Preface

This document is periodically updated by Cornell Information Technologies (CIT), Classroom Technologies Consulting group. While addressing the specific topic of Minimum AV Technology Criteria, this information is intended to be considered in the larger framework of Cornell University AV standards and best practices represented by the “AV Design/Build Widgets Chart” (on page one). Each topic in the chart is addressed in individual standards documents, similar to this one. If you’re unsure about what document(s) apply, or where to find them, contact Classroom Technologies. General information about Classroom Technologies is available at http://atsus.cit.cornell.edu/atsus/programs/classroom_technologies.cfm.

General

The Minimum AV Technology Criteria describe minimum technical standards for implementation of AV (Audio Visual) communication technologies in classrooms and conference rooms.

Wording of the minimum AV technology criteria listed in this document intentionally provides flexibility in the specific products selected for individual room systems. This allows for best value and application as room systems are addressed. Please reference document “Learning Spaces Technology Tier Levels” for more general information on functional criteria for AV and room systems/components.

Proper application of the criteria is expected to be accomplished by teams of professionals familiar with Cornell University design and construction standards. This includes AV/IT technology minimum standards compiled and maintained by Classroom Technologies. In addition, the technology is expected to be deployed in environments with proper architectural and interior design considerations for audio visual communications.

This criterion is not to be construed as the only requirements to planning AV implementations. Good industry best practices are to be applied.

Common Design Guidelines for Classrooms

Acoustics/Sound System

- Acoustic consultants should be hired for large room designs
- HVAC system designs should focus on reducing ambient noise and vibration
- Sennheiser high frequency IR systems are used for ALS hearing assist systems (see Accessibility)
- The sound system must be able to easily produce 20 dB above ambient noise floor
- Loudspeakers chosen and deployed so as to attain the same sound pressure (target 3 dB, but no more than 6 dB, variance) level to all listeners
- Intelligibility and localization should be priority
- Use of separate program and reinforcement systems as appropriate to room use
Accessibility
- Rooms will be wheelchair accessible and contain a minimum of 10% left-handed tablet arms on seats.
- Assistive listening transmitters to be installed in rooms containing audio reinforcement systems
- A minimum of 4% of the room seating capacity shall have available for use assistive listening receivers.
- Closed captioning decoding shall be installed in all AV systems.
- Reference ADA Amendments Act of 2008 and/or other standards and codes

Electrical
- Assure dedicated (common single phase) feed for all components of the A/V system, and that it is properly grounded (consideration for technical, isolated, ground).
- Co-locate AC power outlet with primary AV equipment locations

Control Systems/User Interface
- Cornell University media controls guideline document (CTC-AV-3) to be applied to AV system controls.
- End user accessed equipment (for media playback) and controls to be centrally, and logically, laid out. Use of captive cable connection boxes is encouraged for laptop (and aux video) hookups.

Equipment Racks
- AV equipment installed in industry standard 19” equipment racks. In cases where custom casework is desired, AV equipment in racks should be serviceable by removable back and/or a rack that pulls out and swivels for service.

Room Lighting and Window Treatments
- AV controls for lighting or window treatments are in addition to, not in place of, wall mounted controls
- Separately zoned chalkboard lighting simultaneously avoiding AV display screen illumination
- Video conferencing lighting should help reduce shadowing on participants, but not at the expense of comfortable room lighting or by producing color shifts or glare on displays.
- Controls should be simple and located near the teaching station
- Fluorescent ballasts that operate at frequencies greater than 30 KHz. can interfere with infrared controls
- Note-taking should be possible with dimmable incandescent or fluorescent lights, or switchable floor/ceiling fluorescent fixtures
- Studio fluorescent lights should be used in interactive video rooms
- Window Coverings - There should be two types of coverings; drapes/blinds, shades/blinds, shades/shades
- Zoned from front to back of the room to be able to switch off light in the projection screen area
- Coordination of non-controllable (i.e. emergency fixtures) lighting placement
- In Touch Panel rooms: Requires low-voltage interface for AV control connection
Instructional Media/Teaching Station
- Standardize on equipment makes/models deployed recently and regionally
- Include video connector interfaces for laptops even where a dedicated computer exists
- Teaching Station following standard layout
  - AV control systems
  - Portable Laptop/Video captive cable connection box
  - A/V equipment
  - Computer systems
  - Task Lighting
  - Document Camera or Visualizer

Video Display Systems/Projection Screens
- Image height is at least 1/6 the distance for computer data, and 1/4 the distance for critical inspection to furthest viewer. Nearest viewer is not closer than 1 times the image width
- At least one screen in new spaces should be 16:10 aspect ratio to support native wide screen content. Glass beaded screens *not* used.
- Matt White screen for all classroom applications (rare special needs consider other materials).
- Primary projection screens to be tab-tensioned
- Secondary screens tab-tensioned not required
- Elevation sight lines will determine the lowest screen height for unobstructed viewing. Typical conditions require close evaluation to ensure bottom of image is high enough to avoid obstructed views while also avoiding images being so high as to create fatigue of viewers and/or creating conflict with ceiling. Note that staggered seating, and stepped seating, may help keep the sight lines low. Also consider projection sight lines to be clear of obstructions.
- Typical bottom of image set at following:
  - Flat Classroom Screens at 48” A.F.F.
  - Tiered Classroom Screens at 42” A.F.F.
  - Conference Room Flat Panels 48” A.F.F.
  - Videoconferencing consider lower than above depending on seating layout
- Minimum native resolution is 1024*768 for legacy Tier 1 classrooms and 720p (wide aspect) for new Tier 1 classrooms and/or Tier 2 or higher applications

Security - Consult with Cornell Police and Classroom Technologies

Video Teleconferencing
- Camera for instructor should be mounted very close to the instructor’s view of far site
- Camera for students should be mounted very close to the student’s view of the far site
- Fill lighting (lighting participants at an angle) is very important … avoiding “raccoon eyes” without creating heat and the glare of studio lighting
- Avoid whiteboards across front of the room (white is a poor background for video)
- Avoid large red and/or wood grain surfaces (again bad for video)
- In setting up a camera shot for students try and get all student seats in one stationary camera shot (wider-angle lens needed?). Automation of AV touch panel using preset camera settings should allow for close-ups.
• Be careful of ambient and adjacent room noise
• Define performance expectation of video quality. Videoconferencing quality is getting very good, but it is not “broadcast” (i.e. equivalent to the nightly news) quality
• Lighting color temperature - 3200°K for lamps installed in fixtures for videoconferencing rooms. Mixing of electric light and daylight is not recommended for videoconferencing.

Networking
• Add minimum network connectivity per Tier Level requirements listed in CP-AV-4 (Learning Spaces Technology Tier Levels).
• At least one active network port for an instructor laptop in addition to a port for desktop computer (if it exists in the room). And/or, the availability of wireless for instructor connectivity.
• Network ports for dedicated AV devices requiring such (i.e. control system, CODEC, capture/encoder, etc).