

New Columns for Einsiedeln Abbey

Swiss place of pilgrimage acquires line source
speakers with Fohhn Beam Steering Technology.



The Abbey

Situated in a village of the same name within the Swiss canton of Schwyz, Einsiedeln Abbey is a traditional Benedictine monastery, which, for over 1000 years, has been a place of culture, education and meeting. An important stopping point on the Way of St. James and a destination for numerous pilgrims, it is now widely regarded as Switzerland's best-known place of pilgrimage.

The monastery's central building is the Church of Maria Himmelfahrt and St. Mauritius: Consecrated in 1735, this abbey and cathedral church is one of Switzerland's most important Baroque buildings. In the westerly octagonal entrance area to this east facing church is the Lady Chapel with the famous Black Madonna – a feature that, in itself, attracts many pilgrims and tourists to Einsiedeln.

An important place of pilgrimage: the abbey church with its distinctive double towers.





Virtually invisible: perfectly integrated Linea Focus line source systems.

The Challenge

An abbey church of such historic and religious importance requires a sound system that can meet the most demanding acoustic requirements. Numerous events are still regularly held there including performances by the monastery choir, organ recitals and services. Any sound system used in here must therefore guarantee first-class sound quality and excellent speech intelligibility. Not an easy undertaking in such a large, reverberant church building where the reverberation time lasts up to 7 seconds and smooth surfaces, floors and columns lead to unwanted reflections.

From a visual perspective, the expectations of such a system are no less: None of the loudspeakers installed in the abbey church should in any way detract from the house of worship's majestic Baroque interior – and at best, their integration should be virtually invisible. The new sound reinforcement system would be expected to fulfil all these requirements.



The Solution

The Abbey's technical director eventually decided on loudspeakers from south German manufacturer Fohhn Audio AG. The company's products had already proved convincing in 2013: For an open-air production of Pedro Calderóns "The Great World Theatre", staged on the monastery forecourt, systems with integrated Fohhn Beam Steering Technology were used – active loudspeakers whose vertical beam width and inclination angle can be electronically adjusted in real time, via software.

What had already proved its worth in front of the abbey church should also work inside it: 2016 saw the installation of a completely new sound reinforcement system consisting of Fohhn loudspeakers from the Linea Focus, Linea LX and Linea AL Series, as well as digital amplifiers from the D-Series. Planning and installation of the system was carried out by Sennheiser (Schweiz) AG and Einsiedeln-based EXPERT Cäsar Kälin GmbH, supported and advised by Fohhn engineers. By the end of 2016, the new sound reinforcement system was in operation.

Easy to overlook: Linea LX line source systems in the lower chancel.

The Installation

Two Linea Focus LFI-350 loudspeakers were installed as the main sound system: The 3.5 m long line source systems were both mounted on pillars to the left and right of the transition area from the nave to the lower choir. The systems' enclosure colouring and slim design enabled them to integrate perfectly into the narrow indentations on the front of each pillar.

Linea Focus systems have been specially developed to deliver dynamic transmission of speech and music in acoustically challenging spaces with long reverberation times and in demanding architectural settings. The LFI-350 model is equipped with 24 coated, 4" long excursion drivers and 24 digital DSP amplifiers with 100 W power output per channel – these integrated amplifiers generate a maximum sound pressure level (SPL) of 133.5 dB.

Like all Focus-Series products, the LFI-350 is also equipped with Fohhn Beam Steering Technology. In short: its vertical beam dispersion characteristics can be intuitively controlled – via software and in real time. Its beam(s) can also be configured in such a way that unwanted reflections from pillars, walls or floors are avoided. A special algorithm additionally ensures that the beam's inevitably occurring, unwanted side lobes are suppressed. This results in directional coverage and significantly improved speech intelligibility for the abbey church's visitors.



Modern sound columns amid Baroque art: the two LFI-350 Beam Steering systems.

The main system was supplemented by the addition of three delay lines, each consisting of two Linea LX-150 loudspeakers. These delay speakers were deemed necessary to bypass the large amount of shadowing that results from the pillars in the nave. Four white LX-150 systems were therefore mounted on the pillars in question. Two further systems – with black enclosures – were installed in the entrance area in front of two side altars, cleverly hidden behind elaborate black wrought ironwork.

Linea LX-150 systems are passive loudspeakers with sophisticated two-way technology. Equipped with twelve 4" long excursion drivers and a 1" compression driver with Fohhn Waveguide System, these hybrid line source systems are remarkable for their highly directional, cylindrical beam dispersion. Sound pressure levels within the beam dispersion area remain very constant, even over a longer distance.



Matching the wall colour: Linea LX-150 systems with white aluminium enclosures.



Behind bars: black LX-150 hybrid line source systems in the entrance area.

To provide sound coverage for the Black Madonna, two Linea AL-150 loudspeaker systems were installed in the Lady Chapel at the centre of the octagonal entrance area. The 1.50 m long designer loudspeakers were mounted on the left and right sides of the chapel entrance behind a black wrought-iron gate. With their high quality black piano-lacquered enclosures, these systems are barely noticeable and therefore do not detract from this famous feature.

Linea AL-150 systems are passive line source loudspeakers with two-way technology, 16 vertically aligned 3.3" loudspeaker chassis and a maximum sound pressure level (SPL) of 129 dB.



Black attraction: Linea AL-150 in the Lady Chapel.



Perfect sound at close range: two white LX-10 monitor loudspeakers.



