



# TECHNOLOGY INFRASTRUCTURE PROCEDURES

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# 1 Preface

## 1.1 Introduction

- A. The Technology Infrastructure Procedures (TIP) document is written to communicate with members of the Utah Valley University (UVU) community about how to obtain telecommunications services at UVU facilities, including telephone, network, WiFi, and other services.
- B. This document was prepared by the Digital Transformation (DX) division at Utah Valley University and by Summit Engineering & Consulting, P.S. As technology and needs evolve, the document will be periodically updated.
  - June 1, 2022 – Originally published
- C. The TIP is written as a companion to UVU's Technology Infrastructure Standards, which are focused on communicating with architects, engineers, and contractors who design and construct technology infrastructure at UVU. These documents are available for download from UVU's website.

## 1.2 Document Intent

- A. The purpose of the TIP document is to improve communication with people and organizations served by UVU DX and improve the results of this service. Please become familiar with the content that is applicable to your organization, and thereby improve DX's ability to meet your needs.

## 1.3 Standards and Guidelines

- A. DX has adopted industry standards and codes as the basis for telecommunications distribution design in UVU facilities. UVU leverages these standards to deliver substantial value and performance benefits.
- B. The requirements contained in UVU's Technology Infrastructure Standards are considered to be in addition to those required under contract with the State of Utah. Where the requirements differ, the issue shall be brought to the attention of the UVU CTO/AVP of OIT/Digital Transformation - otherwise the more stringent requirement shall apply.

## 1.4 Copyright

Summit Engineering & Consulting retains the copyright for this document. Utah Valley University is authorized to edit and adapt the document.

Summit Engineering & Consulting has authored similar documents for many other organizations. The document is intended (in part) to describe best practices that are found in some segments of the industry. As a result, portions of this document are similar to comparable content in documents previously prepared by Summit Engineering & Consulting for other organizations. This document does not contain any information that is proprietary or confidential to other organizations.

## 2 UVU Technology Infrastructure Procedures

This section describes UVU telecommunications procedures, requirements, standard practices, and processes associated with designing, installing, maintaining, and operating telecommunications infrastructure. It is intended for an internal audience of UVU personnel, including:

- Division of Digital Transformation (DX)
- Office of Information Technology (OIT)
- UVU Committees involved with OIT
- Events Center
- Facilities
- Anyone that may be involved in the design, installation, maintenance or use of telecommunications infrastructure, network equipment or telephone equipment at a UVU facility.

### 2.1 UVU Committees Involved with OIT

#### 2.1.1 PRESIDENT’S COUNCIL

The President’s Council is an administrative governing body that is responsible for approving items to forward to Board of Trustees, including curriculum, policies, tuition, benefits, student fees, etc. They are a resource to the President to give feedback on any number of University issues. In addition, they are representatives of their respective divisions and campus groups and are responsible for sharing information with these groups.

#### 2.1.2 UNIVERSITY COMMUNICATIONS COMMITTEE

(UCC) The University Communications Committee assures continued improvement of our communications methods. The University Communications Committee has been implemented to oversee campus communications, including the web. This group has representation from across campus.

- (SCC) The Student Communications Committee is a subcommittee of the University Communications Committee (UCC), and they are involved in the oversight of student communications procedures, tools, and processes.
- (SWAT) The Strategic Web Action Team is under the direction of the University Communications Committee (UCC), and they direct the changes needed to keep UVU’s Web current and dynamic.

## 2.2 Everyone

The following procedures apply to anyone that may be involved in the design, installation, or maintenance of technology infrastructure at a UVU facility. It also applies to everyone who uses cabling and technical equipment in University spaces.

### 2.2.1 DO NOT ALTER TELECOMMUNICATIONS CABLING, EQUIPMENT AND SPACES

Cabling and technical equipment shall not be altered by anyone other than specifically authorized personnel from OIT Infrastructure Services. Audio/visual equipment and its associated cabling shall not be altered by any unauthorized person. Doing so will cause interoperability problems with network equipment and may void manufacturer warranties. Please do not:

- Remove installed connectors
- Attempt to access locked panels
- Remove patch cables
- Store non-technical materials in spaces dedicated for technical purposes

Anyone needing assistance with cabling and technical equipment or access to spaces dedicated for technical purposes should contact the Servicedesk for assistance.

### 2.2.2 GETTING HELP FROM THE SERVICEDESK

All requests for IT assistance should be submitted to the Servicedesk:

- Call 801.863.8888
- Self-Service: <https://uvu.edu/servicecenter>
- Chat/website: <https://uvu.edu/servicedesk>
- Walk-in: BA-013

All requests for Classroom A/V assistance should be submitted to the AVSE Servicedesk:

- Call 801.863.1111
- Email [media@uvu.edu](mailto:media@uvu.edu)
- See <http://www.uvu.edu/media>
- AVPM [Travis.Tasker@uvu.edu](mailto:Travis.Tasker@uvu.edu)

Requests will be addressed in one of the following ways:

- Telephone assistance
- On-site assistance
- Logging a trouble ticket
- Requesting a project

Support for issues affecting existing systems will be given priority over new implementation requests.

AVSE is most efficient in meeting your needs when you work through our normal channels. We are committed to applying our best efforts to address each request in a timely and professional manner.

When your request is received, it will be evaluated by the Servicedesk and assigned to the appropriate specialist area to address your needs.

The Service Desk is dedicated to providing quality support and services to students, employees, and the community. We strive to provide these services in a friendly and timely manner.

