the NEW Koerner Hall

Sweet Sounds Flow from Technological Innovations

by Alan Hardiman

Built over three years at a cost of some $110 million, the new Michael and Sonja Koerner Concert Hall is the jewel of the new Telus Centre for Performance and Learning at the Royal Conservatory of Music in Toronto.

The 1,135-seat hall features a number of unique technological innovations, designed both to ensure the highest quality sound reproduction in the Hall itself, but also to support online connectivity and creative collaboration at great distances.

The Hall has the highest possible acoustic rating — N1 — making it ideal for the finest sounding performances across musical genres. Its variable acoustics makes it equally well suited to amplified music, spoken lectures, and film presentations. The hall features two balcony tiers above the main orchestra level, and a third technical balcony, all sounding and looking good with optimal sightlines for TV recording and live broadcasting.

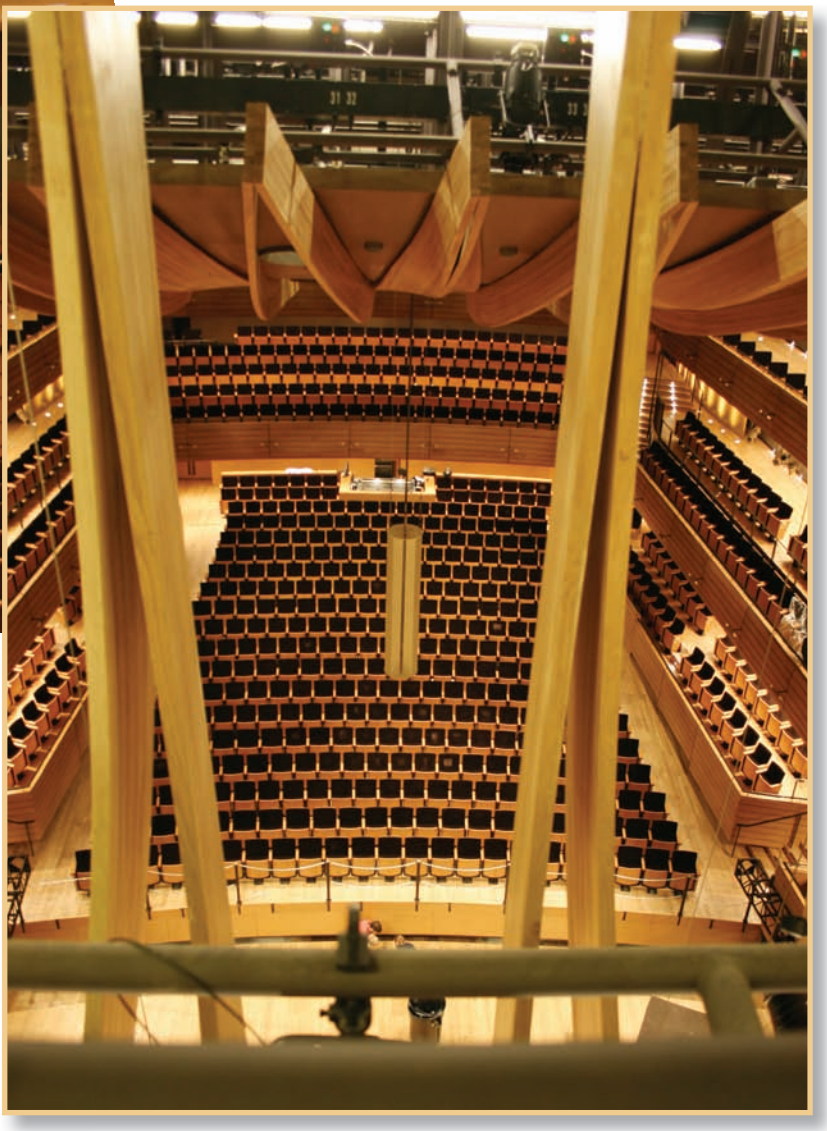
That elegance is not interrupted by the sophisticated in house voice-lift system that integrates with the performance sound system.

"Concert halls need public address systems that are separate from any music reinforcement systems they may need," says Philip Giddings, president of audio-visual consulting firm Engineering Harmonics. "Music systems tend to be large and fairly obtrusive, and if they're hung in the middle of a beautiful concert hall, they can be an eyesore. For announcements and lectures, you need something smaller and inconspicuous," he says.

Engineering Harmonics worked with manufacturer Renkus-Heinz to design a unique and

The Telus Centre for Performance and Learning-the new extension to the Bloor Street headquarters of the Royal Conservatory of Music-will be available for events beginning in October 2009. Designed by Canadian architects Kuwabara Payne McKenna Blumberg, the centre will include music studios, wired classrooms, a library, the Conservatory Theatre rehearsal hall, which will hold 160 for dinner and cocktails for up to 200, and the 1,120-seat Koerner Hall-suitable for music and spoken word performances, lectures, and conferences. Mazzoleni Hall has permanent theater seating for 237. Meeting rooms and workshop spaces can hold groups of 12 to 69 people.

