

The extensive stage technology of the Szigligeti Theater in Szolnok, Hungary, is automated and monitored using components from Beckhoff.

All scenery elements are moved synchronously to defined positions via TwinCAT NC PTP according to previously configured motion profiles and scenarios.

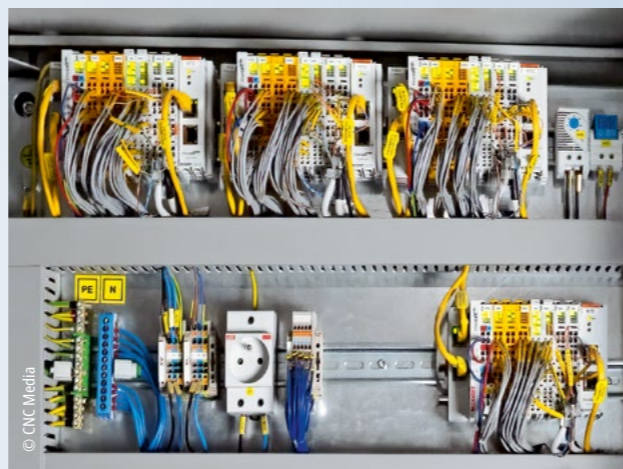


Support engineer János Bódvai and marketing manager Éva Porgánszki (both Beckhoff Hungary) alongside Attila Lukács, Gergely Major, and Attila Major from Gépbér-Színpad (from left to right)

PC-based control automates stage technology in historic theater

Lifting and moving scenery safely and precisely

Gépbér-Színpad from Hungary has been developing and implementing solutions for theater and stage technology for more than two decades – most recently for the retrofit of the Szigligeti Theater in Szolnok. Project manager Attila Major has put his trust in PC-based control from Beckhoff to control and monitor the stage floor and upper machinery.



Section of a control cabinet containing the components for controlling and monitoring four of the total of 64 drives

The Szigligeti Theater is one of Hungary's best-known theaters. Opened in 1912 and in operation ever since, a complete renovation was carried out in 2021. Gépbér-Színpad Ltd. was commissioned with planning and designing all of the stage technology for this project. Attila Major explains: "The design of the theater technology posed a challenge in several respects." Firstly, the designers and engineers had to adapt to the historic building structure. Secondly, where moving scenery is involved, incredibly stringent safety requirements need to be met as people are in close proximity with the structures. The entire automation technology was therefore designed to meet the necessary specifications for

stage technology in accordance with EN 17206:2020 and EN 62061. According to Attila Major, no other theater in Hungary has this level of safety technology. János Bódvai, support engineer for Beckhoff Hungary, adds: "We were delighted that we were able to make our contribution to the extensive automation of the stage technology with PC-based control." This includes:

- 18 pieces of equipment for moving scenery weighing up to 250 kg at a speed of up to 1 m/s
- 44 point hoists distributed over four rows
- a 5-part moving system for the orchestra pit

- a revolving stage with a diameter of 9.5 m and variably integrated performer descent platforms
- a hoist for lifting the scenery and props to the stage level

Flexible control and communication

To engineer and program the stage technology used to move the point hoists and scenery, Beckhoff recommended Drivecontrol, s.r.o., a Czech company, and its iTEMS (Intelligent Technology Motion System) control system based on TwinCAT software. The safety-oriented control section was equipped with EtherCAT TwinSAFE Terminals as hardware, including 64 EL1904 digital input terminals, 64 EL2904 digital output terminals, and one EL69xx TwinSAFE Logic. The signals from the SIL 3-certified rotary encoders used by Gépbér-Színpad for the drive axes are read in via a total of 64 EL5001 EtherCAT encoder interfaces (SSI). For the standard control range, there are another 128 EL1008 digital input EtherCAT Terminals and 64 digital output EtherCAT Terminals (each 8-channel).

When setting up the communication architecture, project managers Attila Lukács and Gergely Major were able to take advantage of the freedom that EtherCAT's topology offers: Two CU2508 real-time Ethernet port multipliers, one CU1128 8-port EtherCAT junction, 16 EK1101 EtherCAT Couplers with ID switch, and a total of 64 EK1122 2-port EtherCAT junctions were used to create a variable topology with eight fundamentally independent EtherCAT branches. "If an error occurs in one branch, the other EtherCAT segments are not affected," says Gergely Major.

Reliable control components with long-term availability

"The control technology must not cause any performance to be canceled," emphasizes Attila Lukács. With this in mind, a second C6920 compact Industrial PC has also been installed in the central control cabinet, which the theater technician can switch to immediately. As the technical infrastructure of a theater has to function flawlessly 24 hours a day, seven days a week, the reliability of all the components used was an important criterion when selecting them. The long-term availability of the control components was also a factor. After all, the stage technology needs to be maintained and modernized over the next 25 years.

Attila Major states that further advantages of PC-based control are the fact that it is easy to integrate the stage technology with the AV and media technology as well as the building management system, plus the fact that remote maintenance is possible. Gépbér-Színpad technicians can provide the theater operator with immediate support in the event of a malfunction, although this has not yet been necessary. "The stage technology has been working smoothly for over a year now – to the satisfaction of everyone involved," says Attila Major.

More information:

www.gepberszinpad.com

www.drivecontrol.cz/en

www.beckhoff.com/entertainment-industry