Assistive Listening Systems on Campus
Today’s Objectives

• Understand what Assisted Listening is
• Identify why the ADA requirements are important to AV system design and installations
• Understand the basic changes of the ADA requirements for Assisted Listening Systems
• Review the various ALS delivery methods
• Review the procedures for testing and maintaining ALS systems
What are Assistive Listening Systems?

- Simply put, Assistive Listening Systems (ALS) amplify the mixed audio to assist persons who are hard of hearing.
- ALS eliminate the acoustical reflections in a room by directly delivering the audio to a person’s auditory canal.
- Allows the person who is hard of hearing to set their own volume to improve their hearing ability.
- ALS (using the Induction Loop) can allow for the use of a telecoil (T-Coil) in a hearing aid to pick up the audio directly.
What are Assistive Listening Systems?
Trends in Hearing Aid Technology
What a T-Coil Looks Like
Why Assistive Listening Systems?

• Assistive Listening Systems are a requirement of the Americans with Disabilities Act – commonly known as ADA
• There has been some form of accessibility regulations in effect since 1968 – but ADA was fully passed by Congress in 1990 and became fully effective in 1992
• Updates to the ADA regulations occurred over the years – but in 2010 there was a significant update to the law and the changes became effective in 2012
Minimum Capacity Changes Initiated by the 2010 ADA Requirements

<table>
<thead>
<tr>
<th>Capacity of Seating in Assembly Area</th>
<th>Minimum Number of Receivers</th>
<th>Minimum Number of Receivers that are Hearing Aid Compatible (Induction Loops)</th>
<th>Example: Listen LA 166</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 or Less</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>201 to 200</td>
<td>2, plus 1 per 25 seats over 50 seats</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>201 to 500</td>
<td>2, plus 1 per 25 seats over 50 seats</td>
<td></td>
<td>1 per 4 Receivers</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>20, plus 1 per 33 seats over 500</td>
<td></td>
<td>1 per 4 Receivers</td>
</tr>
<tr>
<td>1001 to 2000</td>
<td>35, plus 1 per 50 seats over 1000</td>
<td></td>
<td>1 per 4 Receivers</td>
</tr>
<tr>
<td>2001 and Over</td>
<td>55, plus 1 per 100 seats over 2000 seats</td>
<td></td>
<td>1 per 4 Receivers</td>
</tr>
</tbody>
</table>
What are Assistive Listening Systems?

- ADA regulations have significant impacts on AV Design besides Assistive Listening Systems
- Accessible Room Locations
- Access Ramps
- Seating Layouts
- Furniture Design
- Equipment Mounting
- Resource Equipment Rack Layouts
- Control System Designs and Location
There are three basic Assistive Listening Technologies:

- Installed Induction Loops
- Radio Frequency Systems (RF/FM Systems)
- Infrared Systems (IR Systems)

Each of these systems can meet the ADA requirements for Assistive Listening Systems.
ALS Technologies Overview

• Installed Induction Loops
  – Installed Induction Loops are specifically customized for each space and require a unique design that must be done in coordination with the building materials used in the construction of the space.
  – Loop Technologies use copper wires or tape loops that are designed to radiate an electromagnetic field covering the seating areas and can require more than one “loop” – creating copper conductor “arrays” that are installed in floors, ceilings and/or walls
  – Some designs use many “loops” that need to be properly installed and use a phasing technique with the circuit designs
• Installed Induction Loops - Continued
  – Uses the T-Coil technologies built into some hearing aids
  – Can be used without a person having to wear a separate receiver
  – Sound quality is good – because the hearing aid is tuned for the person’s hearing disability
  – Not all hearing aids have the T-Coil technology, so using the Installed Induction Loop alone can exclude persons without the T-Coil technology
ALS Technologies Overview

• Radio Frequency (RF) (FM) Technologies
  – Relative low cost to deploy
    • Uses small low power FM transmitters
    • Can be deployed without built infrastructure
  – Users must wear a receiver
    • Stethophones or personal Headphones can be used
    • Personal Induction Loops will enable T-Coil use
  – Good to use for temporary and portable set ups and can be used for outdoor venues
  – Can be enabled for more than one program
  – RF Signals must be coordinated with other RF frequencies, users may have to tune receivers to the channels being used
Radio Frequency (RF) (FM) Technologies Continued

- Not secure – RF signals can spill over to other venues
- Audio quality is good – but is prone to RF interference and drop outs
- Similar to other personal receiver systems - there is a need to properly distribute, charge and maintain the cleanliness of the receivers
ALS Technologies Overview

• Infrared (IR) Technologies
  – Relatively low cost to deploy
    • Does require some built infrastructure
  – Users must wear a receiver – with a worn personal Induction Loop to enable T-Coil use and/or Headphones can be used
  – Secure transmission – IR stays in the room where it is broadcast there is no spillover to other venues
  – More than one channel can be broadcast
  – Low power – signals will not interfere with other AV equipment
• Infrared (IR) Technologies Continued
  – Can be deployed in new and older buildings
  – Audio quality is good – users must face the emitter arrays for best signal reception, however bright colored rooms help to “bounce” IR signals to assist with indirect reception
  – No RF interference
  – Similar to other personal receiver systems- there is a need to properly distribute, charge and maintain the cleanliness of the receivers
ALS Technologies Overview

• Cornell University has many of the IR systems installed on campus – virtually it is our “adopted standard” for ALS compliance

• Reasons for choosing IR systems
  – Can be used by people with or without hearing aids
  – Less costs for installation
  – Security of IR transmission
  – All IR receivers can be used with any 2.3 MHz IR system
  – Additional receivers can be purchased as needed to allow for increased personal induction loop use, increased seating capacities or new venues- so IR is more scalable for large scale deployments
Things to Remember!

