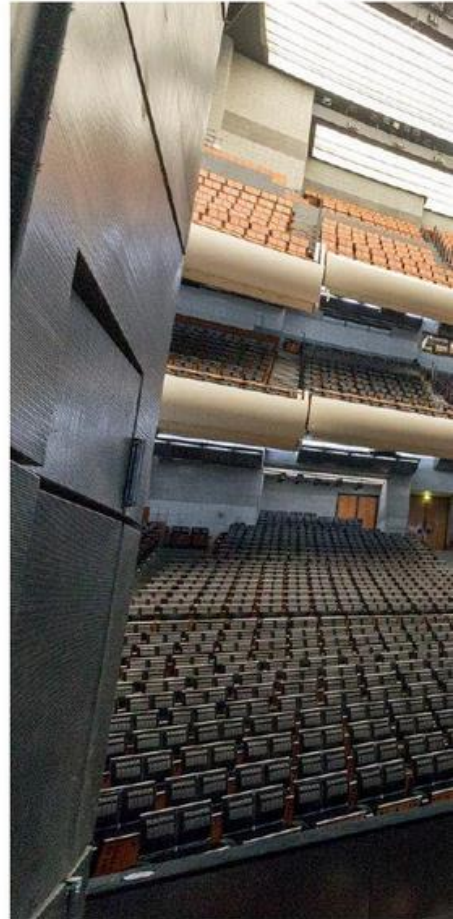


THEATRES & CONCERT HALLS

A round-up of the latest performance venues from every corner of the world, featuring partial upgrades to audio, lighting or visual technology, as well as full inventory installations for new theatrical spaces.

OPÉRA BASTILLE

COMPANY: FOHNN
LOCATION: PARIS, FRANCE



The recent installation of a new loudspeaker system in the world-famous Opéra Bastille, Paris, raised the bar in terms of both sound coverage requirements and architectural integration. Inaugurated in 1989, France's national opera house is a vast complex with stunning architectural features, acclaimed staging facilities, workshops for scene building, costumes and props, plus offices and rehearsal rooms. At its heart is the main concert hall. A 45-metre high main stage has state-of-the-art scenery lifts for creating different levels. A hidden orchestra pit accommodates 130 musicians. The 20-metre by 32-metre by 40-metre auditorium seats audiences of 2,745 on three levels - stalls and two main balconies, as well as eight side balconies. Acoustically, these main balconies pose a challenge as each one covers the seating directly below. Placing loudspeakers level with the seating does not guarantee even coverage of every row. With the top tier 18-metres high and 40-metres from the stage, providing optimum sound coverage for the highest levels of speech intelligibility and music reproduction in every seat,

without spoiling the architecture or impeding audience views, requires a system that can deliver on a number of different levels.

Following a loudspeaker shootout involving several companies, German manufacturer Fohhn was given the task of fulfilling this difficult brief. Assisted by its French distributor, Rock Audio Distribution, and system integrator Silence, Fohhn engineers planned, simulated and ultimately commissioned the new system using the company's Famsa measurement system to ensure best possible results.

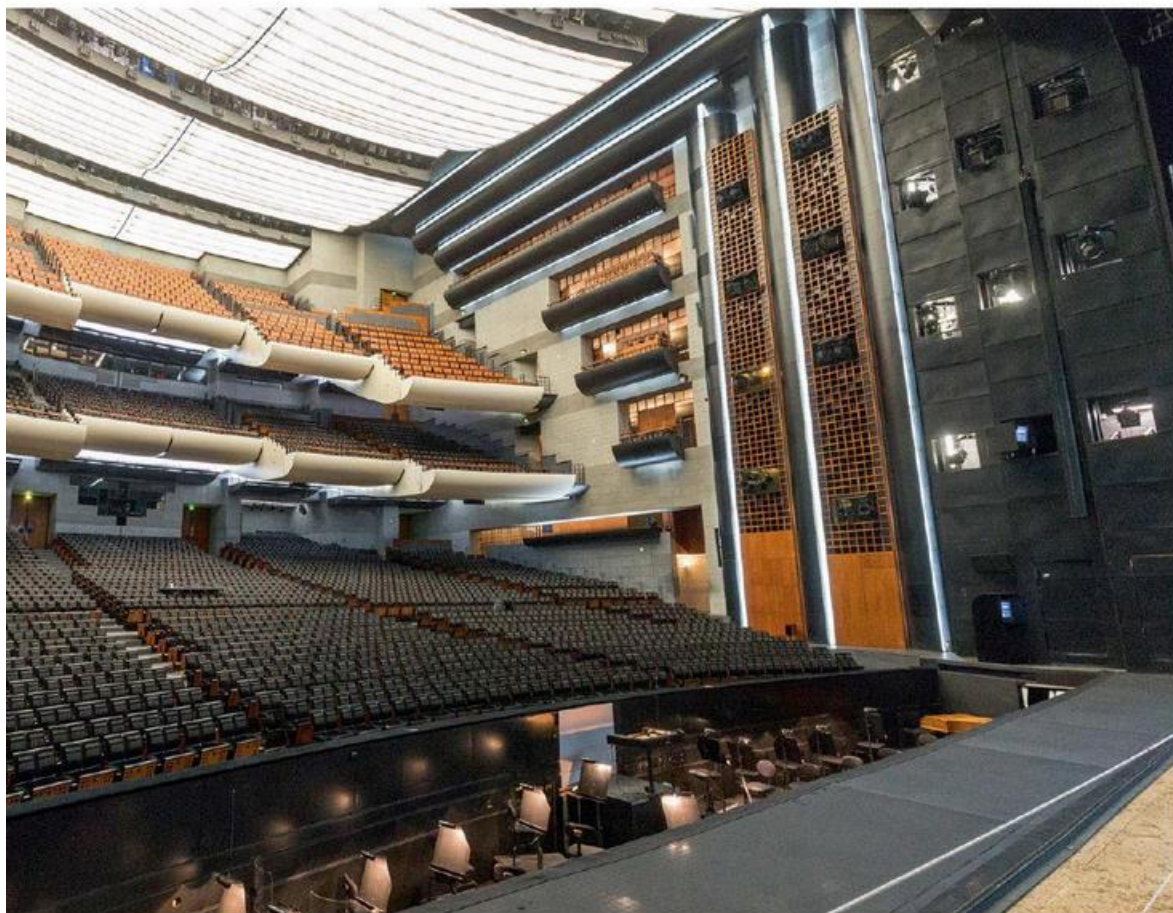
The decision to use loudspeakers equipped with Fohhn's state-of-the-art beam steering technology killed two birds with one stone. Firstly, it could eradicate any acoustic problems caused by the balconies and secondly, the systems' slim, compact dimensions would ensure excellent sound quality while blending unobtrusively into the hall's interior.

