INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

1. GENERAL

A. PROJECT SUMMARY
   a. This Section includes the Audio-Video equipment coordination and installation for the
      UNLV - School of Medicine. The scope under this section includes the 2nd and 3rd floor
      renovation.
   b. The Audio-Visual Contractor (AVC) in receipt of this design specification and all contract
      documents acknowledges that they have reviewed the information contained herein and
      the information is sufficient to enable them to accurately bid the project and complete the
      work as described in the time allotted for the price agreed to with and accepted by the
      Owner. This includes all work, whether or not specifically described in the design
      specification package, which reasonably may be expected or required to present a complete
      installation that is both fully functional and in compliance with all applicable laws, codes,
      rules, and regulations applicable to this project.
   c. The scope of services provided by the AVC shall be the supply of Audio-Visual (A/V) Systems,
      including delivery, installation, and warranty services as specified. Potential Vendors shall
      provide pricing for the installation of Audio-Visual (A/V) multimedia systems in classrooms,
      and auditorium.

2. DEFINITIONS

A. The following definitions shall apply herein.
   a. The term ‘Owner’ or ‘UNLV’: University of Nevada, Las Vegas
   b. The term ‘Project Manager’ (PM) or ‘General Contractor’ (GC): TBD
   c. The term ‘Electrical Contractor’ or ‘EC’: TBD
   d. The term ‘Architect’: TSK Architects
   e. The term ‘Consultant’: Coherent Design
   f. The term ‘P&C’ shall refer to UNLV Planning and Construction.
   g. The term Audio-Video Contractor or ‘AVC’: The successful bidder responsible for the
      complete installation of the audio-video-control systems specified herein
   h. The term ‘shall’ is mandatory; the term ‘will’ is informative; the term ‘may’ describes an
      option; the term ‘should’ is advisory; the term ‘provide’ means furnish and install.
   i. The term ‘by others’ shall refer to material and work that is related to this A/V sub contract
      and for which the AVC is not responsible except as otherwise detailed herein. Some or all of
      these items may be included in the overall Electrical Contract or GC’s scope.
   j. The term ‘OFE’ shall refer to Owner Furnished Equipment, which shall be provided by the
      Owner to the AVC. The AVC shall be responsible for installing and integrating this equipment
      as detailed herein.
   k. The term ‘NIC’ shall mean Not in Contract, which the Owner or other contractors may
      provide. The AVC shall be responsible for providing cabling, plates, and other infrastructure
      as indicated on the drawings and herein so as to provide “plug and play” ready installation
      of all NIC equipment.

B. The basis for terminology used in this document is standard construction and sound &
3. DESIGN INTENT

A. GENERAL: The area of work under this section includes levels 2 and 3 of the UNLV - School of Medicine renovation. The renovation includes multiple classrooms, huddle rooms, a single lecture hall/testing room (Computer Classroom 323), gym and common spaces. This renovation includes audio, video, and control systems as outlined below

a. VIDEO WALL MOUNTED VIDEO DISPLAY SYSTEM: Video displays should be professional grade, 60Hz or better, 1080p or higher, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

b. LECTURE CAPTURE: Rooms with a lecture capture system shall have the ability to record high definition video and audio of an entire teaching session. The capture system shall utilize an HD PTZ video camera and also be connected to the in-room presentation system to allow for simultaneous capture of the presented material and a real-time video feed of the instructor. The system shall be connected via the NSC data network and utilize the existing lecture capture storage and management server for archiving, organization, and internet streaming.

c. DIGITAL SIGNAGE: Several key locations shall include digital signage displays. Digital signage players shall be located at each display. The players shall be networked, but stand-alone and not dependent upon a content management system, cloud, or any sort of continuing licensing for programing or content. Players shall be capable of 4 hours of content storage time each. Visix AxisTV Channel Player (Mini Form Factor) Provides one channel of computer video output (DVI, HDMI or VGA).

d. INTEGRATED CONTROL: The controller shall offer simple control of all applicable A/V equipment located within and adjacent to the venue.

e. NETWORK: The AVC shall be responsible for installation and cabling, and assist in troubleshooting of network switches for the audio, video and control systems within the lecterns. Owner will provide IP addressing upon receiving an itemized list including room number, device type, Ethernet port number and MAC addresses.

f. STRUCTURED CABLING: Ethernet, speaker, wireless microphone, mic/line audio and other specialty AV cabling to be provided and installed by AVC. Plenum cable to be used as required in all plenum spaces.

g. ASSISTED LISTENING: The classrooms shall include an XLR output for use of a portable integrated assisted listening system to meet ADA code.

B. Clinical Skills Lab – Briefing 205:
   1. WALL MOUNTED VIDEO DISPLAY SYSTEM: Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display
mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

2. **BRING YOUR OWN DEVICE CONNECTIVITY:** A wePRESENt WiPG-2000 shall be provided for students or professors to bring their own device and connect to the display wirelessly to show content on the 82” wall mounted display.

3. **AUDIO PLAYBACK:** Audio playback shall come directly from the Display speakers.

