

Wireless emergency warning system fulfills regulations for historic buildings



The old French centerpiece is one of the showpieces in the Silver Chamber of the Sisi Museum.

An electro-acoustic emergency warning system conforming to the latest safety standards has been installed in the Silver Chamber of the Sisi Museum in the Vienna Hofburg. The particular challenge faced here was not to interfere with the ambiance of the historic building. Using Beckhoff building automation technology, the intelligent multimedia and bus system specialists IMBS from Ottendorf, Austria, developed a loudspeaker system that works via radio.

## Cleverly hidden evacuation system for the Sisi Museum

In the case of an alarm, hidden loudspeakers broadcast spoken instructions to the exhibition visitors in the Silver Chamber to leave the building: "Please remain calm; there is no cause for panic. Follow the green lamps to the emergency exit and wait for further instructions from the staff." These requests that are heard by the visitors seem to come from nowhere, because there are no loudspeakers to be seen anywhere in the showrooms. The challenge of installing a comprehensive emergency warning system within such noble, protected walls lies in leaving no visible traces. This means: chiseling work was absolutely forbidden in this project. Therefore, other ways and means had to be found in order to fulfill the safety features required by law.

Klenk & Meder, the electricians responsible for all electrical work at the Vienna Hofburg, were charged with the task of implementing the emergency warning system in the Silver Chamber of the Sisi Museum and

sought an appropriate partner in IMBS: "Of course, this wasn't the first loudspeaker system that we had to install. But the main problem in the showrooms was that we weren't allowed to lay any cables," explains Helmut Fahrnberger from Klenk & Meder.

### Wireless emergency warning system

The safety regulations for electro-acoustic emergency warning systems are clearly defined. The top priority is the 100 percent availability and operating reliability of the evacuation system and the associated constant self-monitoring of the system. This means that the complete sound signal path and the necessary peripherals have to be checked constantly so that there is no sudden radio silence in the event of a real emergency. Safety-relevant signal sources (evacuation messages, sirens), amplifiers and redundancy amplifiers, loudspeakers and their cables as well as the emer-



The loudspeakers, which broadcast the instructions for evacuation in an emergency, are mounted invisibly behind the showcases.



The Sisi Museum in the Vienna Hofburg has been visited by over three million people over the last five years.



Loudspeakers are also installed behind the ventilation grilles of the drain system.

gency power supply are also subject to this compulsory checking. This scenario is precisely where things start to get difficult in historic buildings. For this purpose, the system integrator IMBS developed a wireless loudspeaker controller that can be cleverly hidden in the approx. 30 x 30 cm empty spaces between the showcases and behind the cover grilles of the drain system, all of which is connected via EnOcean technology. The control center of the evacuation system consists of a Beckhoff CX1010 Embedded PC, various digital input and output terminals, four KL6021 EnOcean radio receivers, two KL2602 alarm annunciators on the outside and a C6925 Industrial PC for the visualization.

#### Measuring tone allows the condition of the loudspeakers to be checked

A measuring tone, broadcast five times a day for five seconds at an inaudible frequency of 16,000 Hz, provides information on the condition of the loudspeakers. If this tone is not detected by the measuring microphones mounted on the wide-range loudspeakers, the loudspeaker controller then raises the alarm via the Beckhoff building services. "Our

measuring system evaluates the acoustic data from the individual loudspeakers and, as soon as anything lies outside the programmed range, this information is relayed via EnOcean to the Bus Terminals and to the Beckhoff IPC on which the visualization is running. The automation system collects all safety-relevant data, presents it clearly on a monitor and saves it in a database. "In the event of an error message, we can then read precisely whether a loudspeaker is outside the radio range or whether it just cannot correctly reproduce the 16 kHz tone," explains Josef Donnerer, CEO of IMBS. In addition to that, a kind of anti-theft system is integrated in the portable loudspeakers – to put it precisely, a second radio channel via which their presence is reported to the building management once per minute. If this signal is absent, the system similarly raises the alarm and the staff can set off immediately in search of the 'lost' loudspeaker.

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