A New Paradigm in Flexible Music Halls

By: Mel Lambert

San Francisco Symphony's SoundBox contains a multitude of acoustical environments

While live performance spaces often can provide the flexibility needed to simulate a variety of creative environments, quite often their needs will evolve on a day-to-day basis without a predetermined formula. When Michael Tilson Thomas and the San Francisco Symphony—the conductor/composer serves as its current music director—were considering the orchestra's future requirements, they decided to explore a radically different paradigm. The resultant SoundBox, which opened in December 2014, is described as "unique and stimulating, and totally different."

Located behind Davies Symphony Hall in the heart of midtown San Francisco, SoundBox represents an innovative adaptation of its Zellerbach Rehearsal Hall A, which has been re-imagined as a flexible, intimate music hall and multimedia theatre with capacity for more than 400 patrons. Working with AECOM Architects, Auerbach Pollock Friedlander/APF provided theatre consulting, including planning and design of room configurations, seating, and overhead rigging, in addition to power and distribution infrastructure for the theatrical lighting systems that enable portable systems and equipment to be accommodated by any of the symphony's production designers. APF also coordinated and developed the infrastructure for a Meyer Sound Constellation system installed within the 10,000-sq.-ft. space. Constellation is a fully configurable DSP-based system that can be used to transform the room's acoustic

Photos: Stefan Cohen

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characteristics to suit the type of performances being presented in the constantly shifting environment, creating an immersive experience for different audiences. (Tilson Thomas was also instrumental in the decision to use a Constellation system at New World Symphony Orchestra, Miami, Florida, within the 2.5-acre SoundScape outdoor viewing area—see *LSA*'s May 2012 issue; the Kanbar Forum within San Francisco's iconic Exploratorium also features a Constellation system as a key component for a multidisciplinary theatre—see *LSA*'s July 2014 issue.)

On its website, the new SoundBox facility is described in tantalizing terms. "In the small entry room, you move past a curtain, through an unknown door; some kind of installation fills a sunken space. Turn the corner, find the bar: There are craft cocktails and small bites. Video projections flash on the walls. All eyes go to the stage, ready for the show to start. And then the music. Pounding beats, otherworldly chants come from all corners of the space. Close your eyes: It sounds like you're in a cathedral, and then an underground club. Unique and stimulating and totally different."

Its designers describe SoundBox as "an experimental facility that is the outgrowth of several years of planning to provide the San Francisco Symphony with an expansion plan based on their 21st-century plan." According to Leonard Auerbach, APF chairman and director of design, the project came to his firm because of a decade-long direct association with San Francisco Symphony, "assisting them with facilities planning, starting with analyzing the functions of Davies Symphony Hall—both physically and programmatically. All of our studies and planning were 'pre-architectural' and focused on future development."

APF began work on SoundBox in late 2012 as part of a more comprehensive study. "Design and planning for SoundBox went through several iterations during its development and culminated in a project that pushes the envelope of classical and contemporary music performance," the director of design says. "The venue serves as a tool for a programmatic 'proof of concept' for the new visions of Michael Tilson Thomas and the San Francisco Symphony."

SoundBox atmosphere during Edgar Varèse's *Intégrales* (with members of the San Francisco Symphony).

SoundBox comprises a pop-up venue located in the largest of three spaces within the symphony's Harold L. Zellerbach Rehearsal Hall complex. Known as Zellerbach A, the area has been used primarily by the San Francisco Opera for rehearsals but also serves as a staging area for orchestral tours and occasional special events. The large, open volume of Zellerbach A is described as being conducive to the variability required to format a highly experimental environment. "The openness of that large hall and the volume of space allowed it to be converted easily to suit whatever the performance vision may be," Auerbach continues. "All lighting, video projection, sound, rigging, and staging have been developed to be fully responsive to the [targeted] programming."