C. **Classroom 302, 310, & 312:**
   1. **WALL MOUNTED VIDEO DISPLAY SYSTEM:** Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

   2. **BRING YOUR OWN DEVICE CONNECTIVITY:** A wePRESENt WiPG-2000 shall be provided for students or professors to bring their own device and connect to the display wirelessly to show content on the 65” wall mounted display.

   3. **AUDIO PLAYBACK:** Audio playback shall come directly from the Display speakers.

D. **Student Lounge 316:**
   1. **WALL MOUNTED VIDEO DISPLAY SYSTEM:** Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

   2. **DIGITAL SIGNAGE:** Digital signage player shall be distributed via locally installed player. New players shall be provided with 4 hours shared programming time a piece. Visix AxisTV Channel Player (Mini Form Factor) Provides one channel of computer video output (DVI, HDMI or VGA).

   3. **AUDIO PLAYBACK:** Audio playback shall come directly from the Display speakers.

E. **Student Fitness 324B:**
   1. **WALL MOUNTED VIDEO DISPLAY SYSTEM:** Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

   2. **NETWORK STREAMING PLAYER:** Data cabling shall be provided to display location to provide connectivity for an Owner Furnished network streaming player.

   3. **AUDIO PLAYBACK:** Audio playback shall come directly from the Display speakers.

F. **Information Commons 321:**
   1. **WALL MOUNTED VIDEO DISPLAY SYSTEM:** Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

   2. **DIGITAL SIGNAGE:** Digital signage player shall be distributed via locally installed player. New players shall be provided with 4 hours shared programming time a piece. Visix AxisTV Channel Player (Mini Form Factor) Provides one channel of computer video output (DVI, HDMI or VGA).

   3. **AUDIO PLAYBACK:** Audio playback shall come directly from the Display speakers.

G. **Group Study 321A, 321B, 321C, 321D, & Faculty 321E:**
1. WALL MOUNTED VIDEO DISPLAY SYSTEM: Video displays should be professional grade, 60Hz or better, 1080p, and suitable for 24/7 operation whenever possible. Video display mounting systems shall obscure all connections and wiring, but shall provide easy access for maintenance. Display mounting to meet ADA requirements.

2. DIGITAL SIGNAGE: Digital signage player shall be distributed via locally installed player. New players shall be provided with 4 hours shared programing time a piece. Visix AxisTV Channel Player (Mini Form Factor) Provides one channel of computer video output (DVI, HDMI or VGA).

3. BRING YOUR OWN DEVICE CONNECTIVITY: A wePRESENT WiPG-2000 shall be provided for students or professors to bring their own device and connect to the display wirelessly to show content on the 46” wall mounted display.

4. LOCAL CONNECTION PANELS: An infrastructure of local connection panels in wall boxes shall be provided to allow simple connection of a laptop, camera, playback device, or similar. Labeling for connections shall be white, engraved and black-filled. (1) HDMI and VGA with audio shall be included for local inputs.

5. INTEGRATED CONTROL: The controller shall offer simple control of all applicable AV equipment located within the room. User controls will consist of a 10 button keypad controller. All touch control interfaces shall present simple, clear control of all audio-visual components.

6. AUDIO PLAYBACK: Audio playback shall come directly from the Display speakers.

H. Computer Classroom 323:

1. SOUND REINFORCEMENT AND PLAYBACK AUDIO SYSTEM: An audio amplifier shall provide direct connection to the surface mount speakers. The Computer Classroom shall include a sound reinforcement and playback audio system. The system shall consist of high output surface mount speakers, powered a separate multi-channel power amplifier and DSP. The system shall be divided into two delay zones and time-aligned to the front of the room. The system shall be capable of supporting the sound reinforcement needs of a lectern mounted microphone and a wireless handheld or lapel microphone. The system shall also support the playback of AV media. Speakers shall be spaced so that there is no greater than +/- 3db variation in SPL anywhere in the student seating area of any room. Sound reinforcement shall include a high quality lectern mounted microphone and a single channel wireless microphone system with both handheld and lapel microphones available for use (one or the other at any given time). Control system touch panels shall include one button access from any page to a popup screen which shall present the instructor with three level controls to include “Media Volume”, “Lectern Microphone”, and “Wireless Microphone”. Input gain controls shall also be available on the Technician page for individual sources. Active audio sources shall always be simultaneously mixed to the audio auxiliary output to the lecture capture system.

2. VIDEO DISTRIBUTION SYSTEM: A high definition 4K video distribution system has been designed for viewing Ultra HD images for students to view clearly on 28” monitors at each respective desk location as well as (2) two 98” monitors mounted at the front of the room. A video switch shall be connected through this system for audio and video routing, and monitoring, and distribute them via DM-CBL-ULTRA-P to receiver boxes located at (6) six specific desks throughout the classroom. This UHD signal will then be distributed via HDMI to a video distribution amplifier which will then go to each of the (36) thirty-six display location. A preview monitor with touch capabilities will also be an
output of the entire system for ease of presenting via HDMI.

3. INTEGRATED CONTROL: The system shall control all connected devices either via LAN, serial, or HDMI CEC control. IR control is not acceptable. The system shall include a single 7” touch panel mounted in the top of the teaching station. The AVC shall coordinate with the Owner’s teaching station supplier to provide the proper cutout for the touch panel.

