

CX1000 and Bus Terminals control facade illumination at Allianz Arena



→ When millions of fans from all over the world watch the opening match of the FIFA World Cup on June 9, 2006 in Germany, Allianz Arena in Munich will be the center of the action. In addition to a wide range of architectural and technological highlights, the planners also set new standards in facade illumination during the construction of the new football stadium. The company responsible for the technical building services, VA TECH ELIN EBG, used Beckhoff Bus Terminals as the I/O system and CX1000 controllers for the lighting system.

Masterly football arena

For football matches Allianz Arena replaces Munich's Olympic Stadium, which was opened in 1972. In the future, football matches involving FC Bayern München, TSV 1860 München and the German national team will be played in the new football arena in the northern part of the city. For the 2006 World Cup, the arena will welcome fans from all over the world. The stadium illumination colored in red, white and blue has already caused a stir and plenty of discussion in advance of the event. The arena is illuminated in each respective club's colors, depending on the team playing at the time: white for neutral matches, red for FC Bayern München home matches, and blue for TSV 1860 München.

The opening whistle

Allianz Arena is considered a milestone in advanced architecture. The contract was awarded to Alpine Bau Deutschland GmbH, together with the Swiss architects' team Herzog & de Meuron. The foundation stone was laid on October 21, 2002. After a construction time of approx. two years, the Arena was officially opened at the end of May 2005. It has a capacity of 66,000 seats and a total usable floor space of 170,000 m², including spacious catering areas, conference rooms and other attractions such as "Lego Kinderland". The technical building services contract was awarded to VA TECH ELIN EBG GmbH, Austria. The compa-



Allianz Arena data

- | Start of construction: October 21, 2002
- | Opening: May 30/31, 2005
- | Building owner: München Stadion GmbH
- | General contractor: Alpine Bau Deutschland GmbH
- | Main planner: Hypo Vereinsbank Immobilien AG
- | Architects: Herzog & De Meuron, Basel
- | Dimensions: 258 m x 227 m x 50 m, circumference: 840 m, area occupied by the stadium: 37,600 m², total site area: 171,000 m²
- | 3 tiers with a total of 66,000 seats
- | approx. 6,500 m² catering area
- | 2 video walls, 100 m² each
- | 460 km of high-voltage cables and 140 km of low-voltage cables
- | 4,200 switches, sockets and signalling devices, 4,600 lamps in the indoor areas, 4,200 lamps for the external skin, and 220 floodlights
- | 250 control cabinets and distributors



ny is part of VA Technologie AG and supplies electromechanical, electronic and integrated building systems, installations and services. The company has experience developing solutions for industrial facilities, building services, energy supply, automation, drive technology and facilities management. VA TECH ELIN RM was responsible for all technical building services (electrical and mechanical) for the new World Cup stadium.

