Meyer Constellation System in the Sound Gallery

Definitions and Concepts

1. **Acoustic enhancement by PASSIVE methods:**
   Physical changes made to the chamber to change the acoustical quality. Including extending the height of ceiling, using absorptive or reflective surfaces, etc. A lot of effort to make changes to the physical environment in the chamber for relatively little amount of acoustical change. Generally designed to suit a specific range of musical performance type.

2. **(AAE) Acoustic enhancement by ACTIVE methods:**
   Sound, captured using multiple microphones is processed electronically, and broadcasted back into the room via loudspeakers. Instantaneous changes based on software presets allows a wide scope of dynamic acoustical variations to take place. Ability to accommodate a large variety of musical performances.

3. **Spatial Panning/Mixing:**
   Sending an audio signal to a specific loudspeaker or a group of loudspeakers in the room to create a positional value with respect to listening position in the room.

4. **Reflections:** are sound energy that strikes any room boundary surface and then strikes another surface and so on until the reflection loses energy and is reduced to below audibility.

5. **Reverberation time:** is technically the time interval recorded between the original sound with its associated amplitude and the time interval it takes for that sound to not be heard. Speaking in direct versus reflected energy, it is the interval of time between the direct energy from the source and the last audible reflected wave.
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Overview

Cue Station is the software that drives the Meyer Sound Constellation System. Using an application software on an iPad we are able to remote access this system to make changes while being present in the room to monitor those parameter changes.

There are 2 main parts to the Constellation system.

1. **Active Acoustic Enhancement (AAE)**
   16 microphones, evenly positioned around the room, captures, in real time the live sound environment in the room. This signal then goes through Meyer Sound’s Constellation processing and is reproduced in the room by 67 loudspeaker output positioned evenly around the room.

   We are able to manipulate 5 main parameters to enhance the acoustics in the room. Making changes in the systems settings to compliment a wide variety of musical performances.

   i. **Reverberation Length**
      Increasing the reverberation length is roughly equivalent to making the room larger. Changing the length has relatively little effect on the apparent loudness or the size of the sound source.

   ii. **Reverberation Strength**
      Increasing the reverberation strength raises the level of reverberant sound relative to the direct sound. This is roughly equivalent to removing acoustic absorption from the room.

   iii. **Warmth**
      Increasing the warmth, increases the reverberation length at lower frequencies while reverberation length at mid and high frequencies stay the same.

   iv. **Brightness**
      Increasing the brightness, increases the reverberation lengths at higher frequencies while the reverberation length at mid and low frequencies remain the same.

   v. **Early Reflection**
      Increasing the early reflection strength raises the level of early reflection relative to the direct sound through the air. This can increase the perceived loudness and size of sound sources.

A wide scale of acoustical environments can be created to suit an even wider range of musical instrumentation and performance types within the space.
2. **Spatial Panning/Mixing**

SpaceMap is a feature of the Constellation Systems that allows users to position sounds around the room. 8 XLR line level inputs channels are available to send audio signals into the Constellation System. We can then distribute these signals to the 67 output loudspeakers in the room. The proportion of distribution of this signal to the different speakers gives the listener in the room a sense of spatial direction of the signal. There are some positional movement effects that we can place on each of these channels. These effects allow for rotation, bounce, spiral and a few other spatial movement configurations about a fixed axis. Speed, angle of rotation and radius of rotation are among some of the parameters that can be manipulated. The iOS application ‘Lemur’ is used to send OSC information to Cue Station to allow the user to be present in the Sound Gallery while adjusting parameters in SpaceMap.

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