4. LECTURE CAPTURE SYSTEM: The Computer Classroom shall include a video and audio lecture capture system. The system shall be connected directly to an HD PTZ wall mounted video camera via two CAT6A STP cables for recording an image of the instructor. The system shall also accept a digital HD video and analog audio input from the AV switching system to capture the media source simultaneously. The system shall also be connected as an input source to the AV system so that playback of a lecture is possible.

5. MEDIA SOURCES: Classrooms shall have the ability to accept several different media sources for display by the instructor.
   A. PC and Monitor (OFE) – an owner furnished PC shall be installed in the teaching station to allow for digital presentations, web content, playback of DVD’s via the built-in DVD drive, live streaming of distance learning material, and USB media stick content. The AVC shall obtain the PC’s from the owner and provide rack shelves for them. The PC shall utilize a touch screen monitor. The AVC shall install the PC’s into the teaching stations and provide all necessary connection cabling including HDMI and USB cables for connection to the system as illustrated on the drawings. The AVC shall supply a 4K video card specifically for a SFF (Small Form Factor) PC.
   B. Auxiliary Inputs – the AVC shall supply and install a Middle Atlantic L5 credenza with cable interface in the lectern to provide inputs for inputs for laptops or other portable devices. The inputs shall include (2) two HDMI, (1) one VGA, and analog audio connections as well as USB connections to the PC. The AVC shall coordinate with the Owner’s teaching station supplier to provide the proper cutout for the flip-top.

6. ASSISTED LISTENING: The Computer Classroom shall include an integrated assisted listening system to meet ADA code. The system shall utilize IR emitters and include the required amount of receivers per code.

4. WORK BY OTHERS

   A. Conduits, cable pathways, connection boxes, pull boxes, junction boxes, combined services floor boxes and outlet boxes permanently installed in floors, walls, and ceilings.
   B. All electrical breaker panels, motorized breaker panels, and power receptacles necessary to bring power to the audiovisual systems equipment racks and to devices in the project as indicated in the drawings.
   C. Room lighting fixtures, dimmers, power receptacle outlets, and interconnecting wiring for these circuits.
   D. Structural work, wall openings, platforms, railings, stairs, fire prevention and safety devices, rough and finished trim, painting and patching, drapes, carpets, floor coverings, computer floors, glazing, acoustical treatments, heating, ventilating, and air conditioning systems unless noted otherwise.
   E. Providing network and power connections only.
   F. Providing the pre-determined conduit and boxes inside the walls.
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G. Responsible for removing and disposing of the lectern.
H. See Construction Documents for reference to items marked “Not in Contract” and/or “by others”.

5. SCOPE OF WORK

A. The Work detailed within the Contract Documents has been specified to meet certain requirements for performance, appearance, and costs. It shall be the responsibility of the AVC to implement the requirements contained in the Contract Documents and translate them into a complete design package containing all elements necessary for a complete, operational, and functionally integrated Audio Visual System(s).

B. Provide materials, labor, and equipment including but not limited to:

a. General
   1. The delivery, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required.
   2. All other work whether or not expressly specified herein and on the drawings to provide complete operational turnkey systems.

b. Wall Mounted Video Display System / Mount
   1. Installation of mount, display, & any digital signage boxes or BYOD devices, as well as DM receivers.

c. AV Rack and Lectern Racks
   1. Populate with all equipment shown in the drawings, BOM, and herein.
   2. Provide low voltage cable as per A/V drawings and interconnect system components and equipment.

d. Lectern
   1. Installation of lectern equipment, not mounted in rack space, on the lectern in Owner specified location.
      A. Cable cubby
      B. Touch panel
      C. Document camera
      D. Lectern computer monitor, mouse, and keyboard

e. Speakers
   1. Removal of existing speakers, as specified.
   2. Installation of new speakers, in specified locations.

f. The AVC is to work in coordinate all aspect of A/V installation with the CTS staff.

2. RESPONSIBILITIES OF OWNER
A. Owner will supply the following documentation attached to this document.
   a. A/V Line Drawing on UNLV SOM renovation
   b. Rack Elevation Drawings
   c. Wire Label Schedule
   d. Approved Equipment List
   e. Furniture drawing from UNLV preferred vendor

B. UNLV CTS assumes limited responsibilities in the implementation effort, including:
   a. Providing the AVC with access to buildings
   b. Providing a Project Manager as the main project contact for the AVC provider team.
   c. Facilitating interactions with other trades and/or vendors to promote information exchanges and/or activities required for the installation, implementation, and operation.
   d. Responsible for removing the current lectern populated equipment.

3. PERFORMANCE REQUIREMENTS

A. The AVC shall study the drawings and familiarize themselves with the Work of the entire project scope. The Work of this section shall be carefully organized and programmed so that its progress shall be concurrent with the work of all other trades and so that the work shall proceed as expeditiously as possible.

B. The AVC shall be responsible for the correct placing of the work of this section, equipment to fit into the structure as built, and attachment of equipment to the work of all other trades and Owner furnished equipment and facilities.

C. Install all equipment to industry safety and ergonomic standards and provide full engineering and technical support throughout the installation process.

D. The functional interconnections of the audio, video, and control systems shall comply with the manufacturer’s system installation guidelines, industry standard practices, and as specified herein.