Within the converted SoundBox space, "The stage size matches the performance area at the San Francisco War Memorial Opera House," Auerbach says, "and is equipped with a counterweight rigging system, specialized motorized rigging, and auxiliary electrical power for rehearsal purposes." The existing orchestra rehearsal pit is situated downstage of the framed proscenium behind a large rear-projection screen. Portable stages, movable projection screens, and informal seating on armchairs, cushions, and cocktail tables enable creative configurations with variable audience-performer relationships. Multiple stages can be randomly located in the space to create informal or focus-oriented arrangements. A lengthy back-bar located at stage left provides beverages and snacks both before and during the

performances. The informal floor plans were developed by Blueprint Studios and the San Francisco Symphony's creative team. Musson Theatrical was the installation contractor for the new motorized hoists, with Hathaway Dinwiddie serving as the general contractor for physical improvements.

To meet SoundBox's operational requirements, and to bring the Zellerbach A environment up to code for public use, APF advised on ADA access, expanded egress, and ADA toilets, as well as several life-safety improvements for the 400-plus capacity.

In terms of facilities planning and design of SoundBox, because the space comprises an existing staging and rehearsal hall used primarily for the San Francisco Opera, it needed to continue to support that role. "Nothing was changed to compromise the space's primary function," explains Auerbach. "In the converted space, the stage size matches the performance area at the San Francisco War Memorial Opera House.

"As a staging rehearsal hall, there were only a few production support systems in place, such as an old wire-guide counterweight system with limited capacity, rehearsal lighting, and a company switch," he continues. "All of the new systems were added into the space without interfering with its functionality as a rehearsal hall. We enhanced the rigging with motorized batten hoists and added a portable lighting package. Most significantly, a Meyer Constellation variable acoustic resonance system was installed.

Constellation's user interface provides for performance presets that set all parameters of the system, along with adjustments for acoustic parameters such as reverberation time, strength, warmth, and stage location.

"But this was a very basic project unencumbered by extensive fussiness," Auerbach stresses. "We worked with AECOM Architects in developing audience amenities such as accessibility, toilets, and improvements to the HVAC systems. The electrical service was enhanced and a few basic seating options were planned. The seating in the first season was adaptable around a maximum of three low stages of various sizes that could be reconfigured for each presentation; it was planned like a nightclub, with low seating areas, standing tables with and without stools, standing areas, and a full bar. The shows include pre-concert installations in the orchestra pit near the entrance to the space, which range from real-time projections onto SoundBox's large screens, kinetic musical sculptures, and audience pre-show interaction with percussion instruments using real-time imaging."

Because of a number of parameters, no acoustics consultant was required for the installation. "The space was basically very dry-sounding with a dead acoustic," Auerbach continues. "We worked closely with Meyer Sound on the configuration of their Constellation system, which creates an acoustic environment suitable to whatever performance experience is desired in the room."

