

The National Theatre
of Costa Rica
undergoes a sonic
transformation.

by LSI staff

Historic UPGRADE



A closer look at
one of the
Adamson Metrix
ultra compact line
arrays in place.



The National Theatre of Costa Rica (Teatro Nacional de Costa Rica) is one of the country's most beloved buildings, brimming with cultured operas, concerts, and dance, and it now features a new high-end sound reinforcement system carefully integrated within its historic infrastructure.

Located in the central section of San Jose, the National Theatre opened to the public in 1897 with a performance of Johann Wolfgang von Goethe's *Faust*. Since then it has hosted many of the great theatre companies of the world, as well as famous musicians, artists and classical orchestras, along with attaining national monument status.

Designed by architects from Italy, Spain and France, the interior is filled with incredible art and soaring ceilings, highlighted by a three-story horseshoe-shaped auditorium that seats 1,040 people. It offers a classic "opera house" configuration, with a main floor of seating surrounded by second floor private viewing boxes, balcony, and gallery (second balcony). The wide front stage is framed by a proscenium, with

Top: The exterior of the National Theatre at night. Below: A perspective of the auditorium, with Adamson line arrays now flown at each side of the proscenium.

orchestra seating beginning immediately in front of the stage.

The theatre had been outfitted with a small sound reinforcement system several years ago, but it wasn't designed to support the needs of modern, non-operatic performances, and it also supplied rather poor coverage. National Theatre Technical Director Claudio Schifani began discussions about an upgraded system with Virgilio Azofeifa and Elias Arias of RSTV, a leading sound company based in San Jose.

Small Profile

The primary challenge facing the system design and installation team was integrating the new, full-range system within the architecture and aesthetic of the auditorium, while attaining the desired coverage and full-range performance to all seating areas. With this in mind, the team favored an approach uti-

lizing compact line arrays with a small physical footprint flown to the left and right of the proscenium to deliver the majority of coverage, supplemented by strategic application of compact loudspeakers for specific areas.

The Adamson Systems Metrix Series of compact line arrays held promise in meeting these needs, with Azofeifa noting, "Metrix cabinets were chosen as they offer most power and best coverage of all cabinets in their category, in addition to not creating an undesirable image as an install in a theatre where minimal visual distraction is required on top of a harmonic aesthetic."

Daniel Fernandez of the Adamson Latin America technical support group was brought aboard to lend his expertise to the design process. Specifically, he proposed the use of Metrix-I (installation version) line array modules for several reasons, including their

purpose-built installation rigging system that also helps save on costs, in addition to providing additional flexibility by offering two different vertical coverage patterns. "The flexibility of different vertical coverage patterns allowed us to obtain the ideal coverage pattern with a minimal number of boxes, thus adapting the design to the limitations of the architectural aspects of the venue," Fernandez explains.

Each 2-way Metrix cabinet incorporates an Adamson-designed 8.5-inch Kevlar neodymium mid-low frequency cone driver optimized for the enclosure, as well as a 1.4-inch high-frequency compression driver on a proprietary wave-shaping chamber. Horizontal coverage pattern is 120 degrees, with the aforementioned vertical pattern available in either 5 degrees (Metrix) or 15 degrees (Metrix W - Wide Angle Vertical Enclosure) in a total cabinet footprint measuring 8.5 inches high,

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Left to right, Daniel Fernandez of Adamson Latin America Support, Virgilio Azofeifa of RSTV, and National Theatre Technical Director Claudio Schifani at the house mix position outfitted with a Midas Heritage console.

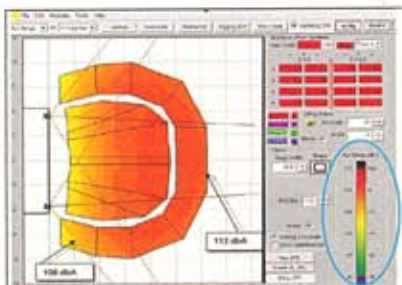
21.2 inches wide and 16 inches deep, and weighing just over 40 pounds.

Modeling Insight

The design took shape with left and right arrays comprised of 10 Metrix modules, with the tighter vertical dispersion models at the top providing extended coverage to more remote areas, transitioning to the wider vertical dispersion models to cover the main seating areas. To further fine-tune and optimize the design, Fernandez utilized Adamson Shooter array modeling and configuration software, which provides 2-dimensional vertical and horizontal calculations and 3-dimensional SPL calculations, in addition to a mechanical view of the array structures.

"We needed to be very careful and accurate with the splaying of the arrays, and this is where help from Shooter was invaluable. The software provided vertical and horizontal predictions in several frequencies and at different locations," Fernandez says, who was supported on the project by Adamson's Benoit Cabot. "On top of that, we had to carefully account for some limitations with the array placement, since we were not allowed to open holes in the main structure of the proscenium in flying the arrays."

The system team created and fab-



Adamson Shooter helped optimize the design. Here we see a top-view prediction (horizontal coverage and SPL) of coverage to orchestra seating, boxes and the back area (full range A-weighted).

ricated a special "arm" in order to fly the arrays from an upper support beam so that they did not touch the proscenium and surround structures. Further, the Metrix cabinets were outfitted with Enclosed Installation Rigging (EIR) system, providing all of the flying/aiming precision and safe structural support found in the rigging for touring Metrix enclosures, but at a lower cost.

Four Metrix Sub compact subwoofers, each with dual 15-inch Kevlar neodymium low frequency woofers, can be utilized to extend LF response for applications requiring it. These can be rolled out to the wings of the stage via dollies or placed under the stage on the main floor level, with cabling infrastructure facilitating quick connection at both locations.

Several Adamson CB1 compact 2-way loudspeakers providing 90-degree by 60-degree dispersion are mounted horizontally in cutouts on the face of the stage to supply front fill support. Further CB1 loudspeakers are flown singly, using the supplied mounting hardware, at the far sides of the proscenium to bolster presence in the boxes and gallery seating located nearer to the stage. All of these loudspeakers are carefully time-delayed in reference to the main arrays to insure synchronous arrival.

A Higher Level

Just two Adamson M Series 4-input by 8-output digital loudspeaker processors were required for all loudspeakers, providing all filtering, limiting and delay. One of these processors feeds the main arrays and subwoofers, while the other is applied to the front frill and side fill satellite loudspeakers.

Lab.gruppen power amplifiers, recommended by Adamson to drive these loudspeakers, are rack-mounted in a secured room with the digital processors. Two FP 10000Q power the arrays, with a single FP 7000 for all four subs and a C 28:4 offering four channels for the remaining fill loudspeakers.

The former system's Midas Heritage 2000 mixing console was retained because it is still performing at a very high level and affords plenty of mix facilities for any application hosted at the theatre. The console resides on a cart so it can be easily rolled into position when needed, with infrastructure for quick interconnection built into the main floor mix position. It is also capable of serving as the monitor console when small wedges from the existing system are needed.

The RTS team performed the new system installation quickly and efficiently during a "dark" period for the theatre, and it debuted to positive reviews that have not ceased. "The new system has exceeded all the expectations, offering the coverage, sound quality, and aesthetic 'look' the client was seeking," Fernandez concludes. ■