

PART 1 – GENERAL

1.1 PROJECT DESCRIPTION

- A. The Simulation Audiovisual Contractor shall procure, assemble, install, test, and document the simulation audiovisual system as described in these specifications and as depicted on the enclosed drawings.
- B. Refer to the CD set of drawings provided by the architect as part of these specifications.
- C. It is the intent of these specifications to provide a complete simulation audiovisual system capable of connecting to the simulation recording equipment provided by the Simulation Recording Contractor. The Simulation Audiovisual Contractor shall assure they understand completely the functional requirements of the simulation audiovisual system specified herein, verify the completeness of the equipment specified, the correctness of the type, numbers, and the overall suitability of the equipment to meet the purpose of the specifications.
- D. Add/Alts are shown at the end of this document.

1.2 SYSTEM DESCRIPTIONS

2nd FLOOR

- Sim Control Room (206)
- Nursing Debriefing Room (202)
- Nursing Sim Lab (201)
- Nursing Sim1 (201A)
- Nursing Sim2 (201B)
- Nursing Sim3 (201C)
- Nursing Sim4 (201D)
- Nursing Sim5 (201E)
- Nursing Sim6 (201F)
- Nursing Sim7 (201G)
- Nursing Sim8 (201H)

- R.C. Sim Control Room (256)
- R.C. Skills Lab (250)
- R.C. Sim1 (255A)
- R.C. Sim2 (255B)
- R.C. Sim3 (255C)
- R.C. Sim4 (255D)

- IPE Control Room (261A)
- IPE Simulation Room (260)

A. NURSING SIMULATION AREA

The Sim Control Room 206 is a small space with four (4) sim control stations. This room is used to control eight (8) nursing simulation rooms (Nursing Sim1 through Sim8). Each sim control station shall facilitate a single scenario. One (1) mic will be provided per control station by the audiovisual contractor for communicating through the simulation room speaker. One (1) OFE PC shall be used per control station for the AV recording software, and an additional OFE PC will be provided for each manikin in the simulation room. Desktop speakers shall be provided per control station to allow the audio being captured to be heard in the control room. One (1) pair of wired headphones shall be provided per control station to be used when required.

Each simulation room (sim1 through sim8) will have a minimum of one (1) faceplate for connecting an OFE manikin, and one (1) faceplate for connecting an OFE vitals touch screen monitor/ all-in-one PC. These rooms will also have a faceplate for connecting an auxiliary medical device to be captured during trainings. All faceplates are provided by others. A ceiling speaker shall be installed for hearing the facilitator's control room mic in the simulation room. A minimum of one (1) ceiling mic shall be installed to pick up audio in the room. One (1) fixed IP and two (2) PTZ IP cameras shall be installed in the ceiling for capturing video during simulation scenarios. The equipment required to convert the vitals monitor/PC(s) and auxiliary device(s) to IP streams for capture shall be included in the Simulation Recording Contractor's bid response. Refer to the drawing set for locations and quantity of devices.

Debriefing for this area will occur in Nursing Debriefing Room 202. All audiovisual equipment in this room will be provided by others. An OFE computer will be provided to playback recorded simulation scenarios through the AV system.

B. R.C. SIMULATION AREA

The Sim Control Room 256 is a small space with four (4) sim control stations. This room is used to control four (4) R.C. simulation rooms (R.C. Sim1, Sim2, Sim3, Sim4). Each sim control station shall control a single scenario. One (1) mic shall be provided per control station for communicating through the simulation room speaker. One (1) OFE PC shall be used per control station for the AV recording software, and an additional OFE PC shall be provided for each manikin in the simulation room. Desktop speakers shall be provided per control station to allow the audio being captured to be heard in the control room. One (1) pair of wired headphones shall be provided per control station to be used when required.

Each simulation room (1 through 4) will have a minimum of two (2) faceplates for connecting an OFE manikin, and two (2) faceplates for connecting an OFE vitals touch screen monitor/ all-in-one PC. These rooms will also have two (2) faceplates for connecting auxiliary medical devices to be captured during trainings. All faceplates are provided by others. A ceiling speaker shall be installed for hearing the facilitator's control room mic in the simulation room. Two (2) ceiling mics shall be installed to pick up audio in the room. Two (2) fixed IP and two (2) PTZ IP cameras shall be installed in the ceiling for capturing video during simulation scenarios. The equipment required to convert the vitals monitor/PC(s) and auxiliary device(s) to IP streams for capture

shall be included in the Simulation Recording Contractor's bid response. Refer to the drawing set for locations and quantity of devices.

Debriefing for this area will occur in R.C. Skills Lab 250. All audiovisual equipment in this room will be provided by others. An OFE computer will be provided to playback recorded simulation scenarios through the AV system.

C. IPE SIMULATION AREA

The IPE Control Room 261 is a small space with one (1) sim control station. This room is used to control the IPE sim room 260. The sim control station shall facilitate a single scenario. One (1) mic shall be provided for communicating through the simulation room speaker. One (1) OFE PC shall be used for the AV recording software, and an additional OFE PC shall be provided for each manikin in the simulation room. Desktop speakers shall be provided to allow the audio being captured to be heard in the control room. One (1) pair of wired headphones shall be provided to be used when required.

IPE sim room 260 will have a minimum of one (1) faceplate for connecting an OFE manikin, and one (1) faceplate for connecting a vitals touch screen monitor/ all-in-one PC. This room will also have a faceplate for connecting an auxiliary medical device to be captured during trainings. All faceplates are provided by others. Four (4) ceiling speakers shall be installed for hearing the facilitator's control room mic in the simulation room. One (1) ceiling mic array shall be installed to pick up audio in the room. Two (2) fixed IP and four (4) PTZ IP cameras shall be installed in the ceiling for capturing video during simulation scenarios. The equipment required to convert the vitals monitor/PC(s) and auxiliary device(s) to IP streams for capture shall be included in the Simulation Recording Contractor's bid response. Refer to the drawing set for locations and quantity of devices. A wall mounted flat panel display shall be installed to view the vitals monitor, ventilator, and display recorded videos for debriefing. Refer to the drawing set for locations and quantity of devices.