All requests to the Service Desk are triaged and documented as a request through Jira Service Management.

Once documented, requests are processed in a timely manner. While most requests are resolved at the Service Desk, some may be escalated to the proper specialist/area if necessary.

Outages reported to the Service Desk are promptly communicated to the Operations and Enterprise Systems Administrations team for further investigation.

### **2.2.3 NEW PROJECTS**

Please contact OIT to discuss any new projects, new technologies needed or other requests meeting at least one of the following criteria:

- Requiring more than 72 hours of effort
- Creates a new system that must be managed and administered
- Costs more than \$3000
- Activities with a high-profile visibility

### **2.2.4 PROCUREMENT**

Procurement of telecommunications cabling, network electronics and telephone equipment shall be handled through OIT.

Please do not purchase any equipment that attaches to the University network or telephone system without involving OIT, even while following otherwise normal procurement procedures.

OIT's IT procurement procedures are fully detailed here:

- <https://uvu.edu/oit/policy/supportstandards/index.html>

Non-standard items (particularly wireless access points (WAP) and network switches) will interfere with the University network. OIT will confiscate unapproved devices that are discovered on the network. Please work with OIT for all technology procurement.

Purchasing personnel meet twice monthly with OIT to coordinate the procurement of all technology needs.



## **2.2.5 SERVICE OUTAGES**

### **2.2.5.1 PLANNED OUTAGES**

Planned networking and telecommunications outages shall be scheduled with facilities, posted on the OIT change calendar, and coordinated with ATSC, after which a notice is published.

Planned power outages shall be coordinated with OIT and ATSC, and published on the change calendar, after which a notice is published.

#### **2.2.5.1.1 CALL BEFORE YOU DIG**

Before digging on the UVU campus for any reason, the Facilities project manager supervising such work shall contact Blue Stakes of Utah. In turn, Blue Stakes will typically notify UVU to locate any University-owned outside plant ductbanks and cabling.

For faster service, the Facilities project manager is welcome to contact OIT directly after first contacting Blue Stakes.

### **2.2.5.2 UNPLANNED OUTAGES AND DAMAGE TO EXISTING INFRASTRUCTURE**

Construction, maintenance, and other activities may result in damage to existing telecommunications infrastructure. Regardless of the cause or party responsible, whoever observes a damage situation shall immediately contact UVU OIT.

The party responsible for the damage to the telecommunications infrastructure shall be responsible for the total cost of the temporary repairs and the full restoration / replacement costs.

All damaged infrastructure shall be restored to within the scope of the original design/installation parameters. This shall include, but not be limited to, all repair or replacement work performed by certified cabling installation contractors of UVU's choosing, all testing and recertification of the infrastructure for full compliance with UVU's Telecommunications Standards, and applicable SCS warranty.

Please note that splicing will not constitute an acceptable repair for damaged fiber optic cabling. Damaged fiber must be replaced in its entirety.

#### **2.2.5.3 POST-RESTORATION ASSESSMENT**

After completing the restoration of damaged infrastructure, an assessment process is conducted. It is hoped that through these processes, institutional learning will occur that will lead to fewer unplanned outages and disruption.

If the event involved Facilities, EIP or ATSC, representatives from those organizations will be included in the process.

The Post-Restoration Assessment is conducted in the "Post-Mortem" blocks in the flowcharts above.

## 2.3 Events Center

Events Center telecommunications needs can vary greatly due to the diverse nature of events that take place at the University. These events can range from athletic events, trade shows, entertainment events, and conferences, and can be anything in between.

UVU's wireless network is not designed to support these events without advance coordination with OIT. The following technology-related requirements shall be addressed as conditions of the contract for all Event Center customers:

- All needs for network services shall be identified and addressed before the event takes place. The Event Coordinator shall coordinate with OIT to identify the services that will be required and when the services will be needed.
- UVU's wireless network is not a production network. The availability, stability, and security of the UVU wireless network cannot be guaranteed. The UVU wireless network is designated a network for convenience only.
- Wired connections will be provided as the standard practice for customer service networking needs. Wireless connections will only be provided as a last resort for situations where wired connections cannot be provided.
- The Event Coordinator is responsible to notify customers that the existing wireless network may not meet all the customer's immediate needs.
- Non-secure payment card data transaction processing is strictly prohibited from being conducted through the University's network (wired or wireless). There shall not be any expectation of privacy via UVU networks (wired or wireless). The Event Coordinator is responsible to inform the customer of this limitation.
- Customers selling products at an event are strictly prohibited from using the University's network (wired or wireless) as a means of processing non-secure payment card data transactions. Customers are required to provide their own secure transaction processing system, independent of the University's network.
- Customers of the Events Center shall not be permitted to set-up or install their own wireless networking systems without coordinating with the Event Coordinator prior to installation. It is the Event Coordinator's responsibility to work with OIT prior to the event to arrange private customer wireless networking systems. Non-coordinated wireless networks will interfere with existing wireless networks of the institution.
- If customers require private wireless networking systems for their event, this service shall be negotiated with the Event Coordinator at the time of booking. The Event Coordinator will then work with OIT to make any necessary arrangements prior to the start of the event.

Event Coordinators shall not make any technology commitments to customers without written approval from OIT.

## **2.4 Facilities**

### **2.4.1 ACCESS TO UVU COMPUTING RESOURCES FOR NON-UVU TENANTS**

The Vice-President of Finance & Administration (with assistance from the President's Cabinet) is responsible for establishing contracts with non-UVU tenants residing in UVU facilities.