E. It shall be the responsibility of the AVC to coordinate with those performing related work and to interface other systems with the Work of this section. The AVC shall ensure that the work by others shall integrate properly with the Work of this section and that all such work collectively complies with all requirements as specified herein

   a. Coordination shall include providing timely submittal and field coordination of mounting requirements, dimensions, and any other information required by other trades.
   b. Maintain constant communications with all designated personnel of the CM and attend all construction meetings as requested by the CM.

F. The AVC shall generate all shop drawings and information for the complete installation and wiring of the system. The AVC shall provide pre-printed wire labels numerically organized for signal type and cable count according to the engineering documentation & shop drawings.

G. The AVC shall be responsible for the comprehensive adjustment of the systems as specified herein and shall provide all test equipment for the system checkout and acceptance tests. Adjust and balance all circuits as specified herein. Set all controls and software parameters to render fully and optimally operating systems and subsystems. All computer controlled functions shall require complete audio/computer/software setup, balancing, label-entry and documentation.

H. Verify with all manufacturers and/or suppliers' availability and cost of all material and equipment proposed, including all material and equipment specified herein. No cost increases
shall be allowed for manufacturers’ cost increases, or for substitutions required because of unavailability of proposed equipment.

I. The AVC shall be responsible for ensuring that it is fully aware of the expectation of the contract documents as well as the location and condition of the work site, any specific conditions and limitations of the Site, and any other influences that may affect the work as outlined in the design specification.

J. Claims for additional time or additional compensation as a result of The AVC’s failure to familiarize itself with all local conditions and the contract documents will not be accepted or approved.

K. The AVC is to provide all labor, materials, transportation and equipment to complete the installation, furnishing, assembly, set up, and testing of the audio, video, and integrated control systems work indicated on the associated “AV” drawings and specified herein. Notwithstanding any detailed information in this section, provide complete, working equipment. Contractor will provide all materials and assemblies and other such work that is required, whether or not specifically mentioned in these specifications. All equipment shall be completely installed with all the necessary interconnection and wiring to provide fully functioning systems.

L. The AVC is to coordinate with GC/EC for all conduits inclusive of junction boxes and pull-wires.

M. The AVC shall coordinate with the Owner’s lectern supplier to provide the proper cutout for the touch panel. For the retrofit of existing lecterns, a custom bezel, approved by the Owner, shall be provided by the AVC for mounting the new touch panels.

N. The AVC shall coordinate with the Owner’s lectern supplier to provide the proper cutout for the flip-top.

O. DISCREPANCIES
   a. Where there is a discrepancy between drawings and documents, the AVC shall seek clarification and approval from owner. The AVC shall consider all the information in combination and not consider one element alone to meet a minimum requirement. These specifications and the drawings do not necessarily indicate every single component part of each system. It is the responsibility of the AVC to engineer each system and its interconnection in order to provide, furnish, and install completely operational turnkey systems. No error or omission herein or on any related Construction Documents shall relieve the AVC from this responsibility to do so.

4. SUBMITTALS

A. NO OWNER OR END USER SHALL SIGN OFF ON ANY SYSTEM OR SUBMIT FINAL PAYMENT TO THE AV CONTRACTOR IF THESE ITEMS HAVE NOT BEEN DELIVERED.

B. INVENTORY LIST AND DOCUMENTATION
   a. The AVC shall submit a spreadsheet listing the location, brand and model, description, serial number, firmware version, MAC address, and Ethernet ports to be connected to of all network equipment
   b. All custom DSP and Control System programming source code (un-compiled) and compiled versions.

C. AS-BUILT DRAWINGS
   a. After substantial completion of the project, the AVC shall submit marked-up As-Designed drawings as the As-Built drawings. All changes to the As-Designed system shall be indicated on these drawings.
D. SUBSTITUTIONS
   a. Requests for substitutions or deviations shall include the following:
      1. Descriptions of the total foreseeable effect of the substitution or deviation upon the
         design of the project and agreement to be directly responsible for any resultant extra
         costs, whether the costs are incurred by the AVC or other contractors.
      2. Upon request, furnish samples (at no additional cost) to Owner of submitted items
         proposed as substitutes for specified items. Products will be reviewed to determine if
         proposed substitute items meet required function and quality.

E. INSTALLATION PROGRESS
   a. Provide Work Progress schedules keyed to personnel, vendors, and tasks as specified herein
      and provide updates as requested by the Owner.

5. QUALITY ASSURANCE

A. CONTRACTOR QUALIFICATIONS
   a. The AVC should have had at least five (5) years of experience in the programming,
      fabrication, assembly, and installation of the audiovisual presentation, conferencing and
      remote control systems of comparable size, magnitude and quality in regards to
      coordinating, engineering, testing, certifying, supervising, training and documentation as
      specified for the subject job.
   b. The AVC shall be an authorized dealer of the necessary manufacturers, in good standing.
      The manufacturers’ warranty shall be authorized to be transferred to the Owner upon
      commissioning of the system.
   c. The AVC’s Audiovisual Technicians assigned to the system shall be trained, qualified, and/or
      certified by the respective original equipment manufacturers on the engineering
      installation, operation and testing of the systems. The AVC shall provide formal written
      evidence of current original equipment manufacturer’s certification(s) for the installer(s. At
      least one (1) Crestron CTI certified programmer and one (1) DigitalMedia Certified Engineer
      (DMC-E) shall be assigned to oversee the installation of the system.
   d. The AVC must have a Biamp Tesira Certification onsite.
   e. The AVC shall respond with an on-site technician within 24-hours of a service call (including
      Saturdays and Sundays) for all equipment and system failures that occur during the
      warranty period. AVC to provide name(s) and telephone number(s) of service personnel to
      be contacted regarding repair and maintenance.