Debriefing for this area will occur in IPE sim room 260. The flat panel display and in-ceiling speakers shall support playback of recorded simulation scenarios through an OFE computer.

3rd FLOOR

- Student Collaboration Area 301

D. STUDENT COLLABORATION AREA 301

The Student Collaboration Area 301 is a large space with a large flat panel display provided by others. An H.264 decoder shall be provided to view a camera feed from the IPE Simulation room on the display. An analog audio feed shall also be provided to hear audio from the IPE Simulation room through the display's speakers.

1.3 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.

The specification includes, but is not limited to:

1. This written specification document
2. All drawings in the CD drawing set
3. Cable terminations and labeling schedule
4. Additions and/or modifications as detailed in written addenda
5. Additions and/or modifications as detailed in drawing additions or reissues

1.4 DEFINITION OF TERMS

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

1. The term "**Architect**" is used to indicate:
Randall Scott Architects
14755 Preston Rd. Suite 730
Dallas, TX 75253
972.664.9100
2. The term "**Consultant**" is used to indicate:
Level 3 Healthcare
955 E. Javelina Avenue Suite B-106
Mesa, Arizona 85204
www.L3Healthcare.com
O: 480.892.1071
F: 480.892.5295
3. The term "**Owner**" is used to indicate:
Midwestern State University
Louis Rodriguez Dr.
Wichita Falls, TX 76308
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 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, providing adequate storage, unpacking or uncrating the item, physically securing the item or otherwise making ready the item for its intended use by following the instructions and approved methods of the manufacturer and those contained 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 Simulation Recording 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 “**OFICI**” (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 installing and integrating this equipment as detailed herein.
12. The term “**shall**” is mandatory; the term “**will**” is informative; and the term “**should**” is advisory.

1.5 SUBSTITUTIONS

- A. 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. If a particular Bid Response contains no deviations from this specification, the Bidder may submit the Bid Form alone. However, if a Bid Response contains deviations from this specification, additional submittals are required to thoroughly document each deviation and demonstrate that the modified system will meet all intentions of this Specification.

1.6 RECOMMENDATIONS

- A. Should the Bidder have recommendations that will enhance the performance of the systems, or reduce costs without the loss of performance, such comments shall be made in the Bid Response. All suggestions that are of value to the Owner shall be taken into consideration in the evaluation of the Bid Response. The Bidder shall represent all such proposals as “alternates”, with the appropriate cost modifications shown separate and apart from the costs of the system as specified.

1.7 DEVIATIONS

- A. For deviations in equipment or hardware, the Bidder shall provide a written statement describing why such deviations are requested. The Bidder shall also provide the manufacturer's specifications and warranty information on proposed substitutions. The Contractor shall be responsible for repaying any additional expenses incurred by other trades, the Consultant, the Architect, and/or the Owner, as a result of instituting such deviations without prior approval.

1.8 EXCEPTIONS

- A. Notwithstanding the detailed information contained in this Specification, the Bidder shall be responsible to see that a complete and functioning system is installed. The Bidder shall notify the Consultant, prior to bidding, of any and all exceptions to these specifications and related drawings. This shall include any errors or omissions in the system design that, in his/her opinion will prevent the system from achieving all intentions of the Specification.

1.9 REQUEST FOR INFORMATION

- A. All requests for information shall be communicated by way of a Request For Information (RFI). An RFI may be e-mailed or faxed to the Consultant at jpilzner@l3av.com or 480.892.5295 (FAX). Verbal requests for information shall be permitted only during the Pre-Bid meeting. All Bidder questions and responses to Bidder questions shall be under the heading "Addenda to the Bid" and made public to all Bidders. All Requests for Information must be received by the date and time indicated in the cover letter accompanying this specification. Requests for Information received after this date shall not be honored.

1.10 BID RESPONSE

This document must be signed and dated by a principal or officer of the company.

A. PERFORMANCE, PAYMENT, AND OTHER BONDS

Performance or Payment bonds may be required for this project.

B. ITEMIZED PRICING

The bidder shall provide itemized unit pricing for each item in the equipment list unless otherwise indicated on the 'Bid Form'. The Bidder agrees that the Owner may increase, decrease, or delete entirely individual items, scheduled quantities of work to be done, or materials to be furnished after execution of the Contract.

C. TAXES

The Bidder shall provide totals for all applicable state and local taxes where indicated on the bid form.

D. POST- BID INTERVIEW

Upon receipt of Bid Responses, the Owner, Architect, and Consultant may require Bidders to participate in a Post-Bid Interview. Bidders should be prepared to attend, answer questions, and clarify any discrepancies in Bid Responses.

E. ACCEPTANCE

Upon acceptance of the bid, the Bidder assumes responsibility for supplying such materials and taking such actions, whether specifically mentioned herein or not, to satisfy all intentions of the Specification without claim for additional compensation.

1.11 SITE CONDITIONS

A. GENERAL

The Bidder shall be responsible for investigating any potential conflicts with site-related or union-related issues regarding use of personnel, scheduling, access to the site, storage of tools and equipment on-site, and other areas of potential conflict. If these issues impact the Bidder's Bid Response, the impacts on cost and schedule should be clearly noted in the Bid Response.

B. EQUIPMENT DELIVERY AND STORAGE

Costs of all shipping to the audiovisual contractor's site for staging, to the jobsite, and of all unusual storage requirements, shall be borne by the Contractor. It shall be the responsibility of the Contractor to make appropriate arrangements, and to coordinate with the authorized personnel at the site, for the proper acceptance, handling, protections, and storage of equipment so delivered.