While virtually all tenants require telephone and Internet services, there are numerous complications associated with providing these services, including:

- Handling of confidential information
- Quality of service expectations
- Loss of business due to service outages
- Support of commercial interests using State service resources

Therefore, including these services within the lease contract is strongly discouraged.

#### **2.4.1.1 OBTAINING TELEPHONE AND INTERNET SERVICES**

Non-UVU tenants shall obtain telephone and Internet services as follows:

- Tenants shall contract directly with the telephone and Internet utility service providers for the services they require.
- The ITPM will help coordinate new service provisions for tenants. Generally, tenant services shall demark in one of the following locations:
  - Student Center Room SC-108F
  - Woodbury Building WB-104
  - Computer Science CS-608
  - Clark Building CB-106
- OIT will then assign dedicated campus backbone fiber and/or copper pairs to route the tenant's services from the demark to their space on campus.

Any technology-related tenant needs shall be addressed as conditions of the contract for all tenants.

#### **2.4.1.2 CONSTRUCTION TRAILERS**

Telephone and Internet services for construction trailers shall be provided as discussed above for non-UVU tenants. The Contractor shall then be required to provide their own cabling from the nearest telecommunications room to their trailer. Any underground or aerial routing to the trailer shall be coordinated in advance with OIT.

## **2.4.2 COORDINATION**

Facilities and OIT have a mutual interest in the success of projects on campus. Regular coordination is essential to project success and is key to reducing the life-cycle costs of University assets.

### **2.4.2.1 MEETING SCHEDULE**

The Facilities Services department holds a regular Facilities Coordination meeting. OIT representatives attend this meeting to discuss applicable technology issues, including:

- New projects
- Tracking and review of current project status
- Projects without technology components, but which may offer attractive opportunities for expanding technology infrastructure
- Planned excavation activities

## **2.4.3 INITIATING NEW PROJECTS**

OIT's definition of a successful construction or renovation project involving technology includes the following facets:

- Appropriate selection of technical features
- Flexible solutions that are adaptable to support unknowable future requirements
- Favorable first cost
- Favorable long-term costs (life-cycle costs)

Several points of coordination between OIT and Facilities are key to successful projects:

### **2.4.3.1 OIT INVOLVEMENT FROM START OF PROJECT**

All additions or modifications to telecommunications infrastructure, regardless of the size or scope of the project or quantity of cable involved, involve the appropriate UVU OIT representative(s) from the beginning of the project.

All new construction projects require the involvement of the appropriate OIT representatives from the beginning of the project.

### **2.4.3.2 STANDARDS COMPLIANCE IS REQUIRED**

All telecommunications infrastructure shall be installed in compliance with the requirements of this document.

### **2.4.3.3 BUDGETING**

OIT stands ready to assist Facilities with the preparation of budgets for new projects. Please request OIT involvement before finalizing any budgets.

Upon request, OIT can provide a set of general guidelines for establishing project budgets, including both the Construction budget and the Furniture, Fixtures and Equipment (FF&E) budget.

ATSC should also be involved in the budgeting process.

#### **2.4.3.4 SYSTEM INTEGRATION**

Great technical advances have been made in recent years resulting in numerous systems that now communicate via the campus network, and many of these systems now require a “quality of service” above certain levels. The following are examples of systems or processes that now require secure, stable networking:

- HVAC / environmental control systems
- Mechanical / DDC control systems
- Security and intrusion detection systems
- Access control systems
- Surveillance video systems
- Infrared scanner systems
- Handling of personally identifiable information (PII)
- Financial transactions

Do not expect wireless networking to provide the capacity, reliability or security required to handle these systems.

It is therefore crucial to the success of these systems that Facilities coordinate with OIT during the planning and design phases to ensure that adequate network and infrastructure are included in the design.

#### **2.4.4 SPACE ALLOCATION**

In the life of a building, the cabling and equipment components of the technology infrastructure will be changed several times as advances occur, and systems become obsolete. To keep the life-cycle costs low, it is therefore essential that spaces and pathways supporting the technology infrastructure be properly sized, properly located and remain accessible.

Please use the following guidelines when allocating space for technology infrastructure in new projects:

##### **2.4.4.1 TELECOMMUNICATIONS ROOMS**

When considering the budgeting requirements for a new project, the following items should be included for each telecommunications room (TR):

- TRs should be located centrally within the areas they serve. TRs should be vertically stacked from floor to floor.

- TRs require 24x7x365 air conditioning, with a preference for AC equipment that is located outside the TR with the controls in the TR. Split systems are acceptable for remodel projects.
- TR doors shall swing out of the room.
- Access control card readers should be provided for all telecommunications rooms (MDFs and IDF), and access permissions limited to authorized OIT personnel.

OIT recognizes that floor plan space set aside for technology infrastructure reduces the amount of space that can be allocated to other valuable programs and purposes. In an effort to be frugal with University resources, the telecommunications room sizes below have been developed to be “**optimally minimum.**” This means that the rooms cannot serve their intended purposes and meet Code requirements if they are made smaller in either dimension. The rooms could be increased in size; however, this additional space would not necessarily be put to good use.

