Historic landmark gets high-tech treatment

Technology meets glamour for Dolder Grand Hotel

In spring 2008, Zurich, in Switzerland, will regain one of its landmarks: After four years of refurbishment, the Dolder Grand Hotel has been transformed from a "spa hotel" originally established in 1899 to a luxury "City Resort". With an investment volume of more than 440 million Swiss francs (CHF), Dolder Grand is among the largest construction projects in the Swiss hotel sector. The hotel operation is based on advanced building automation with Beckhoff components integrated into the hotel's IT network.

The primary focus of the alterations at the historic Dolder Grand Hotel at Zürichberg was not "return on investment", but on the restoration of an old, historic landmark and its adaptation to modern requirements, which was only possible thanks to investments from passionate patrons.

Under the lead management of London-based architects Foster and Partners, internationally renowned for (among many other projects) the conversion of the Reichstag in Berlin and the Swiss Re-Tower building in London, new and old were combined in a unique way, with innovative building technologies creating maximum comfort and luxury. Set in a unique location between the lively city and the invigorating outdoors, the Dolder Grand offers many facets of a luxury class hotel: 173 lavish rooms and suites, a 4,000 m² spa area, exquisite catering as well as spacious banquet and seminar facilities – all to offer guests maximum comfort. A special highlight is the ballroom.

Combining energy efficiency and luxury

The energy supply system for the Dolder Grand is based on a pioneering idea: Heating and cooling demand is largely met with a 400,000 m² geothermal energy storage system. 70 geothermal energy probes with a length of 152 meters each are buried below the foundations of the new buildings. In the summer the probe array is used for providing pleasant cooling in all rooms. In the winter it extracts heat from the ground that is supplied to the heating system. Hot water for bathrooms and kitchens accounts for about half of the total heat demand. The heat from waste water is also recovered. Natural gas is used for supplementary heating. The advanced geothermal energy system reduces electricity consumption and heating costs substantially. A prerequisite for this intelligent energy concept to succeed is equally intelligent building automation: It controls all systems, enables efficient maintenance and rapid response in the event of malfunctions, stores all main data for continuous energy optimization and is so advanced, it is in some ways comparable to the human nervous system.

Inside, the Dolder Grand looks spectacular: Traditional design elements and craftsmanship were combined with advanced materials and a warm color scheme. The new "Spa Wing" and "Golf Wing" nestle against the historic main building, linking past and future. The high quality interior includes integral room automation with user-friendly operation that enables setting of individualized room comfort levels, complemented by an outstanding audio/video system. Thanks to the flexible technology, the room automation data are also available for the Beo5 remote controller from Bang & Olufsen, enabling integrated operation of all room systems.

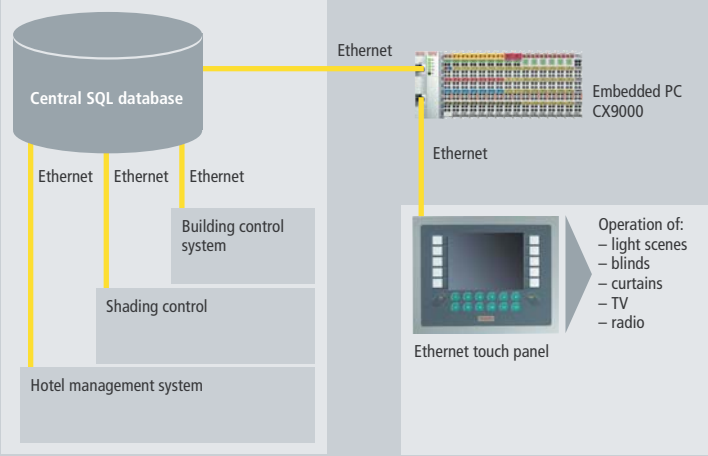
Fully integrated building automation

The building automation system was designed and executed based on advanced concepts and technologies. Panthek AG, the company commissioned to imple-

The Dolder Grand Hotel combines new and old in a unique manner and creates maximum comfort and luxury with innovative technologies.

For maximum individual comfort: integral room automation in all guest rooms

Hotel guests can operate all functions, from lighting to audio/video, via the innovative Beo5 remote control from Bang & Olufsen.



ment the system, used versatile modular automation devices with Ethernet couplers from Beckhoff, which communicate via the hotel network. In the primary systems for heating, ventilation and air-conditioning, Beckhoff touch panel controllers in conjunction with CX9000 Embedded PCs for I/Os are used. These include Windows CE as the operating system. The building and room automation systems are based on worldwide standards and integrate seamlessly with the general networking equipment of the building, as proposed by forward-looking industry experts. Advanced sensors from Sensortec and MP-Bus-capable drives for flaps and valves from Belimo are integrated through corresponding inputs. In this way, the engineering effort can be rationalized despite complex requirements and extensions. High-density drive and sensor configurations, as encountered in the ventilation plant rooms, for example, are efficiently connected via Multibus ribbon cables from Woertz. This saves a considerable amount of space in the control cabinets. Connection times are reduced by half, and the error rate is reduced by 30 %.

The "dispersion" via bus technology principle is also used for the lighting, based on the DALI and DMX standards. The data required for energy measurements are read in via the internationally standardized M-Bus. Smart and comprehensive communication that meets the requirements of this demanding project was achieved via the combination of modular components from Beckhoff coupling to the IP network, the required inputs and outputs and the interfaces to standard systems for individual areas with sophisticated engineering software. Examples of high-end features include individual room temperature settings controlled by guests, pre-setting of room parameters based on stored values for regular visitors through the hotel management system, and fault displays for intervention by the operating staff and external service staff via the Internet. The management system is based on Webfactory, a web-based visualization, alarm management and control system.