C. REFUSE

The Contractor shall keep the site and building free of all debris and clutter, to the satisfaction of the Owner or site manager. On a daily basis, the Contractor shall remove refuse and rubbish related to the specified work from the site and shall leave the relevant areas and equipment clean and in an operational state. The Contractor shall be responsible for repairing any damage caused to the premises by the Contractor's installation activities, at no cost to the Owner.

1.12 SCOPE OF WORK

- A. Review all architectural, mechanical, electrical, millwork and audiovisual drawings.
- B. Project management including merchandise and labor control, scheduling and all coordination with client, architect and consultants.
- C. Timely purchasing of all equipment provided by the winning bid responder. Coordination with the various vendors and suppliers.

- D. Preparation and submission of all shop drawings, for the assembly and wiring of the simulation audiovisual system. Assembly and wiring at Audiovisual Contractor's facility of all consoles, control panels, audiovisual equipment cabinets, electronic components, etc.
- E. Testing and staging of simulation audiovisual systems at Audiovisual Contractor's facility. Review of all system functions and operation. Inspection by the Simulation Consultant and client representative.
- F. Regular job site visits to verify dimensions and to coordinate with various trades such as electrical contractors, millwork contractor, general contractor, architect and interior designers, etc.
- G. Preparations of cable pull drawings. Early delivery of cable, connectors, wall plates, etc.
- H. Furnish all low voltage cable and issue a final cable pull drawing with the cable shipment clearly indicating all cable types.
- I. Terminate all the low voltage cables entering the equipment cabinet in a neat, workmanlike manner. All cables shall be clearly labeled and in accordance with the associated run sheets. It may be the electrical contractor's responsibility for termination and hookup of all AC power (using hookup drawings provided by the Audiovisual Contractor).
- J. Coordination and delivery of all equipment provided by the winning bid responder to the job site. Assurance of delivery to a safe clean area.
- K. Responsible for the delivery of all equipment provided by the winning bid responder to the appropriate secured location.
- L. Preparation of as built documentation drawings, owner's manuals, and operator instructions. Provide a complete Documentation Package of all shop drawings, owner's manuals and operator instructions to the client and consultant.
- M. Assist with training and demonstration sessions for operators, end-users, interested executives, and others. Provide training and assistance to the client on the proper use, operation maintenance of the audiovisual systems.

1.13 WORK EXCLUDED

- A. Work not included in this contract shall be:
 - 1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, floor boxes, lighting fixtures, lighting dimming systems, or millwork except where otherwise specified herein.
 - 2. The data and voice network is provided by Others.

1.14 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.

1.15 SCHEDULE

- A. The schedule is of paramount importance. The successful bidder shall submit a scheduling plan with the bid return, indicating the various milestone dates after award of contract for completion of design, shop fabrication, staging, onsite installation work, testing and acceptance broken into phases as necessary. This shall be in the form of a Gantt chart, and be consistent with the project schedule.

1.16 QUALIFICATIONS OF BIDDERS

- A. Work specified herein shall be the responsibility of a single Simulation Audiovisual Contractor. Bid responses shall document a minimum of five years of experience in the fabrication, assembly and installation of systems of similar complexity as specified herein. This requirement shall apply equally to suppliers and manufacturers of the simulation recording and simulation audiovisual subsystems and major components to be used on this Project.
- B. The documentation shall include the names, locations, descriptions, total contracted amount, and points of contact for at least three installations of the type and complexity specified herein.
- C. Each bidder shall have at least one directly employed supervisory employee that possesses a current certification, from either AVIXA or another recognized organization or institution, providing formal training in audiovisual engineering or installation. Proof of this shall be supplied with bid.
- D. A complete list of the project team shall be provided. The key contact or Project Manager for the Simulation Audiovisual Contractor must be readily available to answer any questions the architect, consultant, audiovisual contractor, general contractor project director, account manager, project manager, field manager or electrical contractor may have.

1.17 SUBCONTRACTOR INFORMATION

- A. The Bidder shall indicate any portion of the project for which the Bidder intends to engage a Subcontractor. The Bidder shall further identify all responsibilities and all work to be performed by the Subcontractor. All work performed by the Subcontractor shall be under the supervision of the Contractor and shall be the responsibility of the Contractor.

1.18 QUALITY ASSURANCE AV9000

- A. The client expects that the system shall comply in product, performance, and practices as outlined in the document "AV 9000" given in the References below. The vendor shall certify compliance by furnishing affidavits prepared by individuals on behalf of the vendor with recognized industry qualifications, namely CTS-D and/or CTS-I (Certified Technology Specialist – Design, Installation), or CQT (AV9000 Certified QA Technician). Affidavits shall reflect that the system passed a Design Review, Staging, and the Commissioning battery of tests without defect before the system can be accepted.
- B. Prospective bidders must attest that they possess, and are skilled in the use of, all the necessary test equipment for verifying that the performance of the system is in compliance with AV9000. The Bid Response must include the name of the certified qualified individual(s) assigned to the project, so that credentials may be verified on the AVIXA website, or with the Association for Quality in Audio Visual Technology, Inc.
- C. No final payment will be made until these certificates have been presented by the vendor for review by the client or his representative. The client retains the right to enlist the services of a third-party Testing and Verification Services Provider to verify compliance, and may elect to do so in the event of any discrepancy in test results. Vendor's final payment may be offset by the cost of corrective actions as well as third party re-testing.

1.19 RELIABILITY

A. GENERAL

The system is 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 this system.

B. WARRANTY

The Bidder shall make known, in writing, at time of Bid any exceptions that might exist between conditions described herein and Bidders 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 final acceptance.
2. During the warranty period, within 24 hours of notification, the Contractor shall answer all service calls and requests for information.
3. During the warranty period, within 48 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.