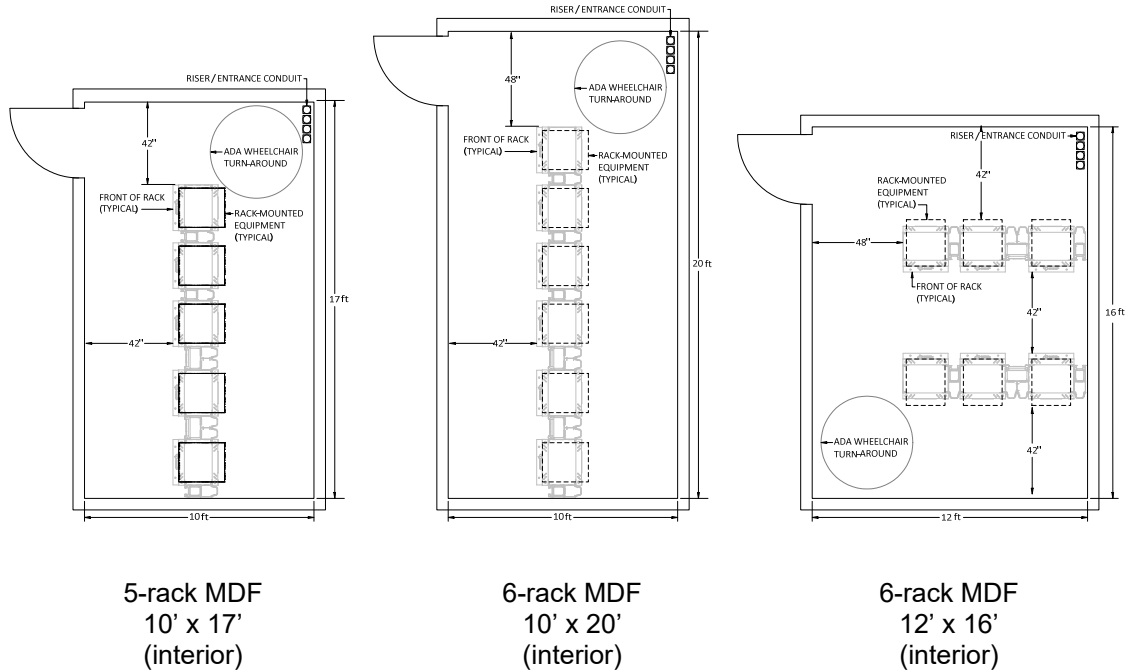
- Frequently (during the design process), value engineering considerations target telecommunications rooms as a source of additional space that might be used for other purposes. OIT considers the spaces described below as being “already value engineered.” OIT will not agree to size reductions to these spaces.
- All room sizes listed in this document are the inside-clear dimensions (between wall surfaces) of the rooms.

Telecommunications rooms shall not be used for non-technical storage purposes.

#### 2.4.4.1.1 MAIN (MDF)

The main telecommunications room (also known as the “MDF”) in the building is typically located on the lowest floor of the building. It is almost always larger than the other telecommunications rooms in the building and will typically contain 5 or 6 racks.

Below are some options for main telecommunications room floor plan (interior) sizing:



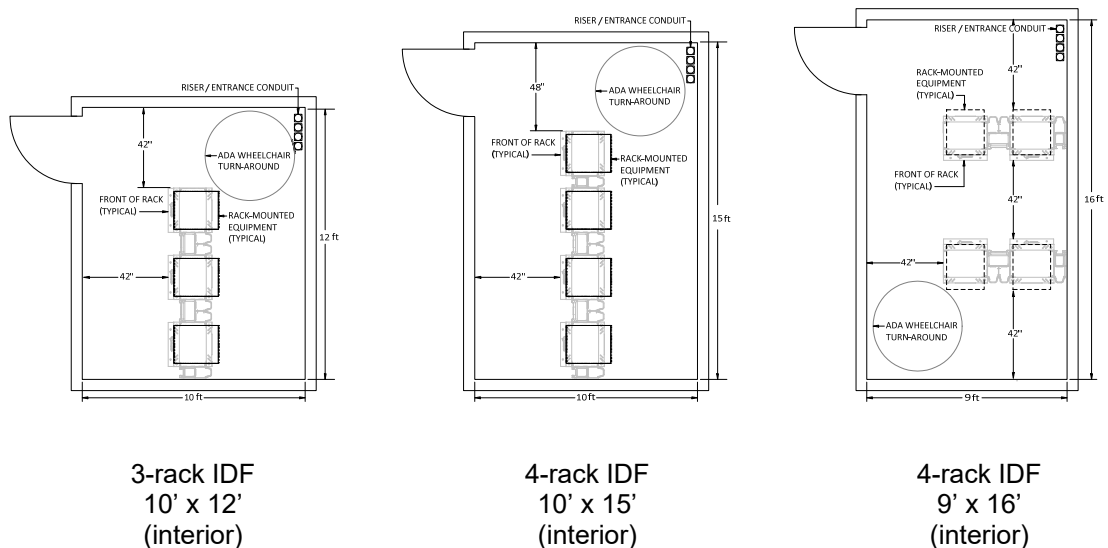
The UVU ITPM will work with Facilities to identify whether a 5-rack MDF or a 6-rack MDF will be required for a given project.

#### 2.4.4.1.2 SECONDARY (IDF)

In addition to the main telecommunications room (MDF), additional secondary telecommunications rooms (also known as "IDF") will be required. At least one per floor will be needed.

The number of racks required is dependent on the quantity of cabling that the room will serve. Typically, an IDF will need 3 racks in a 10' by 12' room (interior dimensions).

Below are some options for secondary telecommunications room (IDF) floor plan sizing:



The UVU ITPM will work with Facilities to identify whether 3-rack IDF's or 4-rack IDF's will be required for a given project.