B. QUALITY OF MATERIALS AND EQUIPMENT
   a. All materials and equipment supplied by the AVC shall be new and shall meet or exceed the
      latest published specification of the manufacturer in all respects.
   b. The AVC shall supply, at a minimum, the latest model, available at the time of bidding, of
      each piece of equipment.
   c. The materials and completed Work of this Section shall conform to the applicable
      requirements of all current local and state codes, and of the following reference codes:
      1. Occupational Safety and Health Act of 1970 and all amendments thereto
      2. National Electrical Code, ANSI C1, as amended by all state and local codes
3. Uniform Building Code
4. All Authorities Having Jurisdiction (AHJ)

6. DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in manufacturer's original undamaged packages or in bulk packing, which provides equivalent protection.
B. Store packaged equipment off ground or slab in manner to protect them from elements, especially moisture damage.
C. As no storage is available by the Owner, AVC must be flexible with multiple equipment delivery locations and times.
D. Timely delivery and installation of material required for the Work of this Section is the responsibility of the AVC. The AVC shall determine equipment lead times prior to developing a construction schedule, and shall be held responsible for all delays associated with both the specified and alternate materials, and for the timely submittal of proposals, submittal items, drawings, and other information in order to expedite the Work and to avoid delays.
E. Costs of all shipping to the site, and of all storage requirements shall be borne by the AVC. It shall be the responsibility of the AVC to make appropriate arrangements, and to coordinate with authorized personnel at the site, for the proper acceptance.
F. During the installation, and up to the date of final acceptance, the AVC shall be under obligation to protect his finished and unfinished work against damage and loss. In the event of such damage or loss, the AVC shall replace or repair such work at no cost to the Owner.

7. COORDINATION

A. GENERAL
   a. The proposed work is to be accomplished in an existing occupied building, the AVC shall make every effort to keep noise levels to a minimum. In cases where extreme or disruptive noise levels are expected, coordinate with the Owner for convenient times for that work. The AVC should thoroughly examine the scope of work to anticipate excessive noise level periods and should prepare his proposals accordingly if after hours work is required.

B. JOB SITE SUPERVISION
   a. The AVC shall provide a working project superintendent to oversee the work of their employees and subcontractors.

C. SPECIFIC SITE CONDITIONS
   a. The construction work should be performed during job-site work hours. The AVC shall be required to coordinate all construction activity to eliminate impact on traffic and normal operations of existing tenants.
   b. The AVC shall be responsible to survey all areas to locate poke-thrus, furniture openings, sleeves, conduits, cable trays, conduit stub-ups, back boxes and pull boxes provided by others for the A/V cabling.
   c. The AVC shall be responsible for verifying on-site conditions during the mandatory site walk of all systems, equipment and conditions that directly or indirectly affect the AVC’s scope of work to include, but not limited to:
1. Walls painted
2. Carpet or other floor covering installed
3. All power and conduit installed as per project drawings and schedules
4. All A/V devices installed by the EC or GC such as A/V back boxes, A/V floor boxes, room lighting A/V interfaces
5. All A/V related CATV, data, ISDN, T-1, IP, voice and analog lines
6. All A/V related furniture installed such as lecterns, credenzas, board/conference tables, closets and other millwork designed to house A/V equipment
7. All obstructions hidden by ceiling
d. The AVC shall be responsible for protection of his work from all environmental conditions. Any delivery schedules affected by environmental conditions shall be noted to the CM not less than 72 hours prior to the day of scheduled delivery with just cause documented in writing.
e. The AVC shall meet all local, state, and federal building and fire codes.
f. The AVC shall coordinate the finish required for all fixtures, plates, panels, grilles, and enclosures supplied as part of this specification section with the Owner. The AVC shall supply finish samples as requested.
g. The AVC shall be responsible for coordination with the Millworker for any A/V items to be built or mounted into millwork.
h. It shall be the responsibility of the AVC to cooperate at all times with all contractors doing work on the project, to the end that lost time, work stoppages, interference, and inefficiencies do not occur.
i. Perform field surveys to determine existing cabling and mechanical conditions. Verify existing as built documents and conditions including cable labeling and ensure new documentation and installation cabling is coordinated and appropriately labeled.
j. Project Meetings
1. It shall be the responsibility of the AVC to supply any necessary requested information and have its project supervisor in attendance at all project meetings in order to coordinate with all related trades.