Focus Modular systems were selected to provide precise, high-quality coverage of both the main part of the hall and the balconies. At each side of the stage, a

7.48-metres column comprising five loudspeaker modules was installed. A stack of three FM-400 low-mid modules forms the column's centre, with high frequency FM-110 modules top and bottom. The individually generated beams from each loudspeaker - one from the top FM-110, two each from the FM-400 modules and two from the lower FM-110 - can effectively cover all seating areas without spoiling the view.

This main system is supplemented on both sides of the hall by passive Linea LX series loudspeakers, driven by D-4.1200 amplifiers. The amplifiers' DSP enable frequency response and run time adjustments to be made, therefore optimising the LX systems in relation to the main system and the room architecture. One LX-150 is installed level with the second of four side balconies. Another is level with the stalls. An LX-100 is deployed at the level of the third highest balcony. The aluminium housing of these slim systems has been colour-matched to the ventilation ducts on which they are mounted to harmonise with the interior.

Two active, high powered, Perform-Series PS-9 sub-



woofers provide impressive levels of bass reproduction in the hall. Clad and hidden from view at the side of the stage, each electronically steerable 21-inch 8,500W system has the same capability as four conventional 18-inch subwoofers, providing extremely precise and powerful sound reproduction in the 28Hz - 110Hz frequency range.

Four active LX-10 ASX compact loudspeakers, belonging to Fohhn's AIREA-Series, provide supplementary sound coverage for each of the highest side balconies. These can be individually adjusted and time-aligned. The wiring of these systems simply involves a single CAT cable on each side - as opposed to conventional passive systems that require their own individual cables. Two further LX-10 ASX systems are used to cover the lowest side balconies. An AIREA AM-20 Master module serves as the central digital interface for these loudspeakers. All digital audio signals and control signals, as well as 48V power, can be transmitted using a single network cable. This has significantly reduced the costs that would have been incurred wiring 10 systems

and connecting them, via 1-2km of copper cable, to amplifiers in the building's basement.

Installing the Fohhn loudspeaker system proved comparatively stress free for the team, as seen from the control rack situated in the opera house's basement. The entire installation has required just a single rack with only seven of its spaces occupied - as opposed to the six racks needed for the previous system. Controlling the new sound system is equally straightforward. All the active loudspeakers and amplifiers have been incorporated into a Fohhn-Net network. Various functions on each of these devices can be controlled using a single piece of software - Fohhn Audio Soft. Whether digital amplifiers, AIREA system components, or Focus Modular systems with their electronically steerable beam characteristics, all adjustments can be made in real time as required. Most importantly, using Fohhn Audio Soft has created a secure and highly efficient working environment for the Opéra Bastille's sound technicians.

As well as sound quality, ease of installation / opera-

tion, reduced space, power and cabling requirements, the new audio system's visual integration has also been highly successful. Loudspeakers are mounted flat against walls and ventilation pipes, or ingeniously hidden behind panelling, causing audience members to ask where the superb sound is coming from. This installation also required far fewer loudspeakers than the previous system.

Philippe Taberlet, Technical Director of the Opéra Bastille, is delighted, he said: "We wanted to change our PA system, but it was important not to spoil the hall's beautiful architecture by having large stacks of loudspeakers everywhere. Then we discovered Fohhn. The Focus Modular systems have proved perfect for achieving high quality reproduction of music and voices, with their Beam Steering technology providing impressive, direct coverage possibilities. What's more, the speakers have integrated perfectly into the hall's interior, leaving its 'look' untouched. We're happy."

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