CTC-AV-2 General AV Design Guidelines

Cornell University AV Design/Build “Widgets” Chart

G. Bronson ver. 1.0
Preface

This document is periodically updated by Cornell Information Technologies (CIT), Classroom Technologies Consulting group. While addressing the specific topic of General AV Design Guidelines, 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.

Design Initiation:

- Project Management - Depending on the scope and dollar amount of the project, a Project Manager should be designated by either the College/Dept. or Planning, Design, and Construction.
- A design task force consisting of faculty, staff (Registrar, Maintenance, Classroom Technologies, Network Service Teams, PDC), and students should be selected.
- The task force should establish the purpose and usage of the room, define the Technology Tier Level (ref. CU AV standards doc CP-AV-4), and determine scheduling classification (25, 25E, etc.).
- The design should focus on the fundamentals first - lighting, seating, acoustics, line of sight, etc. Do not trade a proper learning environment for technological sophistication.
- Do a mockup of the room and/or look at campus benchmarks. Put real people in the room to test sight lines and general function.
- Review the design layout with Environmental Health and Safety for codes compliance (as applicable).

Design Guidelines:

- Acoustics:
  - Acoustic consultants should be hired for large room designs
  - HVAC system designs should focus on reducing ambient noise
- Accessibility: Rooms should be designed as accessible, welcoming, inclusive environments.
  - Contain a minimum of 10% left-handed tablet arms on seats.
  - Assistive listening transmitters should be installed in large rooms with speech reinforcement systems.
  - Reference Americans with Disabilities Act Amendments Act of 2008 and/or other standards and codes.
- Adequate Electrical Outlets
  - Co-locate with primary AV equipment locations.
- Room Lighting and Window Treatment:
  - Chalkboard lighting
  - Controls should be simple (ref. CU AV standards doc CTC-AV-3) and located near the teaching station. Consider low voltage interface to AV controls.
o Be aware that fluorescent ballasts that operate at frequencies greater than 30 Khz. can interfere with infrared controls
o Note-taking should be possible with dimmable incandescent or fluorescent lights, or switchable floor/ceiling fluorescent fixtures
o Studio fluorescent lights should be used in interactive video rooms
o Window Coverings – Consider following window covering types; drapes/blinds, shades/blinds, shades/shades
o Zoned as appropriate for AV program
o Coordination of non-controllable (i.e. emergency fixtures) lighting placement

- Screens
  o Due to the fine detail involved in data projection (small text, etc.), it is very important to have a flat surface for projection. Matt White, or material having a uniform gain, is "safest" selection. The screen size should be according to the size of the room. Typically this is accomplished by means of a tab-tensioned screen. These screens are also typically motorized.

- Instructional Media:
  o Select equipment based on Cornell University Minumum AV Technology Criteria (ref. CU AV standards doc. CTC-AV-4)
  o Encourage use of laptops by instructors/students
  o Room control systems, A/V equipment, and computer systems mounted in or near teaching station
  o Computers - Locate CPU under tables but protected from damage by kicking or knocking over
  o DVD/VCR - Low cost and simple to operate
  o Projection screen(s) quantity and placement appropriate for presentation mode(s)

- Telecommunications
  o Adequate network connections and infrastructure (conduit)
  o Co-locate with AV equipment needing network.
  o Involve Network Service Team early on

- Security of Equipment
  o Consult with Cornell Police, College/Unit and Classroom Technologies

Design Checklist:

**Function:**
- [ ] Addressing defined AV Program for space(s)
- [ ] Campus technology Tier level applied
- [ ] End User interface to system (physical devices, controls, etc.)
- [ ] Technical Support/Utility interface to system

**Audio:**
- [ ] Room coverage requirement (i.e. SPL and uniformity of coverage)
- [ ] System type (i.e. distributed and/or central array, stereo, etc.) appropriate to room acoustical environment and function.
- [ ] Noise (room ambient, sound system generated, etc.) maximums
Frequency Response and Distortion performance
Feedback/echo cancellation

Video:
Brightness
Contrast
Color
Geometric distortion/focus
Native resolution minimums (and scaling technique)
Image sizing and Aspect Ratio
Camera performance

Control:
User Interface Design (touch screen, button controller, etc.)
“Green” power requirements (sequencing, idle state, auto power off, etc.)
Room Controls Interface (screen, window coverings, lights, etc.)
DSP settings and defaults
“E-Control” requirements (w/ tie to “Green” power requirements)

Room:
Predicted acoustic environment
Screen size, quantity and placement
Furniture and AV equipment layout
Sight lines required
Videoconferencing components placement
Security of equipment
Coordinated lighting requirements