8. EQUIPMENT
A. MAJOR EQUIPMENT
a. All equipment and material shall be new and of the latest model offered by the manufacturer.
b. Material and equipment specified herein have been selected as the basis of acceptable quality and performance and have been coordinated to function as components of the specified systems. Where a particular material, device, piece of equipment or system is specified, the current manufacturer's specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail. Each material, device or piece of equipment provided hereunder shall comply with all of the manufacturer's published specifications for that item.
c. The audiovisual equipment specified consists of all major equipment for the project. The AVC shall integrate all components and provide any additional components, wiring, or accessories required to complete a functional system.
d. The manufacturer specifications shall be considered as minimum performance levels of acceptance. These characteristics are part of a design as a whole and particularly the Owner's designs are in full coordination with these characteristics.
e. Small Parts - Systems are described in terms of major products. Even if not specifically mentioned, provide and install patch cables, connectors, hardware, converters, power supplies, labels, terminals, mounting accessories etc. necessary for complete and working system meeting design intent of specifications.

9. OWNER FURNISHED EQUIPMENT
A. The Owner reserves the right to furnish any materials necessary for the project.
B. For items of equipment which are to be installed but not purchased as part of the Work, the Work shall include:
   a. Coordination of delivery
   b. Safe handling and field storage up to the time of permanent placement in the project
   c. Correction of any damage to the item(s) by the AVC
   d. Mounting in place and connection(s) as specified

10. SUBSTITUTIONS
A. Model numbers and manufacturers included in this specification are listed as a standard of quality, complexity, and capabilities due to the current enterprise system in place at UNLV.
B. Proposals for equipment from other manufacturers shall be considered subject to approval by the owner. Unless approved by the Owner, the AVC shall not supply or install any equipment not specified herein.
C. AVC shall submit full technical data sheets, and any necessary system drawings to demonstrate how the proposed equipment would be used in the system to meet the specification. Substitution requests must be received no later than the last day for questions in accordance with the IFB. Any requests received after that date may be rejected.
D. Bidding AVC shall be responsible for all costs associated with submission, review, and approval process for substitutions as well as any item of equipment or hardware not specifically shown on the drawings or specified herein that is required for proper system operation or installation. In the case of a conflict between specified equipment, the AVC shall notify the Owner of the conflict specifics and include proposed modifications to resolve the conflict. The Owner will review the proposal and determine what course of action will be necessary to achieve a resolution.
   a. When a specific piece of equipment specified has been discontinued and/or replaced by a new model, substitution will be acceptable only when the Owner has approved submission of complete data on the new model or substitute.
   b. Subject to the functional and minimum performance requirements for each item, the Owner may require independent laboratory tests proving equivalence of certain alternative equipment not fully or adequately described by the technical specification of the manufacturer. Any and all costs arising from equivalency testing shall solely and completely be the responsibility of the AVC.
E. UNLV alone shall determine if a substitute item is equal to what was requested and the decision will be final.

10. EXECUTION
A. GENERAL
   a. Any item of equipment or hardware not specifically shown on the drawings or specified herein that is required for proper system operation or installation, shall be furnished and installed and be of the highest quality available.
b. The performance of all equipment must meet the most recently published manufacturer’s data sheet.

11. EQUIPMENT LAYOUT

A. The equipment layout and locations shall be as detailed herein and in the A/V drawings and architectural layouts.

12. FABRICATION AND INSTALLATION

A. GENERAL
   a. All installation practices shall be in accordance with, but not limited to, these specifications and drawings. Installation shall be performed in accordance with the applicable standards, requirements, and recommendations of authorities having jurisdiction.
   b. Installation of the system in a manner that will comply with BiCSi, ICIA and routing of all audio, video and control cabling elements of the final design in a subtle, unobtrusive manner to maintain the architectural and visual integrity of the building.
   c. If, in the opinion of the AVC, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the owner. Modifications shall not commence without written approval from the owner.
   d. The AVC must take such precautions as are necessary to guard against electromagnetic and electrostatic hum, to supply adequate ventilation, and to install the equipment so as to provide maximum safety to the operator.
   e. Care shall be taken during installation to prevent chips, scratches, dents, and other cosmetic damage to the product. It shall continue to be the AVC responsibility to protect all material from damage and/or theft once installed prior to Owner’s acceptance and handover. Any damaged products must be repaired or replaced prior to installation.
   f. To insure a proper finished appearance, the AVC shall furnish and install trim/escutcheon components at all conditions where A/V components pass through the finished ceilings. This would include but not be limited to video projector supports, flat-panel display supports and any other component which is not specifically supplied with integral flanges/trim components; i.e. speaker mounts, assistance listening devices, etc.
   g. All trim components at the ceiling plane shall be finished to match the approved ACT ceiling grid system components. The AVC should obtain a sample from the Owner, including any custom color information, or standard color numbers.
   h. Dimension Verification - Verify dimensions and space requirements to assure that proper mounting, clearance, and maintenance access space is available for system components.
   i. Clean-Up - Leave project clean each day. Place debris where designated by Owner. Debris includes but not limited to: solder splatter, cable ends, stripped insulation, spent crimp connectors, gypsum board and ceiling tile dust, and product wrappings and cartons. After completion of installation, thoroughly clean areas worked, including non-visible areas such as equipment rack interiors, rack top panels, and inside lockable floor and wall boxes.