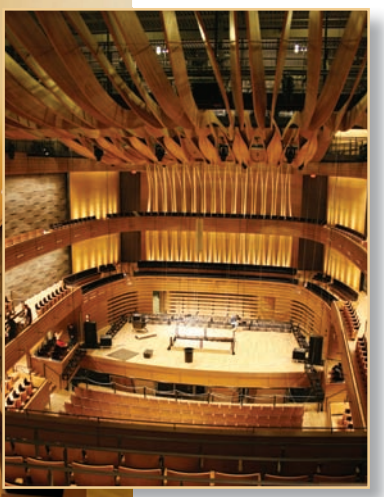
Close-ups of voice stick by Bill Coons



almost invisible retractable 'voice-stick', comprised of three off-white Renkus-Heinz IC16 ICONYX digitally steerable array systems, just a little over six feet high and arranged back to back in a circle 120° apart, sandwiched between two 1/4" thick aluminum discs 18" in diameter and flown over the stage on a three-point hang from the top plate.

The voice-stick is augmented by two additional IC16 arrays camouflaged behind acoustically transparent fabric in the wood front walls on either side of the stage.

Each IC16 incorporates sixteen 4-inch drivers, each of which receives an individually filtered and delayed



Koerner Hall at the new Telus Centre for Performance and Learning is one of Toronto's best new concert venues, thanks in part to the state of the art sound system installed there.

signal, enabling the IC16 to produce up to eight independent specified vertical beams and steering angles up to ± 30°. An upper beam can be aimed to provide coverage for the choir-level and balcony seating while a lower beam can be programmed to cover the lower seating levels.

Beamware control software communicates with the loudspeakers via RHAON (Renkus-Heinz Audio Operations Network) to permit adjustment of coverage.

"With the voice lift system, we are designing to maximize intelligibility, not sound reinforcement," notes MartinVan Dijk, senior designer with Engineering Harmonics. "The voice-stick works very well with the acoustics of the room. If we had used a more conventional array, it would have been difficult, if not impossible, to get that lift without hearing it as a point source."

The sound reinforcement system for amplified performances consists of a single retractable, centre line-array comprising eight JBL Vertec VT4887A compact, bi-amplified three-way loudspeaker systems, augmented by two Vertec VT4881A subwoofers hung in the canopy and seven smaller loudspeakers concealed in the stage lip.

For reinforced performances, the voice-lift system can be integrated with the flown performance sound system in an ingenious way to provide complete coverage of the orchestra level and the seating in the chorus levels above the sides and rear of the stage.

When both systems are deployed, the voice-stick hangs mere inches behind the centre cluster, and this is where things get really interesting. RHAON allows for the front-firing IC16 in the voice-stick to be switched off, otherwise it would fire right into the back of the centre performance cluster. This leaves the other two IC16s that aim at 120° and 240° to provide coverage for those areas to the sides and rear that the performance sound cluster does not address.

The centre cluster is essentially omnidirectional at low and low-mid frequencies, so those parts of the spectrum wrap around to the sides and rear somewhat, and integrate with the mid and high frequencies from the two rear-side units in the voice-stick.

"This alleviates the need to mount a rear-firing unit to the back of the centre performance cluster that would have compromised the riggings' straightforward design and the ability to retract the cluster into the ceiling. Engineering Harmonics consistently thinks outside the box to maximize a design's flexibility and budget allocation, and this design is a first, to their credit," describes Bill Coons, director of Contact Distribution, Inc., who supplied the Renkus-Heinz equipment.

Yet another design innovation was to provide a permanent mix position at the rear of the parterre level on the centreline, just steps from the door to the sound control room.

"For a teaching facility, a house mix position is essential. Listening in a control booth isn't the same as being immersed in the sound environment and hearing it naturally. You can't really learn about sound very well when you're removed from it in a booth," Van Dijk says. The Soundcraft Si3 64-input digital house mixing console can be wheeled in and out of the mix position as required.

For recording recitals and events for practice, review, and archiving, two Sennheiser MKH-416 microphones suspended from the catwalk provide a program sound feed, which is split into a USB microphone preamplifier connected to a dedicated Music XPC computer in the sound control room for recording to hard drive immediately. Says Van Dijk, "I love the XPCs because they're quiet, you can put them in the room with you, and they work."

A broadcast quality Hitachi DK-H32 camera feeds a broadcast-quality HD signal via HD modulators to flat panel displays deployed in the lobbies and back of house, and to a low-noise Dell PC fitted with an Extron HDSDI-ACR 100 video capture card and simple recording software for archiving. This set-up permits capture of a high quality stereo audio and video feed of a recital or concert, which can then be burned to DVD.

Yet another innovation is the incorporation of network infrastructure for collaborative music events and programs with other schools in Canada and the USA.

"You may have a master class recital with a MIDI-actuated piano on the stage in Koerner Hall, and on a retractable screen you'll see live video of a pianist sitting in Montreal, at McGill's studio and playing a MIDI-equipped piano. The MIDI data will be streamed in real time from Montreal to the piano in Koerner Hall some 500 km away, and you'll hear it in all the acoustic splendour of Koerner Hall," Van Dijk explains.

"In future, they see real-time musical collaboration as a reality. To make it as close to real-time as possible, they'll be using a dedicated data path and will know exactly what the propagation time is. This is the Telus Centre, after all, and Telus has guaranteed a certain allotment of bandwidth and capability, so the highway is there. Now they just have to come up with the things to plug into it." **B**

Alan Hardiman is Producer & Creative Director at Associated Buzz Creative, a Toronto-based media, publicity and entertainment house. Portions of his report will appear in Lighting & Sound America.