4. The Contractor shall notify the owner after 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.
5. 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.
6. 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 system acceptance.
7. 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 final acceptance.
8. 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.
9. Certain subsystems and system components may require installation by authorized representatives 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.

C. SERVICE CONTRACT

As part of this Specification, the Contractor shall initiate a one-year maintenance service contract to commence on the date of final acceptance and continue to the first anniversary of the date of final acceptance as defined in 'System Acceptance'.

The maintenance service contract shall include two semi-annual visits to the site for inspection and routine maintenance of all equipment.

PART 2 – PRODUCTS

2.1 APPROVED CABLING

If cable is required to pass through plenum exposed outside of conduit or enclosure-The appropriate rating of this cable must be used.

2.2 EQUIPMENT LIST

The equipment lists below 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 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. Upon submittal of bid, the Contractor accepts responsibility to assure that complete, functioning systems are installed.

The Contractor shall further notify the Consultant, prior to bid submission, of any and all exceptions to these specifications and related drawings. This shall include any errors or omissions in the system design and/or any inconsistencies or ambiguities between package documents that, in the Contractor's opinion, may impact costs to the Owner or prevent the system from achieving all intentions of the Specification.

A. AUDIOVISUAL EQUIPMENT

The equipment lists below 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 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. Upon submittal of bid, the Contractor accepts responsibility to assure that complete, functioning systems are installed.

The Contractor shall further notify the Consultant, prior to bid submission, of any and all exceptions to these specifications and related drawings. This shall include any errors or omissions in the system design and/or any inconsistencies or ambiguities between package documents that, in the Contractor's opinion, may impact costs to the Owner or prevent the system from achieving all intentions of the Specification.

Mfr.	Description	Quantity
RC SIM 1-4 RMS 255A-D		
VIDEO SYSTEM		
AXIS	Network PTZ Camera 1080P, H.264 and MPEG video,white	8
AXIS	Network Fixed Camera 1080P, H.264 and MPEG	8
AUDIO SYSTEM		
AUDIX	Miniaturized condenser microphone cardioid, white	8
ELECTRO-VOICE	4-inch Two-Way Coaxial Ceiling Loudspeaker 70v	4
CONTROL SYSTEM		
OFE	Owner-furnished Vitals All-In-One PC	8
RC SIM CTRL RM 256		
AUDIO SYSTEM		
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	4
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	4
JBL	One Control 2P Powered Master speaker, (without passive extension speaker) and power supply.	4
Shure	Portable Semi-Open Headphones	4
CONTROL SYSTEM		
AVOCENT	Avocent HMX 5000 Series extender receiver - single DVI, USB, audio extension over gigabit with SFP support.	12
AVOCENT	Avocent Command and Control Switch - 1x4 USB keyboard and mouse switch	4
Extron	7" Tabletop TouchLink Pro Touchpanel	4
MIDDLE ATLANTIC	Rackmount Power, 9 Outlet, 15A, Basic Surge.	4
Extron	Under Table Mounts for 1U and 2U Full Rack Width Products	4
OFE	Owner-furnished Monitor	12
OFE	Owner-furnished Monitor Stand	4
IPE RM 260		
DISPLAY SYSTEM		
NEC	70" LED Backlit Commercial-grade Display	1
CHIEF	X-Large Micro-Adjustable Tilt Wall Mount 55" - 82"	1
CHIEF	In-Wall Storage Box	1
Extron	H.264 Streaming Media Decoder	1
VIDEO SYSTEM		
AXIS	Network PTZ Camera 1080P, H.264 and MPEG video,white	4
AXIS	Network Fixed Camera 1080P, H.264 and MPEG	2
OFE	Owner-furnished NUC PC for Debriefing Playback	1
AUDIO SYSTEM		
SHURE	Ceiling Array Microphone with Shure® IntelliMix® DSP Suite, Black, White or Aluminum	1
ELECTRO-VOICE	4-inch Two-Way Coaxial Ceiling Loudspeaker 70v	4
CONTROL SYSTEM		
OFE	Owner-furnished Vitals All-In-One PC	1
Extron	eBUS Button Panel with 5 Buttons - Decorator-Style Wallplate	1
OFE	Wireless Keyboard and presenter	1
IPE CTRL RM 261		
AUDIO SYSTEM		
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	1
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	1
JBL	One Control 2P Powered Master speaker, (without passive extension speaker) and power supply.	1
Shure	Portable Semi-Open Headphones	1
CONTROL SYSTEM		
AVOCENT	Avocent HMX 5000 Series extender receiver - single DVI, USB, audio extension over gigabit with SFP support.	2
AVOCENT	Avocent Command and Control Switch - 1x4 USB keyboard and mouse switch	1
Extron	7" Tabletop TouchLink Pro Touchpanel	1
MIDDLE ATLANTIC	Rackmount Power, 9 Outlet, 15A, Basic Surge.	1
Extron	Under Table Mounts for 1U and 2U Full Rack Width Products	1
OFE	Owner-furnished Monitor	2
OFE	Owner-furnished Monitor Stand	1
NURSING SIM 1-4 RMS 201A-D		
VIDEO SYSTEM		
AXIS	Network PTZ Camera 1080P, H.264 and MPEG video,white	4
AXIS	Network Fixed Camera 1080P, H.264 and MPEG	8
AUDIO SYSTEM		
AUDIX	Miniaturized condenser microphone cardioid, white	4
ELECTRO-VOICE	4-inch Two-Way Coaxial Ceiling Loudspeaker 70v	4
CONTROL SYSTEM		
OFE	Owner-furnished Vitals All-In-One PC	4
NURSING SIM 5-8 RMS 201E-H		
VIDEO SYSTEM		
AXIS	Network PTZ Camera 1080P, H.264 and MPEG video,white	4
AXIS	Network Fixed Camera 1080P, H.264 and MPEG	8
AUDIO SYSTEM		
AUDIX	Miniaturized condenser microphone cardioid, white	4
ELECTRO-VOICE	4-inch Two-Way Coaxial Ceiling Loudspeaker 70v	4
CONTROL SYSTEM		
OFE	Owner-furnished Vitals All-In-One PC	8