B. MOUNTING
   a. All mounting and attachment methods shall follow industry approved and recommended practices and shall be designed for applicable static and dynamic loads. Double sided adhesive tape is not considered to be permanent mounting solution.
b. Mounting - Mount equipment and enclosures plumb and square. Ensure that permanently installed equipment is firmly and safely held in place. Design equipment supports to support loads imposed with project safety factor of five (5) or greater.

c. Separate safety cable shall be provided for all overhead items (lights, loudspeakers, video projectors, etc.) Safety cables shall attach directly to the suspended device and a structural member capable of supporting the load. Safety cables and their fittings shall be designed to withstand impact loads in any direction and shall permit replacement of the device without damaging the safety cable or attachment fittings.

d. Threaded Connections
1. All nuts and bolts used together shall be matched in grade and shall conform to U.S. Standard (ANSI, ASTM, and SAE).
2. All load-bearing fasteners shall employ a nylock locking system that can be verified by visual inspection. Split washers, star washers and any thread-damaging nuts, as well as double nuts are not acceptable.

C. EQUIPMENT RACKS
a. All specified equipment listed must be mounted into equipment racks.
b. Provide unused rack space with blank or ventilating panels.
c. All equipment shall be rack mounted and/or permanently attached. All power supplies, rack mounts, interconnects, brackets, etc., shall be included while they may not be specifically called out herein. See attached rack elevation drawing.
d. Any equipment with front-panel controls that are not required for daily use shall be furnished with protective covers or programmatically locked out to prevent unwanted or inadvertent tampering. Supply and install security covers on any electronics with front panel controls that should not need to be adjusted after initial set-up, per UNLV specification.

e. If decorative equipment fascia interferes with flush mounting of security covers:
   1. Fascia shall be removed, if possible
   2. If removal is not possible, custom method to affix security cover to be approved by Owner.

f. UNLV will provide Bryce security bits and Bryce security screws to secure rack components.
   1. One (1) security screw per piece of rack-mounted hardware in the bottom right corner.
   2. Standard Mid-Atlantic rack screws for blank panels and vents

g. Ventilation and Cooling:
   1. AV equipment racks are to be fitted within air-conditioned spaces in order that component’s operating temperatures do not exceed manufacturers’ recommendations.
   2. If rack is not located within technical space, proper furniture with adequate ventilation will be supplied to architectural design.

h. Rack screws shall be tightened to a maximum torque of 24 in/lbs.
i. Rack screws shall be used in all available screw holes, except as otherwise noted.
j. Equipment mounted on shelves shall have ‘L’ brackets preventing equipment rearward motion.
k. Equipment mounted on shelves shall have a security bar to prevent motion.
l. Cable ties shall be hook and loop type fasteners with minimal 1” overlap around cables.
m. Excess signal cabling shall be looped at source device.

D. WIRING AND CABLE HARNESSSES
a. All shielded cables shall be insulated. Shields shall not contact conduit, raceways, boxes, panels, or equipment enclosures.
b. Service loops shall be maintained in or adjacent to all enclosures, termination cabinets, racks, and junction boxes. Service loops shall not be excessive in length causing undue crowding in cable raceways. Cables shall be neatly harnessed and dressed with Owner approved hook and loop ties with the appropriate amount to allow for future expansion.

c. All cables shall be harnessed according to professional practices and to prevent mechanical stress on electrical connections. No cable shall be supported by a connection point.

d. All wire and cable shall be continuous and splice free for the entire length of run between designated connections or terminations.

e. Care shall be exercised in wiring so as to avoid damage to the cables and to the equipment. Do not exceed cable manufacture’s pull-force or bend radius recommendations

f. Individual cables shall exit the harness at the same elevation as the equipment to which the cables terminate.

g. Serial data interfaces shall be wired using appropriate cable with an overall shield. These cables shall be terminated with an appropriate connector that plug directly into the serially controlled device.

h. Microphone and AC power shall by not less than 4”.

i. Cables running in plenum spaces without conduit shall be plenum rated cable. Cables running in areas exposed to environmental factors such as, but not limited to, UV, chemicals, direct burial, etc. shall be rated for such exposure and shall match the performance characteristics of its equivalent cable as specified.

j. All wire bundles are to be neat and combed free of cable crossovers.

k. As a general practice, all power cables, control cables, and high level cables shall be run on the left side of an equipment rack as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear.

l. Cables ties shall be placed at appropriate intervals of no greater than six inches for vertical bundles, two inches for horizontal bundles.

m. All vertical cable bundles shall be attached to the rack frame.

n. Except where noted otherwise in the specifications, NO BARE WIRE TERMINATIONS WILL BE ACCEPTED. Heat-shrink tubing shall be used to insulate the ground or drain wire.

o. Unused wires at the end of a cable shall remain unstripped and shall be laid back and held in place with wire ties.

p. When connection stranded wire to compression screw terminals, do not tin the wire ends. When inserting wires into a compression terminal, take proper care to insert only the stripped portion of the cable.

q. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4 inch of insulation from the stranded conductor. Then the un-tinned wire shall be inserted into the terminal and the screw tightened using a secure fitting precision screwdriver.

r. All cable ties shall be cut flush with the boot so as not to cut into adjacent cabling or scratch personnel servicing racks.

s. Auxiliary cables shall have a minimum 36” length of cable extending though the cable flip top box.

t. Auxiliary cables shall have an unobstructed path behind the cable flip top box to extend and retract cables.