#### **2.4.4.2 CABLE TRAYS**

UVU uses cable trays to distribute cabling throughout its buildings. Cable trays should be installed in corridors or other accessible spaces. Ceilings below cable trays must be accessible. Hard-lid (gypboard) ceilings prevent access to cable trays.

Cable trays should not be installed above offices or classrooms for the following reasons:

- It is very difficult to work with ladders in office spaces. Removing ceiling tiles and working above desks disrupts the users and spreads ceiling dust on their desks.
- Coordinating around class and office schedules causes inefficiency and longer response times.
- If cable trays are installed in classrooms, all cabling work must be scheduled around class times.

The minimum space required for cable tray along the entire length of main corridor ceilings is:

- A minimum clear space of 12 inches adjacent to the side of the cable tray to allow technicians to stand next to the tray (on a ladder) and add or remove cabling.
- A minimum clear space of 10 inches (head height) above the cable tray to allow for cables to be added to or removed from the tray.

Therefore, the minimum overall cross-sectional area for a 12"x4" cable tray and the associated working space is 24" wide x 14" high. Wider trays will require more space.

#### **2.4.4.3 AUDIO / VISUAL EQUIPMENT ROOMS**

In most classrooms and small auditoriums (seating less than 150 people) the audio / visual equipment will fit inside the Teacher Station. An A/V Equipment Room will be required for larger auditoriums as follows:

- For auditoriums designed to seat 150-249 people, a 10' x 9' A/V Equipment Room is required. The room will host one A/V equipment rack and one telecommunications rack.
- For auditoriums designed to seat more than 250 people, a rear projection room is required, located behind the presentation wall. The rear projection room shall be as wide as the presentation wall, twice as deep as the height of the presentation wall and have clear ceiling space as high as the presentation wall.



- The rear projection room will host any needed A/V Equipment racks.
- A separate 10' x 9' telecommunications room (secondary IDF) is also required. If the Auditorium is less than 100 ft from a major telecommunications room on that floor, this requirement might be waived.

## 2.4.5 AUDIO/VISUAL FEATURES IN BUILDING SPACES

In the life of a building, technology advances occur, systems become obsolete, and the cabling and equipment components of the technology infrastructure will be changed several times (typically following a 7-year replacement cycle). To keep the life-cycle costs low, it is essential that spaces and pathways supporting technology infrastructure be properly sized, properly located, and remain accessible.

Please use the following guidelines when considering the audio/visual features of spaces in new projects:

### 2.4.5.1 CLASSROOMS & INSTRUCTIONAL SPACES

Classrooms and instructional spaces are designed in a variety of sizes and functions:

Space Type	Student Capacity	Room Configuration
Classroom/Teaching Lab	up to 150	Movable tables and chairs with a designated Teacher Station to one side.
Collaboration Labs	up to 60	Configurable tables (up to 10) for pods of up to 6 people. Room equipment will be rack-mounted in a custom credenza.
Horseshoe Classroom	up to 150	Fixed tables with movable chairs, with a designated Teacher Station off to one side.
Lecture Hall	151 – 250	Fixed tables with movable chairs, with a designated Teacher Station off to one side.
Auditorium	250 or more	Fixed tables with movable chairs, with floor boxes for adjusting the location of the Teacher Station or lectern on the stage.
Large Auditorium	1000 or more	Fixed tables with movable chairs, with floor boxes for adjusting the location of the Teacher Station or lectern on the stage.

#### Standard Feature Set:

- Audio/visual equipment rack housed in custom furniture (see Appendix)
- Projection screen and projector
- Document camera
- Blu-ray player
- Touch panel control interface
- External VGA, HDMI, Data, 1/8" audio connections for user devices
- Stereo and PA audio with amplifier and speakers
- Presenter microphone (wireless lapel)
- Assistive listening system
- Whiteboards
- Acoustic wall treatment as required
- Instructor computer, with network
- Standard office and presentation

- Wireless Video Solution software
- Lecture Capture

Classrooms may include also soft Video Conferencing equipment.

#### 2.4.5.1.1 LARGER SPACES

As Classroom and Instructional spaces increase in size to support larger groups, the following additional features will also be required:

##### Standard Feature Set:

- Digital signal processor (audio)
- Different audio amplifier(s) with sufficient power to support the higher power stereo speakers
- Public address amplifier (70 Volt)
- Additional microphones
- Speakers sufficient for the space
- Multiple projection displays and surfaces, including additional projectors
- Additional equipment racks
- Audio/Visual Equipment Room (approximately 10' x 9')

#### 2.4.5.1.2 VIDEO CONFERENCING SPACES

Video conferencing spaces are designed to support two-way video conferencing with other classrooms and distance sites. In addition to the presentation audio/visual features of Classrooms and Instructional Spaces, Distance Education spaces will also have the audio/visual features listed below:

##### Standard Feature Set:

- Cameras
- Video codec
- Additional video panels
- Additional cameras
- Acoustic wall treatment
- Instructor computer
- Lecture capture application
- Standard office and presentation software
- Ceiling microphones (hanging, beamforming)
- Technical Operation Station (in-room)

#### 2.4.5.2 COLLABORATION LABS

Collaboration Labs are designed to support groups of 2-6 people in numerous pods. Pods will work independently and have the ability to be linked together. The number of pods in a lab will be determined by the size of the space.