Installation:
Equipment Rack requirements (layouts, sizes, types, etc.)
Wiring technique (dressing, signal separation, etc.)
Wire types and labeling
Plates (connector type, labeling, etc.)
Electrical power requirements
AV conveyance
End user and Service access to equipment
Equipment heat management
Full documentation (Video flow, Audio flow, etc.)
Training (End User and Technical)

Accessibility:
Access/clearance to equipment
Assisted listening system type (i.e. IR)
Support for cc decoding
Telecommunications:

- Locations and types of connections
- Special provisioning (i.e. Wireless Networking, etc.)
Appendix List

- Infocomm International AV Task Parameters for AV Program (ctsforav)
## AV Task Parameters for Development of the AV Program

The following table is a list of possible AV tasks that may be required to support the end-users’ applications and needs. It is this level of information that is ultimately needed to create the AV Program Report and its opinion of probable cost for the AV systems.

<table>
<thead>
<tr>
<th>AV Task</th>
<th>Parameters of AV Task</th>
<th>AV Task</th>
<th>Parameters of AV Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image display</td>
<td>• Number of simultaneous images</td>
<td>System Control</td>
<td>• Locations of control within each space</td>
</tr>
<tr>
<td></td>
<td>• Source resolutions</td>
<td></td>
<td>• What do the control systems need to do?</td>
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<tr>
<td></td>
<td>• Sources/signal types to be displayed</td>
<td></td>
<td>• Who will be controlling the system (end-users, assistants, technicians)?</td>
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<tr>
<td></td>
<td>• Aspect ratio of sources</td>
<td></td>
<td>• Local and/or remote control required?</td>
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<tr>
<td>Audio playback</td>
<td>• Number of audio sources</td>
<td></td>
<td>• System-wide monitoring</td>
</tr>
<tr>
<td></td>
<td>• Audio signal types</td>
<td></td>
<td>• Help desk functions</td>
</tr>
<tr>
<td></td>
<td>• Area to be covered by loudspeakers</td>
<td></td>
<td>• Interfacing to other devices or systems required (lighting, drapes, building automation system, etc.)</td>
</tr>
<tr>
<td>Speech</td>
<td>• Number of talkers to be reinforced</td>
<td>Ancillary Systems</td>
<td>• Are there any ancillary systems required such as audience response systems, background music, sound masking, nurse call, security or other systems that are needed to support the users’ activities or spaces?</td>
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<tr>
<td>reinforcement</td>
<td>• Location of talkers</td>
<td></td>
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<tr>
<td></td>
<td>• Area to be covered by loudspeakers</td>
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<tr>
<td></td>
<td>• Interface to other systems</td>
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<tr>
<td>Audioconferencing</td>
<td>• Stand-alone or part of videoconferencing</td>
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<tr>
<td></td>
<td>• Concurrent with speech reinforcement?</td>
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<td></td>
<td>• Local bridging for multi-party audio</td>
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<tr>
<td>Videoconferencing</td>
<td>• Dedicated function or incorporated with presentation system?</td>
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<tr>
<td></td>
<td>• Number of participants</td>
<td></td>
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<td></td>
<td>• Single axis or dual axis (participants in audience only or is there also a presenter?)</td>
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<td></td>
<td>• Number of images required</td>
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<tr>
<td></td>
<td>• Resolution of conferencing images</td>
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<tr>
<td></td>
<td>• Type of connections to be supported (ISDN, IP, satellite, fiber, broadcast, etc.)</td>
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<tr>
<td>Overflow /</td>
<td>• Identification of potential source spaces</td>
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<tr>
<td>Interconnection</td>
<td>• Identification of potential destination spaces</td>
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<tr>
<td>of spaces</td>
<td>• Number, type, resolution and format of audio and video signals to be connected</td>
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<td></td>
<td>• One or two way connections required?</td>
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<td></td>
<td>• Are sites within or outside of the project facility?</td>
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<tr>
<td></td>
<td>• Type of connections to be supported (ISDN, IP, satellite, fiber, broadcast, etc.)</td>
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<tr>
<td>Recorded media</td>
<td>• Types of recorded media</td>
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<tr>
<td>playback</td>
<td>• Audio and video parameters of media content</td>
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<td></td>
<td>• Accessed by technicians and end-users?</td>
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<tr>
<td>Recording of</td>
<td>• Audio and/or video</td>
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<td>events</td>
<td>• Audio and video parameters of recorded signals</td>
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<td></td>
<td>• Set-up and controlled by technicians and end-users?</td>
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