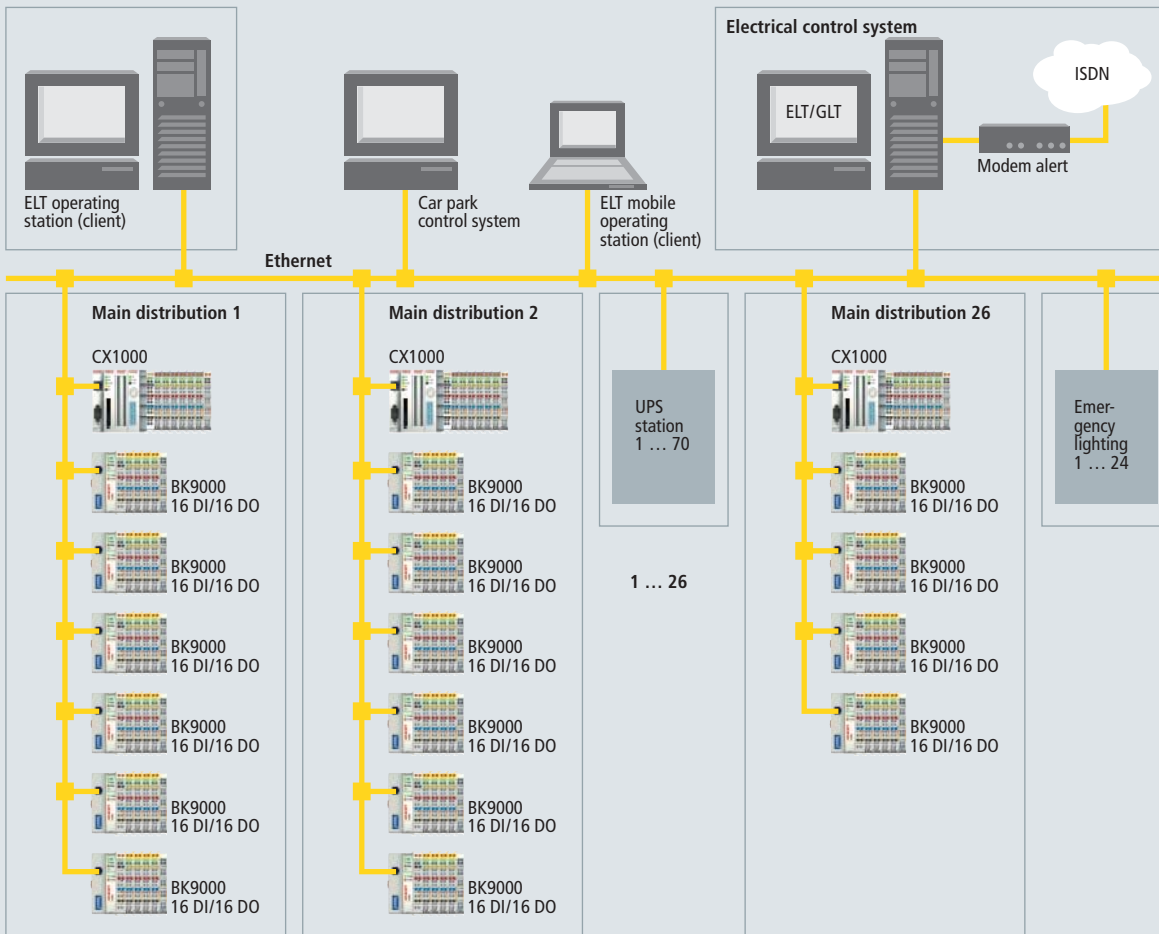
Gottfried Blumauer, at VA TECH ELIN in Linz (Austria) responsible for the infrastructure technology section (industrial building automation, automation technology, IT, voice and data networks) and joint project manager for the implementation of the electrical control system at Allianz Arena, reflects on the magnitude of this project: "The new football arena in Munich was our largest stadium construction project to date. The services we provided include illumination, networks, heating, air-conditioning, ventilation and sanitary engineering, as well as instrumentation, switching and control engineering. We also dealt with all aspects of electrical engineering, medium voltage installations including energy management, illumination, fire alarms and telecommunication systems, and the complete safety management system. The automation systems are based on an Ethernet network."

Fast data communication via real-time Ethernet

VA TECH ELIN RM chose automation components from Beckhoff for the lighting system, malfunction logging, and for controlling the low voltage switchgear for the whole stadium. The systems controlled by these components include the following:

- | Illumination of the external facade;
- | general illumination;
- | floodlighting;
- | camera illumination;
- | lighting in the multi-level parking ramps;
- | column heaters;
- | safety illumination;
- | operating mode specification for the parking ramp control system;
- | fault monitoring for the UPS systems.

The installation utilizes 35 CX1000 Embedded PCs running Windows CE and more than 100 I/O stations with BK9000 Bus Couplers that communicate with the higher-level control system via real-time Ethernet. A total of around 2,500 Bus Termi-



Topology electrical control system



nals log data from approx. 9000 I/O points such as switching commands, feedback, lighting output, fault and position signals, or counter settings.

"We have already been using Beckhoff technology in other building services areas for some time," Gottfried Blumauer explained. "For this large project, the requirement for flexible automation based on the standard Ethernet network was a good argument in favor of the open control philosophy from Beckhoff."

Adaptable external facade

One of the most impressive features of Allianz Arena is the illuminated external facade that turns the stadium into an enormous light show with changing colors. Beckhoff Bus Terminals are also used for controlling the illumination. The roof with a total area of 64,000 square meters is the largest film roof in the world. The film is only 0.2 mm thick and is 98% UV-permeable. Each "cushion" has an area of approx. 35 square meters, but none of the honeycombs, which are up to eight meters long and are made from ethylene tetrafluoroethylene, have exactly the same shape.

1056 of the 2874 air cushions can be illuminated in different colors, creating a total illuminated area of 24,000 m². Each air cushion has a special lamp from the

company Siteco in each of its four corners. Each lamp is made from 6 fluorescent lamp bulbs from Osram (two bulbs for each color) and three electronic ballasts, also from Osram. All 12,000 electronic ballasts are controlled via digital Bus Terminals. Red, blue and transparent covers in each lamp allows the color to be changed. In addition, various patterns in the colors red, white and blue can be created over the whole external skin (honeycomb pattern), depending on the club: Diamond patterns – optionally moving from the bottom upwards, or rings in white/blue or white/red combinations. The patterns may be changed within two minutes, in order to prevent the light spectacle from becoming a traffic hazard for the nearby motorway.

→ Allianz Arena www.allianz-arena.de

→ VA TECH ELIN EBG-Gruppe www.elinebg.at