##### Standard Feature Set:

- Audio/visual equipment rack housed in custom credenza (see Appendix)
- Button panel control per pod and touch panel for the entire room
- External VGA, HDMI, Data, 1/8" audio connections for user devices and touch pad at the credenza
- Audio per pod via video panel or external speakers and PA audio with amplifier for larger space
- Whiteboards next to each pod display
- Standard office and presentation software

- Multiple displays for groups of 2-6
- Facilitator computer, with network
- Wireless video solution (per pod)
- Collaboration software
- White-boarding software

Collaboration labs may include lecture capture capabilities, interactive video panel displays for each pod, computers per pod, soft video conferencing equipment, etc.

### 2.4.5.3 THEATERS

Theater spaces are defined as Small, Medium, and Large Theaters.

#### Standard Feature Set:

- Audio/visual equipment racks
- Video projector(s) and projection surface(s)
- Building wide digital video distribution system/matrix
- Flat Panel displays throughout the venue, including lobbies, light booth, sound booth, backstage, dressing rooms, green rooms, ticketing office, etc.
- Presentation Podium with built-in microphone jack, video monitors, and A/V inputs
- Wired and wireless discrete networks (campus, Dante primary, Dante Secondary, and A/V)
- 400-amp power 3 phase power with posilok/camlok type connectors
- Theater-wide DMX system
- Video surveillance cameras
- Backstage multipurpose area (storage, scenery, etc.)
- Dressing rooms, green rooms, rehearsal spaces, dance studio spaces (all sound-treated to prevent overflow)
- Stage wings ½ width of stage on left and right sides
- Catwalk system
- Emergency lighting separate from other lighting systems in theater (fixtures off by default unless power outage)
- Generator power in light booth, sound booth, and A/V rack areas
- Wireless/wired collaborative screen-sharing system
- Audio system, digital audio mixer, stage monitors, house speakers, and digital audio distribution system (Dante)
- Neutrik XLR and Speakon master patch panel with I/O boxes throughout venue
- Building-wide public address
- Assistive listening system
- Room control panel with presets for lighting, sound, and A/V
- Acoustic wall and ceiling treatment appropriate for venue
- Sound-proofing treatment for theater to prevent sound bleed to neighboring rooms
- Above-stage fly system, single pitch, 1.5x height of proscenium, access from stage and loading dock above stage
- Above-stage and house work lights
- Theatrical lighting fly bars above stage and in house, other “boom” lighting locations in house
- House lighting, dimmable and powered from dimmers or DMX controllable
- Dimmers for theatrical lighting
- Lighting console
- Orchestra pit (depending on size of venue)
- Stage trap door (depending on venue)
- Manual spotlight positions
- Wired and wireless production intercom system

#### 2.4.5.4 MULTIPURPOSE ROOMS

These rooms are intended for hosting a variety of events and are typically dividable.

##### Standard Feature Set:

The following features are typically needed per joined and divided space:

- Audio/visual equipment rack housed in custom credenza (see Appendix)
- Projection screen and projector
- Document camera
- Blu-ray player
- External VGA, HDMI, Data, 1/8" audio connections for user devices
- Stereo and PA audio with amplifier and Speakers
- Assistive listening system
- Touch panel control interface for joined and independent control
- Additional microphones
- Partition sensor

#### 2.4.5.5 CONFERENCE SPACES

Conference spaces are designed in a variety of sizes and functions:

	# of People	Feature Set
Small Conference/Group Study Room	up to 10	Limited presentation features, possibly supporting soft video conferencing
Conference Room	up to 20	Presentation, soft video conferencing and/or distance education video conferencing

Presentation spaces typically need the following features:

##### Standard Feature Set:

- Audio/visual equipment rack (housed inside credenza furniture)
- Projection surface and projector
- Document camera
- Blu-ray player
- Touch panel control interface
- Auxiliary A/V analog and digital connection for user devices
- VOIP conference telephone
- Speakers (may be integrated with the video panel for small spaces)
- Assistive listening system
- Whiteboards
- Acoustic wall treatment as required
- Instructor computer, with
- Standard office and presentation software

Conference spaces may include lecture capture capabilities, interactive video panel displays, integrated computers, soft video conferencing equipment, etc.

#### 2.4.5.6 BOARDROOMS

Physically, Boardrooms are shaped similarly to Conference Rooms; however, the audio/visual features in Boardrooms are more closely resemble full-featured Classrooms.

### Standard Feature Set:

- Audio/visual equipment rack housed in custom furniture (see Appendix)
- Interactive monitors
- Multiple video panels (option)
- Multiple projection displays and surfaces including additional projectors (options)
- Document camera
- Blu-ray player
- Wired microphones
- Touch panel control interface
- External VGA, HDMI, Data, 1/8" audio connections for user devices
- Wireless video solution (support for BYOD personal devices)
- Cameras
- Video codec
- Microphone(s) (desktop, lapel, and/or ceiling-hung)
- Additional video panels
- Additional cameras
- Acoustic wall treatment
- Public Address amplifier and speakers sufficient for the space
- Assistive listening system
- Whiteboards
- Acoustic wall treatment as required
- Instructor computer with network
- Standard office and presentation software
- Teleconferencing
- Controllable, dimmable lighting
- Controllable window shades
- Audio recording
- Digital signal processor (audio)
- Additional equipment racks
- Audio/Visual equipment room (approximately 10' x 9')
- Instructor computer
- Lecture capture application
- Standard office and presentation software
- Tabletop microphones
- Ceiling microphones (beam-forming)

#### 2.4.5.7 HUDDLE SPACE PODS

These spaces are intended for collaboration and are usually placed in hallways or other open areas where small groups can congregate.

