



Kursaal Oostende

EUROPE'S PIONEERING MULTI CHANNEL REVERB PROJECT

“A 2,201-seat, multi function hall whose sound reinforcement system has to fulfill four separate roles”

In one of the most prestigious refurbishment projects of recent years, Belgium's premiere multi-purpose venue, the postwar, modernist Kursaal on the seafront in Ostend, recently reopened.

At its heart is a brand new auditorium sporting a highly innovative audio system that incorporates a unique multi-channel reverb (MCR) system, allowing instantly variable acoustics.

The Kursaal, whose tall, curving glass façade throws its interior wide open to the maritime light, houses a 2,201-seat auditorium, the country's largest casino, four large halls, a conference centre, three restaurants (one already awarded a Michelin star) and a lounge bar. Designed in 1945 by Dutch architect Leon Stijnen it has – after years of dilapidation – been radically remodelled internally by architect Patrick Verhamme of Antwerp-based Group Storme Van Ranst. “Its transparency,” comments Verhamme, “was the core of Stijnen's original idea, because of its location by the North Sea – he wanted to express the

atmosphere that comes from the sea.”

The audio design team responsible for the auditorium's revival (headed by Ampco Belgium and Team Projects, with acoustic consultant Cees Mulder of Lichtveld Buis & Partners) were led by Theateradvies bv of Amsterdam, with a brief to allow the Kursaal to cater for a huge range of uses, spanning live TV shows, large theatre musical productions, classical concerts, political party congresses and touring music shows. Moreover, the hall does double duty as a full-blown cinema complete with 5.1 surround sound.

The major technology brands featured in the project include Renkus-Heinz loudspeakers, Peavey MediaMatrix, Crest amplification and Midas consoles.

Steven Kemland of lead audio contractor Ampco Belgium headed the audio design and installation team. The system had to perform four separate roles – sound reinforcement for concerts, 5.1 cinema surround sound and voice announcement and evacuation, as well as the specially developed multi channel

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The main proscenium system is a PN102/LA compact line array

reverberation (MCR) system. The latter allows the auditorium's acoustic to be tailored to suit the occasion by feeding back the sound of its natural reverberation via a matrix of microphones, processors and small, high quality loudspeakers. While the theory that underpins the MCR concept has, like many recently realised audio innovations, been around for years, it has taken this project's DSP based technologies and its designers' mindsets to bring the dream to life.

The complete system is controlled by a Peavey MediaMatrix system, using custom-tailored software written by Ruud Caltofien of Ampco/Flashlight Group R&D company Team Projects of Utrecht, assisted by technical engineer Raphaël Bollen. This co-ordinates all the necessary routing, delay and equalisation functions, making re-configuration for the four sound system modes fast and straightforward from a networked laptop PC.

Acoustic consultant Cees Mulder of Lichtveld Buis & Partners (LBP) headed the MCR variable-acoustics system design. Based on MediaMatrix, it consists of 42 independent amplification channels which amplify the hall's own reverberant sound and feed it back into the space in precisely controllable amounts. A radically different approach to the standard live sound engineer's practice of 'livening up' a room by adding reverb to a stereo PA mix, the MCR system at the Kursaal works its magic with unamplified performers including orchestras, choirs and theatre groups. Used correctly, it is virtually undetectable by an audience as the sound emanating from the matrix of small loudspeakers spread across the walls and ceiling is both diffuse and subtle. Each channel is separate and consists of an in-ceiling microphone, equalisation, amplification and a single wall or ceiling mounted Renkus-Heinz TRC62/9 loudspeaker. Mulder explains: "By amplifying the reverberant sound, the reverberation time increases and the

Clarity C80 decreases. It functions like 'anti-absorption', and no artificial reverberation processing is added to the signal, creating natural, variable acoustics using electro-acoustic means. In the auditorium, the reverberation time can be varied in eight equidistant steps from approximately 1.5 seconds to approximately 2.1 seconds in the mid frequencies. The system is designed so that, by aiming the loudspeakers sideways, the lateral sound is increased to create spaciousness." The eight MCR 'steps' (plus 'Off') allow a house engineer – usually in consultation with each concert's conductor or producer – to set the room's reverb level to suit the individual musical performance. Kemland adds: "The MCR system means the correct acoustic can be created to suit each production, whether it's a small theatre group, a jazz band or a full symphony orchestra."

The TRC62/9 was selected from Renkus-Heinz's 'custom' range to meet a highly specific combination of cabinet size, directionality and Q. It features a medium sized Complex Conic horn and dual 6.5in woofers arranged vertically next to the horn, which produce the stipulated dispersion pattern.