- There are 3 primary ALS distribution systems that are ADA compliant –
  - Installed Induction or “Hearing Loop”
  - RF Radio Frequency (FM)
  - IR Infrared
- The 4% Fixed Seating Rule is gone
- Rooms with capacity of 50 or less that have installed AV systems are required to have an Assistive Listening System
- Inductive Neck Loops have been added to the ADA Standards
- As of March 15, 2012 new public facilities need to be in compliance
- In all cases, the presenter must use a microphone to be heard
Assistive Listening Signal Flow

1. Speaker's Microphone
2. RF Transmitter
3. AV Audio Program Resources
4. RF Receiver Unit

Radio Frequency (RF/FM) System
Assistive Listening Signal Flow
Assistive Listening Signal Flow

LISTEN TECHNOLOGIES
IR SYSTEM
Complex Assistive Listening Signal Flow

COMPLEX LISTEN IR SYSTEM
Testing Procedures

• Locate ALS Receivers
  – Places where the Receivers may be stored
    • Lectern or AV cabinet or Rack
    • In the Building Coordinators Office
    • Department Office
    • If in a Library – at the Circulation Desk
    • If in a Presentation Space – like Bailey or Call Auditoriums – Box office, Usher Stations or Projection Booths
Testing Procedures Continued

• Identify where the AV components are located
  – Most likely in lecterns or AV equipment racks
    • Keys may be needed to access these locations
  – Turn on the AV system as needed – most systems need to be warmed up
  – Locate where the IR Emitter(s) are located in the room
    • Usually on the front wall or in a corner- the emitter is facing the audience
  – If there is a DVD player in the AV system use the control system to switch up the DVD to the display
  – Insert a DVD or CD into the player and play the media
Testing Procedures Continued

• Playing the media should activate the IR emitter and you should hear the DVD or CD through the audio system
  – To check the IR emitter’s operation the LED indicators should change with the application of audio signals
    • For Sennheiser equipment – the single LED goes from RED to GREEN once activated by audio signals
    • For Listen equipment – there are three LEDs
      – If the Left LED is lit RED there is power supplied
      – If the Center LED is lit YELLOW there is a connection to the Transmitter
      – If the Right LED is lit GREEN there is audio signal
Testing Procedures Continued

Sennheiser Equipment

Location of LED indicator Behind Glass - glows RED (inactive) to GREEN once the emitter is active
Testing Procedures Continued

Listen Equipment

During Normal Operation the RED and GREEN LEDs are lit!

- Power Red LED is lit when there is power to the Emitter Radiator
- No connection (Yellow) Yellow LED is lit when a connection to the transmitter is lost
- Carrier is Present when Green LED is lit and there is an audio signal present
Testing Procedures Continued

• Put on a Receiver Stethophone, with the volume down, face the emitter, use caution and raise the volume slowly- listen for the audio program

• Check both the Instructor Microphone(s) and the Program Audio separately to be sure that all audio resources are mixed into the audio line going to the IR emitter

• Please note that all audio resources should be at approximately the same volume levels

• The Stethophone receivers should be capable of reproducing a very LOUD Audio Level (110 dB)
Testing Procedures Continued

- Either Emitter product will work with either brand of receivers - both are using the 2.3 MHz frequency (Channel 1) once the system is activated with an audio program.
- Wearing the Stethophone Receiver, walk around the space-checking for any dropout areas or audio distortions – if none are found, the ALS testing is completed.
- Shut down the DVD or CD player and remove the media from the player.
- Return the microphone(s) and receiver to storage and power down the AV system as needed – secure the AV system.
- Please Note and Report any ALS difficulties.
Testing Procedures Continued

• Check ALS Signage
  – Signage should be located at primary entrances to a venue
  – Signage should have both visual symbols and a Braille line of information for persons with visual disabilities
  – Information should be provided as to where the ALS receivers may be located or checked out
Signs to Look for

- There are several styles of signage that are all based on the universal “ear” illustration.
- Some examples of manufactured signs that could be used where needed...
Signs to Look for
Where we can improve Campus ADA Compliance

• Install Assistive Listening System Signage
  – Including a location and/or contact person responsible to distribute receivers

• Regular Testing and Inspection of ALS systems
  – Microphones and Program Audio
  – Properly Maintain Receivers
    • Charging Receiver Batteries
    • Cleanliness of Receiver Ear buds
  – Availability of Inductive Neck Loops

• Notify Building Coordinators and/or AV Tech Managers if there are non-compliant conditions or systems in need of repairs or adjustments
Questions & Comments

Thank You for Participating!