JBL	LCT 81C/T	Low-Profile 2' x 2' Ceiling Tile Loudspeaker w/ 8" Driver, Single - Sold in Pairs	41	-
41	QSC Audio	MP-A20V	2-CH, 200W @ 4/8Ohm, 70/100V Audio Amplifier	1	-
Control System					
42	Crestron	AV4	4-Series Integrated Controller, (6) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN	1	-
43	Crestron	TS-1070-x-S	10" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
44	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	2	D

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Audiovisual Systems Bidding Equipment List

Number : **2130**

Type : **MSY25**

Name : **Interprofessional Clinical Training Lab**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
45	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
46	Middle Atlantic	BGR-552FT-FC	BGR-Series Fan top, 552 CFM, w/Controller	1	-
47	Middle Atlantic	BGR-RR45	BGR-Series 45RU, Rear Rack Rail Kit	1	-
48	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
49	Middle Atlantic	PDT-1220C-NS	Vertical Power Distribution Strip, (12) Outlet, 20A	2	-
50	MinuteMan	ED2000RTXL2U	UPS with power conditioning 2U 2000VA/1800W 120 VAC Rack/Wall/Tower mountable	3	-
51	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
52	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	4	-
53	MinuteMan	SNMP-NV6	Remote Power Management Adapter	4	-
54	**Middle Atlantic**	**L5 Series Lectern**	**Lectern (coordinate with owner and archtect for configuation and finish)**	**1**	**D**
55	**Crestron**	**FT2-202-MECH-X**	**Flip Top FT2 Series, 202 Size, Mechanical**	**1**	**D**
56	**Crestron**	**FT2A-PLT-PT-10**	**Cable Pass-Through Plate Modules for FT2 Series, Qty. 10**	**LOT**	**-**
57			Installation Materials as Defined in AV Systems Specification	Lot	
58			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
59			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
60			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
61			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
62			Control System Accessories as Needed	Lot	
63			Power Supplies and Power Distribution as Needed	Lot	
64			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Audiovisual Systems Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number :					
Type : **MSY26**					
Name : **Portable Equipment Pool**					
Rm Qty : **1**					
Display Devices					
1	NEC	M551	**55" LED LCD Professional Display, 3840 x 2160, 24/7, 500 nits, Landscape/Portrait, RS232C, LAN, Integrated Speakers**	4	-
2	Chief	LPAUx	Large FUSION Manual Height Adjustable Mobile AV Cart	4	-
Video Capture, Streaming and Conferencing					
3	Axis	T8415	Wireless Installation Tool	1	-
Speech Reinforcement System/Audio Conferencing					
4	Listen Technologies	LKS-4-A1	Listen Talk Portable ADA Kit w/1 Transceiver and 3 Receivers	6	-
Rack, Panels, Misc.					
5			Installation Materials as Defined in AV Systems Specification	Lot	
6			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
7			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
8			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
9			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
10			Control System Accessories as Needed	Lot	
11			Power Supplies and Power Distribution as Needed	Lot	
12			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					