The proscenium PA consists of one compact Renkus-Heinz PN102/LA self-powered line array per side, augmented by DRS-18 subwoofers and a centre cluster of three STX4 loudspeakers and TRC32 frontfills. Kemland specified the PN102/LA after the auditorium had been evaluated using EASE, as it is designed to provide even frequency spectrum coverage across its 150 degree horizontal dispersion pattern. Given the auditorium's sweeping 50 metre breadth, this was a vital factor. Focused using Renkus-Heinz's Aimware programme, the arrays were flown low to cover the seating with eight cabinets per side, from the balcony down to the stalls. The first two rows of the stalls are covered by TRC32 front fills.



The MCR loudspeakers are small and unobtrusive

TeamProjects developed the software while Cees Mulder developed the MCR design

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Eight TRX61s provide the under- and over-balcony delays and, when the room is in cinema surround sound mode, the rear 5.1 channels too. Amplification for all loudspeakers bar the self-powered PN102/LAs is provided by Crest amplifiers including the CK1, CK1 400, 800-2 and 1200-2 models. The Crests driving the STX4 centre cluster are backed up by a UPS system, as the cluster acts as the voice announcement and evacuation system.

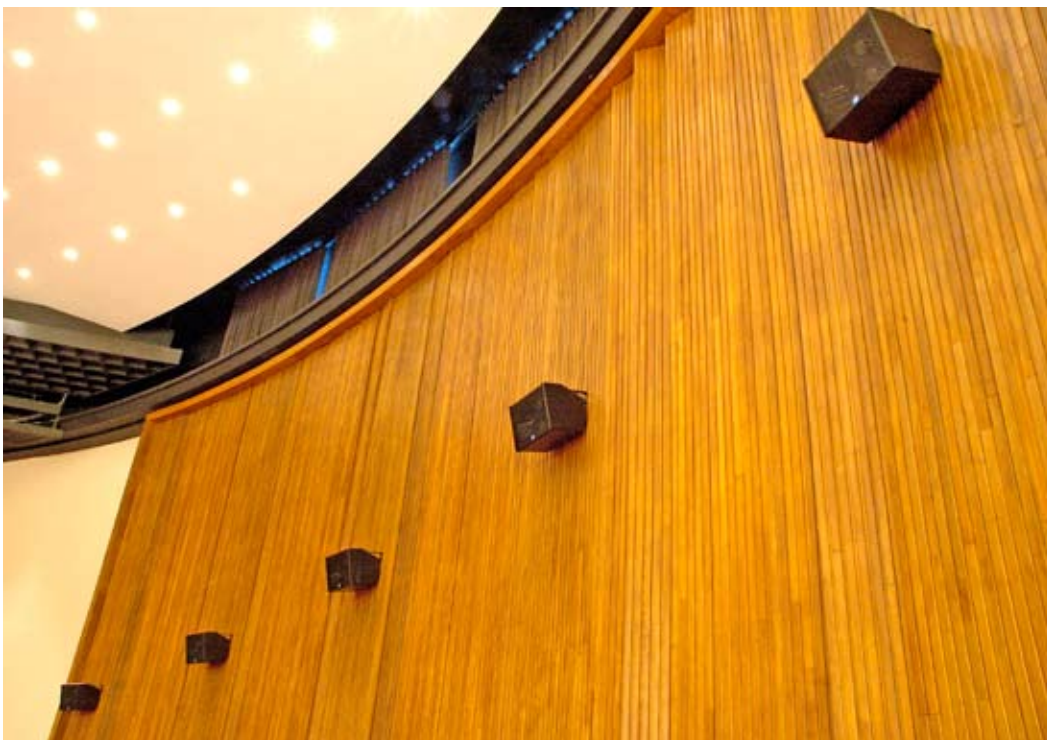
The mix position is occupied by a new Midas Venice 160 8 mono / 4 stereo input console, along with a Venice 320 24 mono / 4 stereo input desk. In the racks are BSS FCS 966 equalisers and DPR 422 compressor / limiters, TC and Yamaha effects processors and Tascam playback machines, with Quested F11 active monitors. Microphones include Shure Beta 58A, Beta 91 and MX 412 DC, Neumann

KM105, Schoeps CMC5/MK4, and AKG CK 391 and GN15E/CK47. Wireless microphones are AKG Series 4000. Other audio facilities include an IR system and a Simultane language system, along with an extensive ASL Intercom system including the company's WS19 wireless headsets.

For events elsewhere in the building, a mobile PA is on hand, consisting of six Renkus-Heinz line arrays PN121 self-powered loudspeakers, BP15-2 powered subwoofers and a pair of PN121M powered monitors, with another Midas Venice 160 console in control.

Freddy Lowyck, the theatre's chief technician, concludes: "The teams put a lot of thought and hard work into designing our lighting and audio systems, but the results more than justify it as our auditorium is now one of the most versatile in Europe."

The design features self-powered Renkus-Heinz line arrays and externally powered loudspeakers for the MCR system



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