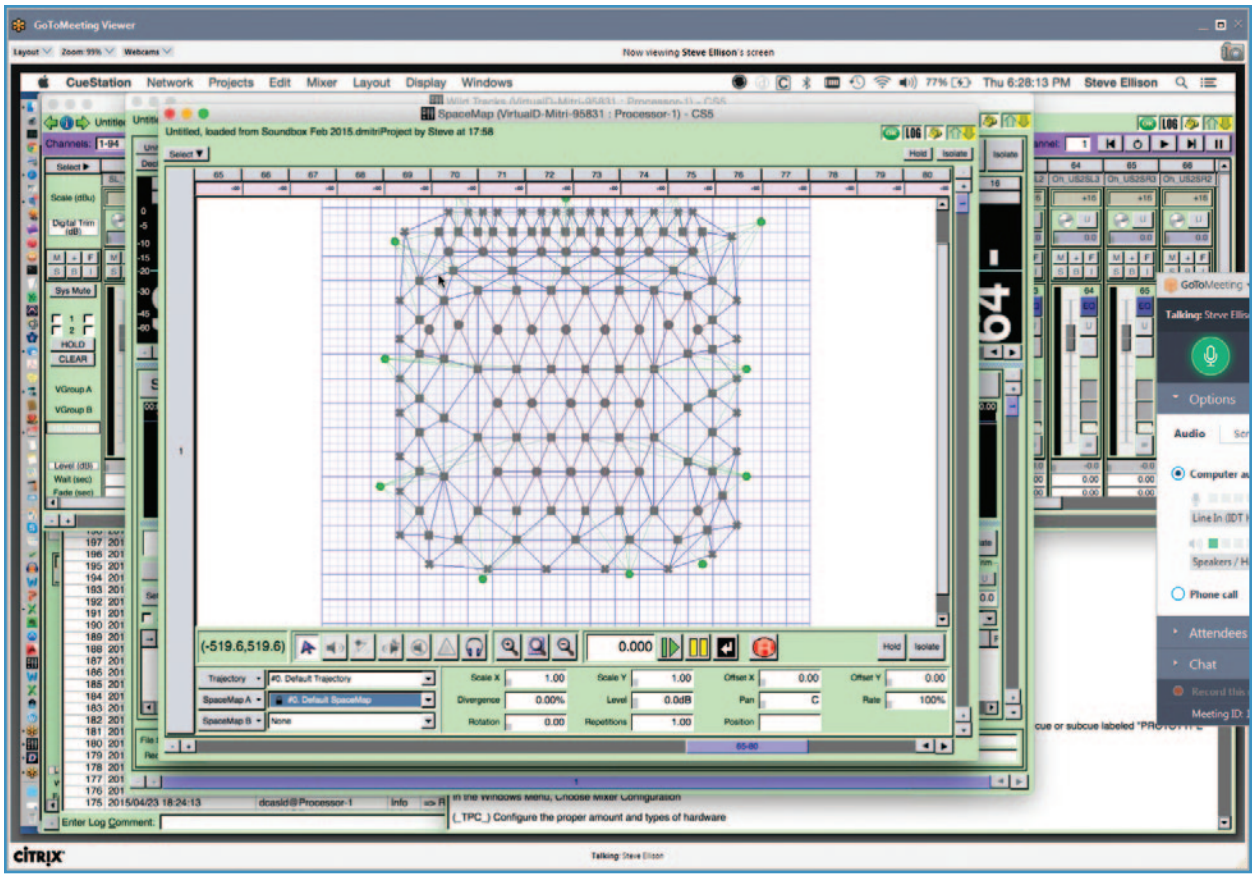
Meyer Sound Constellation

The scope of musical presentations planned for SoundBox required a variable acoustic response that could accommodate virtually everything from small ensembles to soloists to large chamber orchestra, jazz, and amplified voice and instruments. "The basic rehearsal requirements for the operatic programming are very different from the variable music environment criteria," states Auerbach. "The Constellation system enables the space to respond acoustically in a range from soft, low reverberation to that of a highly reverberant cathedral."

"SoundBox is a new and experimental space for music of all kinds," Tilson Thomas says. "Part of the experience of being in this space is to hear music of many different eras, from ninth-century Gregorian chant to music composed today. Constellation, from Meyer Sound, provides the optimal acoustics for each genre and has helped us create a space where audience and musicians can explore a new kind of musical journey together."

The new room is equipped with a Constellation processing engine that connects to 28 widely distributed microphones and an array of 85 compact loudspeakers located above and around the room. Meyer Sound worked closely with the San Francisco Symphony, APF, and installer BBI

Photos: Courtesy of Meyer Sound



SpaceMap provides for automated panning for any loudspeaker configuration. The same loudspeakers that provide acoustic energy also are used to reproduce program audio, either with a static mix or dynamic panning.

Engineering throughout the system's conception, design, installation, and tuning. The Meyer team included senior acoustic engineer Pierre Germain, digital products support specialist Tom Cavnar, senior scientist Roger Schwenke, Constellation project director John Pellowe, and applications director of digital products Steve Ellison.