NURSING SIM CTRL RM 206		
AUDIO SYSTEM		
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	4
Shure	Cardioid Dynamic, High or Low Z, Noise Canceling, Push-to-Talk Switch, Desktop	4
JBL	One Control 2P Powered Master speaker, (without passive extension speaker) and power supply.	4
Shure	Portable Semi-Open Headphones	4
CONTROL SYSTEM		
AVOCENT	Avocent HMX 5000 Series extender receiver - single DVI, USB, audio extension over gigabit with SFP support.	8
AVOCENT	Avocent Command and Control Switch - 1x2 USB keyboard and mouse switch	4
Extron	7" Tabletop TouchLink Pro Touchpanel	4
MIDDLE ATLANTIC	Rackmount Power, 9 Outlet, 15A, Basic Surge.	4
Extron	Under Table Mounts for 1U and 2U Full Rack Width Products	4
OFE	Owner-furnished Monitor	8
OFE	Owner-furnished Monitor Stand	4
SIM EQUIP RM 241		
AUDIO SYSTEM		
BIAMP	Tesira DSP server w/ up to 48 channels of I/O, 1 AVB-1 network card and 1 DSP-2 card	3
BIAMP	Tesira 4 channel mic/line input card with AEC per channel	13
BIAMP	Tesira 4 channel mic/line output card	10
BIAMP	Tesira 64x64 Dante module	1
LAB GRUPPEN	125W x 4 Channel 70V Amplifier	4
MOTU	5 Port AVB Switch	1
CONTROL SYSTEM		
OFE	Owner-furnished PC for Session Recording	9
AVOCENT	Avocent HMX 5000 Series extender transmitter - single DVI, USB, audio extension over gigabit with SFP support.	9
OFE	Owner-furnished PC for Manikin Instructor Software	17
AVOCENT	Avocent HMX 5000 Series extender transmitter - single DVI, USB, audio extension over gigabit with SFP support.	17
AVOCENT	Avocent HMX Advanced Manager - 24 Nodes	1
AVOCENT	HMX Advanced Manager 100 Node License (replaces 24 Node license)	1
AVOCENT	Rackmount Kit for 2 HMX 5000/6000	13
HP	HP ProCurve Switch 2810 Series	2
NETGEAR	NETGEAR ProSAFE GS748T 48-Port Gigabit Smart Managed Switch	3
Extron	IP Link Pro Control Processor	1
EQUIPMENT RACK		
MIDDLE ATLANTIC	36" D X 83-1/8" H 44 RU NVR Configured Deep Gangable Rack with Doors, Sides and Vented Top	1
MIDDLE ATLANTIC	36" D X 83-1/8" H 44 RU NVR Configured Deep Gangable Rack with Doors and Vented Top	3
MIDDLE ATLANTIC	Premium Series UPSRackmount Power, 8 Outlet, 2150VA/1650W	4
SurgeX	Rack Mount Surge Eliminator and Power Conditioner, 1RU - 120V/20A	4
MIDDLE ATLANTIC	3 Space (5 1/4") Vented Rackshelf Four Pack	13
STUDENT COLLABORATION 301		
VIDEO SYSTEM		
Extron	Streaming Media Encoder	1

2.3 LIST OF MANUFACTURERS

Vertiv/ Avocent

Avocent Business Unit Main Office

4991 Corporate Drive

Huntsville, Alabama 35805

<https://www.vertivco.com/en-us/>

Audix

9400 SW Barber St

Wilsonville OR 97070

Tel: 800.966.8261

www.biamp.com

Axis Communications

West Coast Office and Axis Experience Center

18101 Von Karman Ave.

Irvine, CA 92612

Tel: 800.444.2947

<https://www.axis.com/us/en>

Biamp Electronics

9300 SW. Gemini Drive
Beaverton, OR 97008
Tel: 800.826.1457
www.biamp.com

CHIEF

6436 City West Parkway
Eden Prairie, MN 55344
Tel: 866.977.3901
www.milestone.com

Crestron Electronics, Inc.

15 Volvo Drive
Rockleigh, New Jersey 07647
Tel: 800.237.2041
www.crestron.com

Electro-Voice

130 Perinton Pkwy
Fairport, NY 14450 US
Tel: 800.289.0096
www.electrovoice.com

Extron USA West

Worldwide Headquarters
1025 E. Ball Road
Anaheim, CA 92805
Tel: 800.633.9876
<http://www.extron.com/index.aspx>

HARMAN International

400 Atlantic Street
Stamford, CT 06901
Tel: 203.328.3500
www.harman.com

HP

1501 Page Mill Road
Palo Alto, CA 94304
Tel: 650.857.1501
<http://www.hp.com/>

LAB Gruppen AB

12354 East Caley Ave #104
Englewood, CO 80111
Tel: 303.662.8200
www.labgruppen.com

Middle Atlantic Products

300 Fairfield Road
Fairfield, NJ 07004, U.S.A.
Tel: 973.839.1011

<http://www.middleatlantic.com/>

MOTU

1280 Massachusetts Ave
Cambridge, MA 02138
Tel: 617.576.2760

www.motu.com

NEC Display Solutions of America

500 Park Blvd. Suite 1100
Itasca, Illinois 60143
Tel: 630.467.3000

www.necdisplay.com

Netgear

350 E. Plumeria Drive
San Jose, CA 95134
Tel: 888.638.4327

<https://www.netgear.com/>

Shure Incorporated

5800 West Touhy Avenue
Niles, IL 60714-4608
Tel: 800.257.4873

www.shure.com

SurgeX

8001 Knightdale Blvd. Suite 121
Knightdale, NC 27545
Tel: 800.645.9721

www.espsurgex.com

2.4 PRODUCT SPECIFICATION

Unless restricted by the published specifications of a particular piece of equipment, or unless otherwise required under the Detailed Specifications, the following performance standards shall be met by this system:

- A. Cameras
 - 1. IP cameras only.
- B. Video Encoding
 - 1. H.264
- C. Video Resolution
 - 1. 720P minimum.
 - 2. 1080p capable as future upgrade path preferred.
- D. Camera Control
 - 1. Native support for Axis PTZ cameras required in recording software.
- E. Video Feeds
 - 1. A minimum of 4 video feeds shall be capable of being recorded simultaneously for each session.
 - 2. Feeds shall be capable of being selected natively in the simulation software without the need of a 3rd party control system.
- F. Latency
 - 1. Acceptable latency shall be less than 750 ms.
- G. Simultaneous Recordings
 - 1. A minimum of 12 simulation sessions shall be capable of being recorded simultaneously.
 - 2. The maximum number of simulation sessions capable of being recorded simultaneously as specified, without need for additional equipment, shall be indicated in the bid response.
- H. IP KVM
 - 1. Shall be capable of being used with an IP KVM system where computers and servers are in a different location than the control room recording station and vitals computer.

PART 3 – EXECUTION

3.1 GENERAL CONDITIONS

- A. Work shall be carried out in conformance with applicable Building and Electrical Codes, the requirements of OSHA and the applicable provisions of Underwriters Laboratories (UL), ANSI, Electronic Industries Association and National Fire Protection Association. All work shall be in accordance with all applicable codes, local, state and national.

3.2 PROJECT MANAGEMENT

- A. The involvement of the Consultant in this project ends after construction is substantially complete. At that time, the Contractor shall communicate and coordinate directly with the Owner or Owner's representative(s), Architect and other trades. Complying with all

requirements as defined under Scope of Work and elsewhere is mandatory to fulfill all requirements of this Specification. System commissioning is the responsibility of the contractor.

3.3 DESIGN REVIEW AND SUBMISSIONS

- A. The contractor shall prepare a submission for approval prior to beginning fabrication. The submission shall show evidence that a cross functional design review has been performed, including calculations to conform the performance of the system that will be installed, and including a signed affidavit from the project manager with CTS-D qualifications, in accordance with AV 9000. Approval of shop drawings does not relieve the contractor of meeting the specifications in product, performance, and practices. The submission shall be delivered in four copies and shall also include:
1. Plain-language functional narrative, preferably signed by client
 2. A complete set of engineering drawings, prepared in CAD, including but not limited to AV flow, control flow, panel/user interface layouts with button by button script and/ or "Programmers Design Kit" (control system specification), rack elevations, wiring details, conduit details, I/O and user interface plates, and reflected ceiling plans, AV layouts, and elevations as required to clearly show the system in an unambiguous manner such that it may be reviewed, fabricated, installed, and calibrated.
 3. Where applicable, suspension arrangement for the loudspeaker clusters. This drawing shall indicate hanging details and orientation of loudspeakers as required for proper coverage as specified. When deemed necessary, shop drawings shall be sealed by a Structural Engineer licensed in the State of California (or other jurisdiction as required).
 4. Control panel layouts, when not defined by the client, must conform to the industry's "Dashboard Controls" recommendations
 5. List of major items of equipment being provided.
 6. Function list (i.e., playback of DVD disc, presentation of computer video and audio, etc.).
 7. Calculations verifying the predicted performance.
 8. Certificate of review and compliance.

3.4 STAGING

- A. Before delivery to the jobsite, the system shall be staged completely in the successful bidder's shop. A test of the simulation recording and simulation audiovisual system, with peripheral equipment and working control system programming shall be scheduled, and the owner may elect to inspect the staging. A written report will be prepared and signed by the qualified individual described above, using the Staging Checklist below. Not all tests may apply. The successful bidder shall provide a list of the calibrated equipment that will be used on the

performance tests in the Staging and Commissioning Checklists, along with the calibration date and serial numbers for each. Refer to the generic list of instrumentation below.