The following features are typically needed in a Huddle Space:

- Video panel
- Button panel control interface
- Wireless Video, HDMI, Data, 1/8" audio connections for user devices

#### 2.4.5.8 ENTERTAINMENT SPACES

Spaces for relaxation, social interaction, and entertainment can be created with a variety of applications:

- Sports zones, with multiple video displays and wall button control
- Video game centers, composed of seating furniture surrounding video displays with gaming equipment
- Informational digital signage
- Entertainment displays (not just in sports zones)

These applications will require some or all of the following:

- Special conduit and pathways
- Video panels
- Furniture
- Power and data outlets
- Audio speakers
- Simple control interface
- Signage players and licensing
- Video game equipment
- Digital Graphic Engine for content overlay/control

#### **2.4.5.9 DANCE STUDIOS**

Dance studios are used for academic instruction and artistic practice.

##### **Standard Feature Set:**

- Audio/visual equipment rack (housed inside a credenza)
- Media player
- Speakers
- Acoustic wall treatment
- Audio inputs for personal music players

#### **2.4.5.10 ATHLETIC/PERFORMANCE STADIUMS**

Large facilities are constructed for athletic and performance events. These venues are each unique and require custom-designed solutions.

The following features are typically needed:

- Audio/visual control rooms
- Large video displays
- Video distribution/digital signage
- Audio/visual equipment racks
- Pathways and power for event setup
- Large audio amplifier systems
- Large speaker systems
- Acoustic treatments
- Fixed HD PTZ cameras (not security)
- Extra video surveillance

#### **2.4.5.11 EXERCISE SPACES**

Exercise spaces often have stationary exercise equipment such as treadmills, bicycles, stair climbers, etc. The following features are typically needed:

- Multiple video displays showing multiple simultaneous television programs
- Low-power FM radio audio broadcasts for each video panel, allowing patrons to tune in to the audio for the video program they would like to watch.
- Informational digital signage
- Data and power outlets for equipment

#### 2.4.5.12 INSTRUCTIONAL MEDIA STUDIOS

Instructional Media Studios are used to prepare audio/visual media for instructional and or training purposes. Lectures or demonstrations can be recorded (both audio and video) and streaming media files can be produced in this space.

The space is sized similar to an office and will require a movable table.

##### **Standard Feature Set:**

- Audio/visual equipment rack (floor-standing)
- Computer with two video panels for lecture capture and presentation software
- Interactive video panel
- Cameras
- Document camera
- Blu-ray player
- VOIP telephone
- Speakers
- Microphone (lapel, desktop, or ceiling-hung)
- Acoustic wall treatment
- Specialty lighting as needed

#### 2.4.5.13 VIDEO PANEL APPLICATIONS

Video panels are wall-mounted or ceiling-mounted in a variety of forms and serve the following applications:

- Digital Signage
- Video Walls
- Entertainment Displays
- Way Finding and Informational
- Multiple Display
- Study Pod
- Conference Rooms
- Classrooms

Where applicable, the video panels may also be provided with touch-interaction capability.

UVU uses a variety of content sources to display information on digital signage. Consult with the AVPM regarding the appropriate solution for each application.

#### 2.4.5.14 OUTDOOR PLAZA/GATHERING SPACES

Outdoor public gathering spaces can be used for group events requiring public address systems to communicate with larger groups. The following physically constructed features are needed:

- Various high amp (50 amp or greater) multi-phase power circuits to distribute power via spider boxes.
- 150 amp or greater outlet with cam-lock (3-phase, neutral, ground) for lighting and high-powered audio systems.
- Wireless network access points

In addition to the infrastructure above, the following audio/visual equipment is also required and supplied as a portable kit with enclosures, to be deployed whenever an event occurs:

- Large projector with 20k Lumens, mounted on mobile cart
  - Two lenses: one standard throw 1.3-1.7 and one short throw 0.3-1.0
- Large, portable, free-standing projection screen with protective enclosure, 16x9 aspect ratio
- Two large venue class, powered line array speakers (800W)
  - Hand-crank speaker stands and road cases with wheels for speakers
- Power cables and signal cables to connect system with projector and speakers located at least 50 feet away from power source and each other

#### **2.4.6 A/V FURNITURE PROVISION**

The UVU Furniture Purchasing Agent shall pay close attention to the audio/visual furniture needs, including:

- Teacher stations
- Credenzas
- Collaboration pods
- Conference tables
- Movable podiums
- Movable demonstration tables

All A/V furniture shall meet the program requirements of the space, shall match the interior design of the space, and shall be coordinated through the AVPM.

#### **2.4.7 SYSTEM INTEGRATION**

Significant technical advances have been made in recent years resulting in numerous systems that now communicate with audio/visual systems and with networks. The following are examples of systems or processes that should be integrated with audio/visual systems:

- Window coverings/sunshades (in conference rooms and multipurpose rooms)
- Folding walls (to divide rooms)
- Lighting control systems

These systems shall use both wired-network connectivity and RS232 serial. Do not expect wireless networking to provide the capacity, reliability, or security required to handle these systems.

It is therefore crucial to the success of these systems that Facilities Services coordinate with OIT during the planning and design phases to ensure that adequate network capacity and infrastructure are included in the design.