E. TERMINATION ENCLOSURES (FLOOR BOXES)

a. All cables intended for connection to wall, floor, or ceiling mounted panels shall terminate in the appropriately rated termination enclosure (floor box). Termination of wires and cable,
without an appropriately rated enclosure, will be considered to be defective, and will require replacement.

b. All wiring connections shall be secured so they cannot work loose under normal vibration conditions.

c. The AVC shall field verify all back box installation conditions on site.

d. Clean floor boxes of all dust and debris prior to installation of any active or connector plate.

**F. TERMINATIONS**

a. Proper termination tools and practices shall be used during the termination process. Crimping shall be performed per the connector manufacturer’s instructions.

b. No terminations shall have stress from cable weight or cable bending.

c. Polarity (Audio) shall comply as follows:
   1. The "high" side will be connected to “Pin 2” on XLR connectors
   2. The “low” side will be connected to “Pin 3” on XLR connectors

   a. Microphones will be wired so that an acoustic compression at the diaphragm produces a positive going signal on “Pin 2” with respect to “Pin 3”.
   b. Speakers will be wired so that when a positive going signal is applied to the + or red terminal an acoustic compression is produced.
   c. The system will be wired to maintain absolute polarity through all system components to ensure that a positive signal on “Pin 2” or tip produces a positive signal at the + or red speaker terminal.

d. Shield grounding for audio shall comply with the following to eliminate any possibility of ground loops:
   1. Do not tie pin 1 to the case of XLR connectors anywhere
   2. All audio low-level signal lines will be balanced and floating
   3. Should any other situation arise which would form a ground loop, please inform the Owner for direction.

**G. ELECTRICAL**

a. All AV equipment racks shall have pre-wired AC power distribution strips that conform to an approved testing laboratory specifications.

b. All power supplies shall be located, oriented, and connected electrically so as to minimize hum and RFI interference. Further, all plug-in type power supplies shall be firmly attached using mechanical fasteners to its associated power receptacle to insure against accidental removal and/or connection loss.

c. All joints and connections shall be made with rosin-core electrical solder or with mechanical connectors and insulated with heat-shrink on each conductor as approved by the Owner.

d. Excess power cabling for devices shall be looped at power source, with the exception of service loop at device.

**H. LABELING**

a. Cable labeling shall abide by INFOCOMM International Standard (F501.01:2015).

b. Cable labeling shall follow cable schedules in A/V drawings.

**13. CUSTOM SOFTWARE AND PROGRAMMING**

A. It is required that the AVC be experienced in programming systems with this complexity. Due to the nature of this project, the Owner will be providing the necessary compiled Crestron
program, however the AVC shall be experienced in the necessary manufacturers’ tools to
configure, deploy, and troubleshoot the specified equipment and code. By submitting this bid,
the AVC agrees that they understand systems of this type and that all programming services are
included to the satisfaction of the Owner.
B. The AVC agrees that they will not make any claim for additional monies because of
misinterpretation of programming requirements.
C. The AVC shall provide and install the seamless integration of the management software via the
University’s computer network to all of the classrooms, meeting rooms and auditoriums
specified within this RFP. The AVC shall work directly with the UNLV CTS Department to
implement this function.

14. COMMISSIONING

A. The primary purpose of the official Commission process is to provide the AVC and Owner the
opportunity to fully test and inspect the installation practices and functionality of all systems.
The AVC is to demonstrate to the Owner in each room the operational functionality.

15. TRAINING

A. The AVC shall provide four (4) hours of training for UNLV AV staff, as well as one (1) two (2) hour
training session for UNLV education staff in conjunction with UNLV AV staff. AVC to provide in
advance an outline of the training course content. Topics should include: daily operations,
maintenance, trouble shooting, as well as typical classroom functionality.

16. WARRANTY

A. The system warranty shall be for twelve (12) months from the date of final acceptance and be
inclusive of all necessary parts and labor. AVC to provide all equipment, material, and labor
required to uphold a full system warranty at no charge to the Owner. All manufacturers’
equipment warranties shall be activated in the Owner’s name and shall commence on the date
of final acceptance. In the case of any equipment that has been modified from the factory
conditions where the manufacturer’s warranty has been voided, AVC to provide the Owner with
a warranty equivalent to that of the original manufacturer.

B. AVC to respond with an on-site technician within 24-hours of a service call (including Saturdays
and Sundays) for all equipment and system failures that occur during the warranty period. AVC
to provide name(s) and telephone number(s) of service personnel to be contacted regarding
repair and maintenance.

C. There shall be no cost to the Owner for maintenance performed during the warranty period
beyond the fixed cost of the contracts. AVC to replace or repair, at no cost to the Owner, any
failed equipment hardware or software installations required to provide full system operations.

D. To maintain certain manufacturer’s warranties, said equipment must be installed, aligned and
serviced by those installers authorized by said manufacturer to perform those duties. If the
contractor is not authorized, by said manufacturer, it is his sole responsibility to make the
appropriate arrangements and bear all cost and consequences thereof.
END OF SECTION