For monitoring in the lower choir, Linea LX loudspeaker systems were installed: Six 60 cm long LX-60 systems were mounted on the salmon-coloured walls of the altar area. The loudspeakers are each equipped with four coated 4" long excursion chassis and a 1" compression driver on horn-loaded Waveguide. Their aluminium enclosures are in a special RAL colour to match the interior.

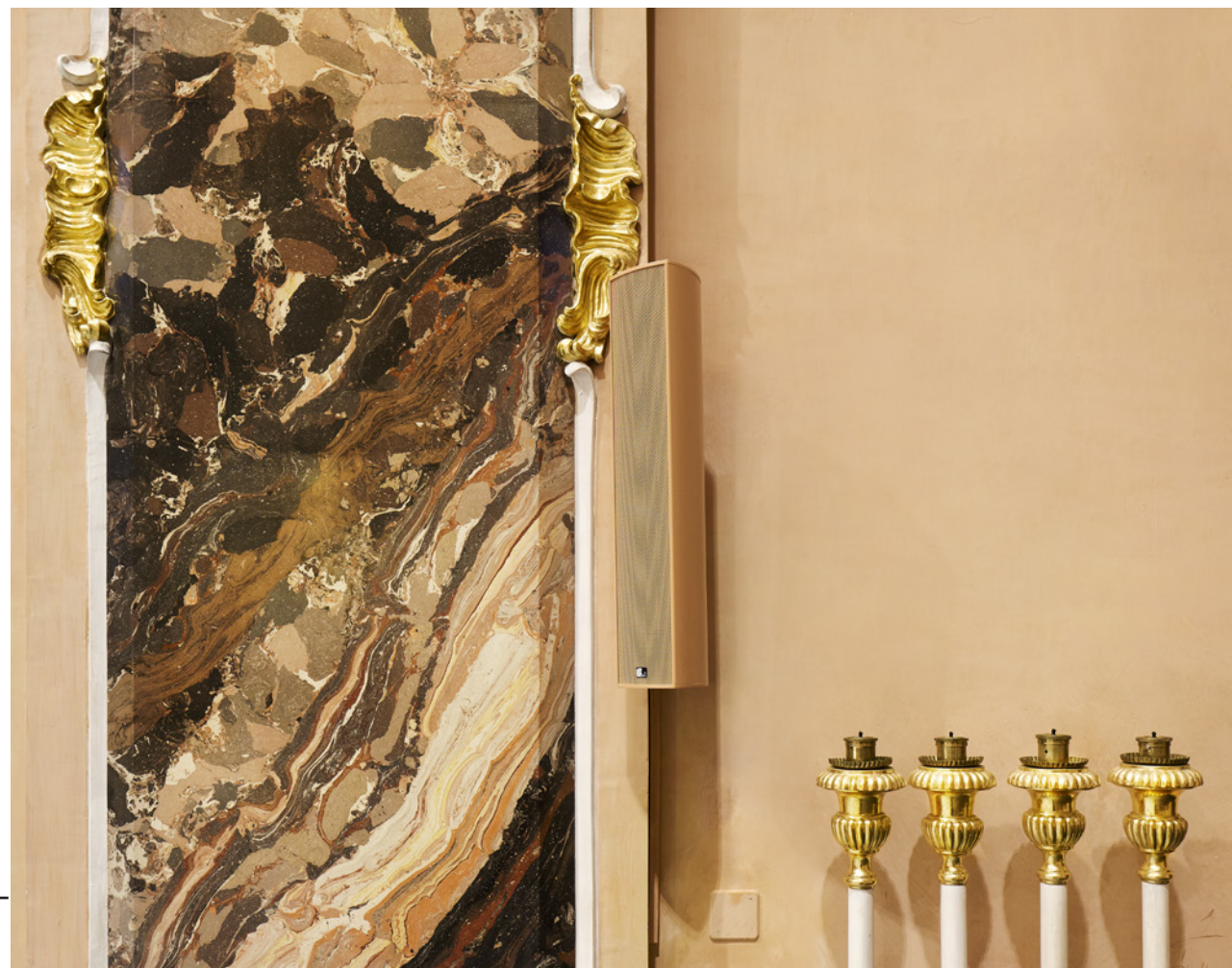
All Linea LX and AL Series passive loudspeakers are driven by Fohhn DSP-controlled digital amplifiers: Three D-4.750 CLASS D amplifiers (four input channels, four amplifier channels each generating 750 W at 4 Ohm) were installed to power the delay lines, monitoring systems and loudspeakers in the Lady Chapel. The amplifiers are equipped with an

integrated power monitoring system (Fohhn Mains Control). Should an overload occur, this interrupts the supply of power in order to protect any connected devices.

The digital amplifiers and the two Beam Steering systems used in the abbey church are connected with one another in a control network – Fohhn-Net. All DSP functions for these networked devices can be configured and adjusted using a single piece of control software – Fohhn Audio Soft.

The entire sound system is controlled via a Symetrix Prism Matrix. Over 10 Sennheiser microphones have been deployed in the most commonly used areas of the church (such as the pulpit, altar etc).

Sound in a special colour: LX-60 line source speakers are used as monitor systems in the lower choir.





Conclusions

The installed Fohhn sound system met all the visual and acoustic requirements. The Abbey's technical director was particularly impressed by the performance of the loudspeaker systems in conjunction with all the connected microphones. Despite a lengthy reverberation time of up to seven seconds, a Speech Transmission Index (STI) of over 0.6 has been achieved.

Congratulations to everyone involved in this impressive project!

Amplification for the loudspeakers: four digital DSP amplifiers from Fohhn.

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