## 2.4.8 DOCUMENTATION

### 2.4.8.1 SYSTEM DIAGRAMS

System diagrams are an important tool for long-term maintenance and operation of audio/visual systems. Any project involving audio/visual systems must include the provision of system diagrams. The FSPM and A/V commissioning agent should verify that the required documentation has been prepared during design for use during construction, and that as-built drawings and record drawings have been accurately prepared and submitted before releasing retainage funds.

### 2.4.8.2 AS-BUILT/RECORD DRAWINGS

When a construction project is completed, copies of the as-built drawings and record drawings need to be given to OIT and AVSE as follows:

- Full-size hardcopy of printed Electrical Drawings. The full set is not required, just the sheets that pertain to electrical features of the project.
- Full-size hardcopy printed drawings – the portion of the drawing set that is applicable to telecommunications and A/V technology. The full set is not required, just the sheets that depict the technology features of the project.
- The A/V Contractor's as-built drawings are extremely important for maintenance of the A/V systems. Please obtain both hardcopy and CAD files of these drawings on a flash drive.
- The A/V Contractor's software configuration files and software settings (used in the A/V equipment) are also required for UVU to maintain the A/V systems.
- Uncompiled, editable configuration files and software settings for each A/V component, including control system program and graphic layouts.
- A hardcopy printed system diagram shall be posted on the door inside each equipment cabinet.
- Facilities shall maintain a network-accessible archive of both CAD files and PDFs of the record drawings, organized by building. OIT and shall have unrestricted access to review the information via the network.

### 2.4.8.3 CABLE TEST REPORTS

At the conclusion of each project, the telecommunications cabling subcontractor is required (in the project specifications) to provide their cable test reports. The subcontractor is also required to register the manufacturer's warranty for the cabling infrastructure.

- Other technology subcontractors may also have similar test report and warranty requirements for their specialties.

The Facilities Project Manager should require the test results and warranty registrations at the time that record drawings are submitted, and prior to final payment.

## 2.5 UVU Administration

The optimal design solution balances first cost and ongoing costs. Since the ongoing costs for technology support, maintenance and replacement are typically not borne by capital funds, operating budgets must also increase in step with campus growth and technology improvements. OIT is committed to strategies that optimize stewardship of the University's resources. Please invite OIT to participate early in the planning processes.

When plans are being laid for a new or remodeled building, please be aware of the following indirect commitments that are made:

### 2.5.1 ADDITIONAL OIT STAFF REQUIRED

When new buildings are added to campus, the demand for OIT support staff increases.

For every additional 100,000 square feet of building space that is added to campus, the following additional full-time technical support personnel are required to maintain and operate the building:

Network	0.3 additional FTE
Telecommunications Cabling	0.15 additional FTE
Service Desk	0.75 additional FTE
Video Surveillance and Security (VSS)	0.15 additional FTE
Audio Visual	0.75 additional FTE

### 2.5.2 ADDITIONAL CENTRALIZED COMPUTING INFRASTRUCTURE REQUIRED

As the campus grows, adding buildings, students, faculty and staff, the demand on the existing computing infrastructure also increases. The data center, main communications facilities, telephone system, network infrastructure, audio visual systems and central points of service must all scale up to support the additional capacity required to handle the new growth.

In the future (with ongoing growth and construction), our existing centralized systems will cross thresholds where their capacity to scale will be exceeded, and additional capital expenses will be incurred to support the requirements of another new building.

### 2.5.3 FUTURE EQUIPMENT MAINTENANCE AND REPLACEMENT REQUIRED

When new technology is purchased and installed on campus, it has a lifecycle during which it will wear out, break down or become obsolete. At that point, the University must replace the equipment to continue operations.

- Audio/visual equipment requires maintenance labor and spare parts and consumables (spare stand-by equipment to replace malfunctioning equipment, projector lamps, etc.)

- Every 7 years, the network equipment requires replacement due to obsolescence.
- Every 3 years, the wireless network equipment requires replacement due to obsolescence and expansion due to increased usage demands.
- Every 7 years, the audio/visual equipment requires replacement due to obsolescence. Some areas of our campus community will choose to fund a more frequent replacement cycle.
- Every 7 to 10 years, the security camera equipment requires replacement due to equipment wearing out and failure.
- Every 20 years, the telecommunication (network) cabling requires replacement due to obsolescence.

## 2.6 Applicability to Non-UVU Tenants

The content in this document has limited applicability to provisions for non-UVU tenants who occupy space in UVU-owned facilities. Any physical mounting of signage or other equipment requires prior UVU approval and shall comply with UVU's standards (this document) and accepted industry best practices. Heavy equipment (such as projectors and video panels) shall be securely attached to robust surfaces and structure using specified mounting hardware as described herein. It is also the University's intent that such mounting does not harm the permanent building structure.

The University's ADA-related requirements must also be met by non-UVU tenants.

Non-UVU tenants are strongly encouraged to follow UVU's audio-visual standards and are invited to coordinate directly with the AVPM about the audio-visual solutions they wish to deploy.

UVU requires that non-UVU tenant spaces provide the same attention to public safety given elsewhere on campus.

Workmanship standards shall be commercial grade, matching the workmanship found elsewhere on campus.

All audio-visual devices that are wall-mounted (such as video panels, speakers, and cameras) shall be securely attached to wall structure. Anchoring to gypboard is not acceptable.

Non-UVU tenants shall invite the AVPM to review the installation of audio-visual equipment installed in their spaces, and shall cooperate with requests to improve the safety, workmanship, and attachment of audio-visual equipment.