"The Constellation system comprises a D-Mitri digital audio platform with four DVRAS processors that use ambient-acoustic inputs from the 28 compact microphones," Ellison explains. The DVRAS modules host Meyer Sound's VRAS algorithms, which generate early reflections and late reverberations within multiple zones. "By dividing the system into four early reflections zones, performance stages can be placed in different parts of the room, and used simultaneously," the applications director continues.

The 85 self-powered loudspeakers are either wall-mounted or suspended from the 50' ceiling. Overheads comprise 24 UPM-1XP loudspeakers, with 18 UPJunior-XP VariO and 31 MM-4XP self-powered loudspeakers as upper and lower laterals, respectively. Twelve UMS-SMXP subwoofers extend the reverberation envelope through the lower octaves. All loudspeakers employ Meyer Sound's IntelligentDC technology, which is said to maintain the sonic advantages of self-powering while simplifying installation by running both balanced audio signal and DC power for the system's on-board amplifiers via a single five-conductor cable from a remote power supply and signal-distribution unit.

Initial system tuning was handled by Meyer Sound's Schwenke, Pellowe, and Ellison, working closely with Tilson Thomas and representatives from the orchestra to select settings and adjustments for the critical opening concert. For the inaugural SoundBox program last December, entitled *Extremities*, acoustical settings were chosen by the artists for each musical selection. "The shortest reverberation setting was for Steve Reich's percussive *Music for Pieces of Wood*," Ellison recalls, "while choral works, such as Josquin des Prez's great 16th-century *Missa Pange linguam*, were wrapped in a spacious cathedral setting. Contemporary works like [Edgar] Varèse's *Intègrales* and Meredith Monk's *Panda Chant II* were appropriately enhanced by intermediate settings."

In addition to a Constellation system, SoundBox uses a Meyer Sound Wild Tracks solid-state audio playback sys-

Pianist Sarah Cahill performing solo piano works by Terry Riley; video art by Adam Larsen.

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tem, together with SpaceMap multichannel surround panning, an algorithm for the D-Mitri digital audio platform. "SpaceMap defines a panning space as a series of contiguous triangles defined by three nodes and referred to as 'trisets'," Ellison continues. "Panning within each triset is equal power, with SpaceMap providing extensive control over the behavior of each triset nodes. But trajectories are defined entirely separately from the physical loudspeaker system; the two become related when trajectories are rendered for the physical layout, which happens on the fly." Multiple SpaceMap panning layouts can be defined using different sets of loudspeakers within a sound system and implemented simultaneously for a variety of creative results.

Wild Tracks playback is achieved in D-Mitri using a DWTRX module that is configured to provide 24 discrete audio tracks. These tracks can be grouped on-the-fly as virtual playback decks of arbitrary track sizes and started and stopped independently of one another. "A time line GUI lets operators easily drag files to build cues that can incorporate SpaceMap trajectories," Ellison states. "Wild Tracks has been used for everything from announcements to accompanying tracks for compositions written for musicians with pre-recorded elements." The system provides instantaneous playback, while SafetyNet enables automatic switchover to redundant solid-state drives in the event of a media failure."

Lighting

To support the overhead Constellation elements, and to clear the equipment for opera rehearsals, APF also designed a system of five motorized rigging battens using ETC Prodigy P1300G hoists and cable-management pan-

Photo: Stefan Cohen

tographs. Existing counterweight battens support fixtures for the new lighting plot, which includes LED spotlights and automated fixtures. Additional power was brought into the hall for the motorized rigging and portable ETC dimmer racks. A large rear-projection screen fills the framed proscenium opening.

