



Active Acoustics

Overview

The Constellation system is a ground-breaking technology that enables the acoustic properties of a room to be altered instantaneously to recreate almost any type of sound environment.

The 2000 sq. ft. performance hall was specially constructed for active acoustics. The hall is housed in a heavy exterior concrete shell and built on rubber pucks so as to be vibration as well as sound isolated, with a second acoustically-isolated inner shell built inside the exterior shell. Heating and air conditioning systems were specially designed for low turbulence and very slow air movement to minimize heating and air conditioning noise. This design creates a large, incredibly quiet space (meeting NC10 background noise standards), rivaling most much smaller sound recording studios. In addition, acoustic treatment inside the room produces a very low natural reverberation. The result is an acoustic '*blank slate*' which can then be modified by the active acoustics system to create the desired acoustic environment.

The microphones throughout the space record whatever sounds occur, feed them through digital processing equipment to compute the desired echoes to feed back to the speakers located throughout the space. In this way, the desired reverberation can be created in real time. In addition, the timing of the first echoes can be adjusted to alter the perceived size of the space. Thus, we are able, for example, to instantaneously change from a large reverberant cathedral to a smaller acoustically dead space. Pre-recorded sounds can also be presented through the system in order to, for example, immerse an audience in the 3D sounds of a streetscape or a restaurant. We can also create auditory illusions and virtually move sounds through the space.

Our staff will assist in reviewing a research design to ensure you get the most out of your LIVELab experience.

All research conducted in the LIVELab is subject to appropriate ethics approval and secure data handling.

Research Examples

- Measuring psychological, physiological, and sociological responses of performers and/or audience members to changes in sound environment
- Creating simulations of different acoustic environments
- Studio music recording in controlled but naturalistic acoustics
- Evaluating hearing aid technology in realistic environments



Technical Specifications and Software Output

- Meyer Sound Constellation Active Acoustics
 - 28 microphones
 - 75 separately-addressable speakers and subwoofers mounted on walls and ceiling
- PA system: 2 x Meyer 500HP subwoofers, 5 x Meyer UPJ-1P
- Room background noise level: NC10
- Minimum reverberation time: 500ms
- Maximum reverberation time: 8 sec

Technical Synchronization

All technologies included in the LIVELab are built to interact with each other.

Frequently Asked Questions

Can the acoustics be set independently on the stage and in the audience?

Yes, two different acoustic zones can be set up so the sound experience is varied in different parts of the room.

Can the acoustics be changed during the performance of a piece of music?

Yes, the reverberation can be changed with a flick of a switch, or continuously in real time.

Can the LIVELab be used as a recording studio?

Yes, see the page on Sound and Video Reproduction and Recording.