Test	Staging Test Description
5.1.0	Physical
5.1.1	Verify that all the exceptions from previous checklists, if any, have been successfully completed.
5.1.2	The full complete inventory is all new equipment, in full compliance with the specification, or as modified by approved submission. Record all equipment not present, and why.
5.1.3	Racks have temporary labels indicating the building and room where they are being installed.
5.1.4	I/O Panels are easily accessible.
5.1.5	All equipment being installed is connected, and ALL peripheral equipment is hooked up as per flow diagram: microphones, loudspeakers, video monitors, projectors, PC's, USB switchers, etc.
5.1.6	All mounts for all rack and field equipment (rack mounts, ceiling mounts, wall mounts, loudspeaker mounts, etc.) have been verified and tested..
5.1.7	Racks are "clean". All blanks and vents are installed.
5.1.8	All labeling in general is permanently fastened.
5.1.9	All the equipment can be pulled for repairs or replaced without hindrance, and equipment without IEC removable power cords are not tie-wrapped to the cabinet. There are no obstructions to the item being pulled from the front of the rack. If there are obstructions prohibiting the disconnection of terminations on the back of the unit, there must be sufficient cabling to permit the equipment to be pulled from the front, and disconnected there. Further, terminations are such that it is relatively easy to find their proper terminating points when the item is re-installed.
5.1.10	The cabling and wiring is properly dressed, and allows for signal separation (cables carrying voltages differing by 20 dB or more must be separated by 4 inches), cable stress, serviceability, and cable management. All cables are labeled in a manner consistent with the documentation, and at both ends of each cable, with machine-generated labels that are permanently fastened, and positioned and oriented in a consistent manner that is legible and unambiguous. Refer to InfoComm Document F501.01:2015 "Cable Labeling for Audiovisual Systems". Cable supports are used when unsupported lengths exceed 12 inches (depending on size and stiffness of cables), and that all terminations are free from stress due to gravity acting on the form.
5.1.11	Terminations have sufficient service loop, allowing at least two re-terminations without having to open a form to lay in a new cable.
5.1.12	All cables are within manufacture's recommended bend radius specification, usually given as a multiple of a cable's diameter.
5.1.13	CatX or twisted pair cables have hook and loop fasteners, and there is no cable deformities caused by poor dress or fasteners being too tight; cables are properly identified; any color convention used by the building/integrator, or used to identify POE, proprietary video or data cabling is conforming to plan.
5.1.14	RJ terminations are solid in their connectors. Quality of RJ connector crimps has been verified by sampled inspection: wire is fully seated in each connector, copper is visible at the end of each wire slot, no loose pins exist, and copper is in no danger of shorting to another conductor.
5.1.15	Fiber cables have hook and loop fasteners, and have been properly identified in an unambiguous manner; unterminated spares have dust caps; they are loosely dressed, and any color convention used by the building/integrator is labeled by the patch panel.
5.1.16	Screw terminals have spade or ring lugs on wires.
5.1.17	All cables are of the type recommended by the manufacturer they connect to, and they are dressed in accordance with the manufactures' recommendations.
5.1.18	Rack elevation and flow drawings, cable and other labels and engravings are an accurate paper model of the furnished system, and in compliance with latest revised specifications. All nomenclature is consistent: drawings, touch screen, wall plates, floor boxes, patch panels, equipment, etc. Record test results as pass/fail.
5.1.19	All inputs and outputs of switchers are labeled (wherever possible), so that users can easily make manual routes quickly, without having to refer to the system drawings.
5.1.20	All channels on amplifiers, especially on multi-channel amplifiers are properly labeled, so users can make quick adjustments without having to refer to the system drawings.

5.1.21	All equipment in the rack is labeled in an appropriate and reasonable manner, and the labels match those on the drawings (equipment symbols and/or description), control system, field plates, patch panels, and any labels associated with the system. This will allow for easy serviceability, as well as prevent confusion in systems with multiples of similar equipment.
5.1.22	A representative sampling of the wiring practices of the System Under Test is captured using digital photographs
5.1.23	All unbalanced and balanced terminations are in agreement with the equipment manufacturer's recommendations.
5.1.24	There is perfect agreement between the "paper model" documentation (drawings), the control system user interface (i.e., touch panel screens, push button labels, panel engravings, etc.), the device labels, any patch panels/designation strips, the physical wiring and labeling, and any label associated with the system.
5.1.25	All connectors on input and output plates are identified in a discernible, consistent manner (i.e., there is only one "MIC 1" in the system), and in agreement with all other labels in the system.
5.1.26	Small racks to be installed into credenzas have carpet tiles or sliders on bottom to avoid scratching credenzas.
5.1.27	The thermal gradient of all the equipment in the rack has been measured and all active components to be deployed in the space (including wall plates, floor box plates, credenzas, etc.) and all equipment is operating within manufacturers' specifications. Record the highest measurement and where it was found.
5.2.0	Audio
5.2.1	All audio paths on the flow diagram have been verified (all lines marked).
5.2.2	All audio channels can develop a headroom level with THD < __ (0.5)% Record results for all sources.
5.2.3	All audio channels have a signal to noise (S/N) > __ (55) dB. Record results for all sources.
5.3.0	Video
5.3.1	All video paths on the flow diagram have been verified (all lines marked).
5.3.2	The system has been configured in accordance with the designer's EDID Plan, where applicable, and the system performs as intended (resolutions, displayed images, audio formats, etc.
5.3.3	All displays are able to switch between different color spaces and resolutions. Show a BluRay or TV (YUV) signal, then show a laptop (RGB) signal, and then switch back to the BluRay/TV (YUV) signal. The source should always display properly.
5.3.4	Automatic CEC controls do not negatively affect the displays. With the displays powered on, power off each source in the system. The displays should remain on (no Power Off command sent from a source).
5.3.5	All sources can be routed to all expected destinations. Disregard any routes that are not permitted by design, as described in the narrative, such as HDCP sources routed to a codec.
5.3.6	All HDCP sources can be routed to all expected destinations at the same time. There are some devices with a limited capability to display on multiple displays. The system requires that each source can display on the required number of displays in the system at the same time.
5.3.7	All HDMI signals have been tested using the entire cabling to be installed in the field, to the extent it is possible. <i>Using an appropriate HDMI generator, display with HDCP enabled, for the following resolutions and timings, as required in the design (check all that apply):</i> _1920x1200@60 _1920x1080@60 _1600x1200@60 _1280x720@60 _1280x768@60 _1280x800@60 _1024x768@60 _800x600@60 _640x480@60 _1080P@60 _1080P@59.9 _1080@30 _720@60 _720@59.8 (base default, in case the PC has issues and boots up in default mode). Images exhibit no "sparklies" when leaving the signal on for several seconds. Appropriate HDMI Generator required.
5.3.8	A report is obtained when the switcher makes available a system status report with information regarding each source and destination signal integrity, EDID and CEC status information, etc. If a printed or 'pdf' report is not included, a screen print showing the status of the system (including source and destination communications with the switcher) is obtained and it is included.
5.3.9	A BluRay movie plays. Sometimes HDCP is not enabled during the menus and previews, but only during the movie.