Portable instruments include approximately 65 ETC Source Fours in various models and degree sizes, 15 Philips Vari*Lite 1100AS luminaires, 19 Martin Professional MAC Aura LED wash fixtures, and 26 Chauvet Professional COLORado Tri-Tour LED PARs. Dimmers comprise an ETC Sensor 3 48X2.4KW and an ETC Sensor 3 24X2.4KW, coupled to a pair of Lex Products 36-way 208V/110V distros. Lighting control is via a MA Lighting grandMA2 light, with a Pathway Connectivity Pathport Quattro DMX/RDM gateway and a 16-port Gigabit network switch. A variety of Rosco filters also are available, including Primary Blue, Nile Blue, and Light Steel Blue.

Projection hardware includes a Barco HDF-W26 projector, linked to a pair of Show Sage Show*Server CORE R4 media servers with four outputs for production and display, facing an AV Stumpfl Flex 23' x 40' rear-projection screen that fills the framed proscenium opening; an AV Stumpfl Flex 6' x 18' CL screen and Screen Works 13' x 7.5' RP screen; and three Panasonic PT-VW340ZU 3,700-lumen projectors mounted on their sides, with two edge-blended onto the tall screen. Video playout is coordinated through Dataton WATCHOUT multi-display production and playback software, which orchestrates stills, animations, graphics, video, sound, and live feeds into a single presentation across multiple display areas.

"The informal social atmosphere is dynamic and appropriately comes to a hush by the wonder of the music and the spatial play of the media interaction," Auerbach says. "Since the atmosphere is that of a nightclub, with lighting and projections setting the tone upon audience entry, there is an initial level of excitement and activity. At 'curtain time'—there is no curtain—there's a sound-and-lighting cue that's simply a person clapping hands traveling around the high space. Attention of the audience is piqued and things quiet down, the exits are noted by a lighting cue and an announcement, and players come on to whatever stage is in use. Then the music and environmental fantasy begins."

Initial client and audience reactions

Summarizing his reactions to the completed SoundBox auditorium, Auerbach—perhaps not unnaturally—is highly enthusiastic. "We have been blown away by the high artistic caliber and unique visual and acoustic environment created for each performance," he states. "Being able to experience the detail of each artists' work up close and with enormous clarity is so much fun, and expands one's awareness of the professionalism and talent that the artists have.

"Although we have promoted the design of such spaces in the past, this is the greatest success, due to the artistic vision of Michael Tilson Thomas and the San Francisco Symphony, the innovative programming, and the best use of the space and advanced technology. And we have been very pleased with the results, and with all the very positive press."

In May, UK-based *Installation* magazine presented its InstallAwards "Best Project for Audience Venues" to SoundBox. Speaking on San Francisco's KQED Public Radio following receipt of the recent award, Tilson Thomas stated: "You do not have a feeling with Constellation that you're listening to music coming out of speakers; the music seems to be absolutely coming from the performers themselves. The acoustic that's around them has greater beauty—it feels like it's breathing with you."

As the San *Francisco Chronicle*'s music critic, Joshua Kosman, wrote last December, following the inaugural concerts: "This space [Zellerbach A] has long been known as a drab, acoustically dead barn where rehearsals were held because the alternatives were even worse. The transformation has been remarkable. The chief metamorphosis has been acoustic, thanks to the sonic wizardry of the Constellation sound system out of Meyer Sound. It's a creation that allows the space to simulate a huge range of acoustical environments, from the vast, echoing reaches of a Baroque cathedral to the crisp, dry milieu of a recording studio."

Writing in a February 2015 issue of *The New Yorker*, music critic Alex Ross offered that "the strongest argument for the Meyer approach is a pragmatic one. The apparatus at SoundBox is hardly cheap, its price tag running into the high six figures, but even a small new venue in downtown San Francisco would have cost many millions of dollars more. [The Constellation system has] helped to make classical music a more mobile, adaptable beast, one that is freer to roam the entire cultural landscape. A mirage of the Musikverein [a concert hall with highly regarded acoustics, and home to the Vienna Philharmonic Orchestra] can arise almost anywhere, with a few swipes on a screen. The simulation may fall short of perfection, but it trains the ears to yearn for the ideal."

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