5.3.10	Typical client laptops have been successfully used with the system, inclusive of default resolution (works with switcher EDID), and any adapters, etc. Client laptop(s) required.
5.3.11	Motion video has satisfactory lip sync. While observing each display using a video of someone clapping their hands, confirm that there are no objectionable latency issues
5.3.12	Video levels at 'sinks' (displays) are 1 v P-P +/- 10% for composite (if any) or 700 mV for computer video for all sources.
5.3.13	Camera(s) image quality has a focused, acceptable image.
5.3.14	There are no lost or stuck "on" pixels when Full White Test signal is displayed (7 pixels maximum per quadrant, or follow manufacturer's spec). Note number and location of lost pixels, if any.
5.3.15	AV equipment configuration and control system programming has been optimized for the least switching time when selecting different sources. In the event switching time goes beyond a reasonable time (___(5) seconds), the User receives a visual message with the estimated time to execute the command. Record the maximum switching time experienced.
5.4.0	Control and Network Integration
5.4.1	All control paths on the flow diagram have been tested (all lines marked - emulate closures for screens, motors, etc.)
5.4.2	All serial controlled equipment is properly configured and communications has been established.
5.4.3	Control system functions not obvious from the control flow diagrams (i.e., lighting presets that are activated when the control system enters a videoconferencing mode) have been verified.
5.4.4	All IP information provided by the client is accurately loaded into the system, including IP address, network ID's, subnet masks, default gateway, timeserver, Gatekeeper, alias, hostnames, etc. Confirm that these settings are listed in a report that will remain with the system.
5.4.5	All web-based system control or monitoring features, and other IP functionality of system (time servers, system-generated e-mail, etc.) has been verified.
5.4.6	All system programming is installed (control system, DSP devices), and properly communicating with the equipment intended. If a control specification is present, it has been thoroughly tested.
5.4.7	When system is powered down, system "up" sequence presents the system in a desirable state with no objectionable anomalies.
5.5.0	Final Inspection
5.5.1	Non-conformances, anomalies, etc. have been video recorded and included in this report.
5.5.2	Sanity Check: There is no reason why this system should NOT be released for installation. Everything plumb and square, clean and blemish-free.
5.5.3	The system under test satisfies ALL of the system requirements laid out in the client-approved functional narrative/signed proposal.
5.5.4	A document report has been completed, certifying the product, performance, and practices are in compliance, and any exceptions are noted below. Distribute accordingly.

3.5 WORKMANSHIP

- A. The contractor is responsible for keeping the jobsite clean, and removing all rubbish at the end of each day. The contractor must cooperate with building officials to keep the disruption to the jobsite at a minimum, and shall be responsible for all damages and marring of finishes caused by the installation.

3.6 OPERATOR TRAINING

- A. The system shall include criteria-based training of designated operators. That is, besides written instructions, there is a formal presentation with PowerPoint handouts, and each "system operator" specified by the owner shall demonstrate a basic proficiency in using the system in all of its designed functionality. Successfully trained operators shall then issue certificates by a qualified instructor (CTS-D) directly employed by the successful bidder, certifying that the individuals were successfully trained.

3.7 DOCUMENTATION

- A. Four sets of as built drawings, operator instructions, and training materials shall be delivered before training and acceptance. Documentation also shall include the data files for drawings, system operator instructions, equipment user manuals and peripherals, usernames and passwords, AV LAN IP addresses, DSP files, and control system files including uncompiled source codes and touch panel layouts on CD or USB memory stick.

3.8 ACCEPTANCE

- A. At the time of training, when the documentation is handed over and the system is well exercised, the successful contractor shall certify that: all work has been completed on the simulation audiovisual system; it is fully in compliance with the specification and that there are zero defects in the system; all engineering, fabrication, installation, testing, and checkout of the simulation audiovisual system are complete; documentation drawings and manuals have been turned over and training with the designated operators has been performed.

3.9 WARRANTY AND PREVENTATIVE MAINTENANCE

- A. All work shall be guaranteed for one year from acceptance against defects in materials and workmanship. If manufacturers' warranties exceed one year, these warranties will apply. The specified system is mission-critical communications for an enterprise. As such, the warranty period shall include unlimited telephone support, online support, on-site service, and one predictive maintenance visit as part of the base contract. These visits include a review with a designated representative, a complete function check, where detailed inspection takes note of any system deterioration, cleaning of air filters, surfaces, etc., noting of projector lamp hours (as applicable), and other maintenance tasks in accordance with a prescribed checklist. A complete maintenance history shall be maintained, and an engineering review shall take place at the end of the period.

PART 4 – ADD/ALTS

4.1 WIRELESS CONNECTIVITY

- A. The end users would like the option of running a simulation from within the simulation training room, or in the general area of the room utilizing a wireless device. The wireless network required to accomplish this shall be OFE. List all additional equipment, software, licenses, etc. and associated labor that will be necessary to accomplish this.
- B. The end users would like the option of running a debriefing from within the simulation training room, or in any available room with wireless connectivity on the same network, utilizing a wireless device. The wireless network required to accomplish this shall be OFE. List all additional equipment, software, licenses, etc. and associated labor that will be necessary to accomplish this.

4.2 HIGH FIDELITY VOICE OF PATIENT UPGRADE

- A. A separate PTT mic shall be installed at each control station for a facilitator to simulate VoP sounds.
- B. A dedicated rackmount vocal effects processor shall be installed for each VoP mic to change the facilitator's voice to sound more like the gender and/or age of the patient.
- C. A simple button interface shall be installed at each control station to choose between settings on the vocal processor.
- D. The audio from the VoP mic shall come through a dedicated speaker installed on the headboard wall for each manikin location in the simulation rooms.
- E. The audio switcher must have additional inputs and outputs added to support the additional mics.
- F. Additional audio amplifiers must be included to have enough discrete channels to support the additional speakers.

4.3 MED ROOM CAMERAS

- A. Ceiling mounted IP cameras shall be installed to provide the ability to record the video feed during a simulation. These cameras shall be 1080p capable, with the ability to be set to 720p output.
- B. Depending on the room and the required field of view, these cameras shall either be fixed or PTZ versions. The decision for which camera to use shall be discussed and agreed upon with the client on a room by room basis.