The fine art of system integration

In such a large project with more than 25,000 wired and more than 250,000 virtual data points, systematic and efficient engineering is crucial for ensuring that the work can remain profitable for the contractor. This is especially true in view of the need for the flexibility to cope with constant modifications during the execution phase. Panthek developed a number of customized solutions based on its long-standing experience as system integrator. The main tool is a so-called "generator": From the wiring diagram, Excel tables corresponding to the terminals and connections used in the building are created based on templates. From these the "generator" creates exp files for the Beckhoff controllers, thereby completing basic programming tasks. The entire control system is based on such program blocks developed by Panthek. Building on the basic programming, staff must add certain program components as a second step. With support from the "generator", many man-hours can be saved considering the large number of controllers used in the hotel rooms.

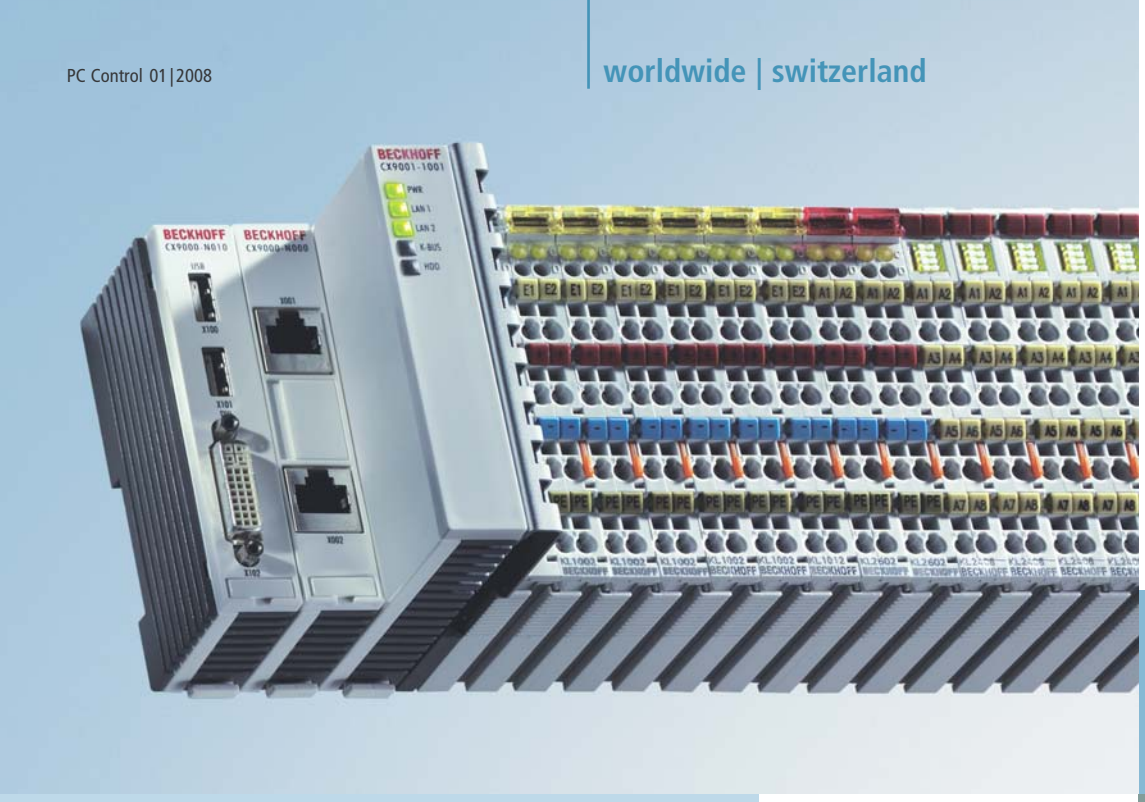
The serial connection of DMX lighting systems for the ballroom is another special feature of this project. DMX is a standard for show and theater lighting. Therefore, the chosen solution involves serial communication via DALI, which operates impeccably in conjunction with a commercially available DALI-DMX gateway.

The majority of the lighting systems communicate via DALI, thereby considerably reducing the cabling effort compared with digital outputs. Here too, special tasks

Dolder Grand Hotel, Zürich

The Dolder Grand is among the largest construction projects in the Swiss hotel sector. Under the lead management of London-based architects Foster and Partners, new and old were combined in a unique way, with innovative building technologies creating maximum comfort and luxury. The building automation consists of:

- Control: 280 CX9001 Embedded PCs or CP6719 Ethernet touch panels
- Software: TwinCAT PLC, TwinCAT Building Libraries, Webfactory (web-based operating system)
- Communication: Ethernet TCP/IP, subsystems: MP-Bus, DALI, M-Bus
- Data points: 100,000 (25,000 I/O terminals)



CX9000 Embedded PC

Beckhoff touch panel in the control cabinet wall for control system visualization

Panthek Building Automation AG

Panthek Building Automation AG was established in 2007 with branches in Zurich, Chur and Lucerne. The new company bundles the competency of two system integration suppliers for building automation and intelligent living. Panthek combines sound advice with technology-based service and accompanies customers with comprehensive experience along the complete project planning chain in different roles: as visionary, developer, implementation planner, system integrator and operator.

→ www.panthek.com

had to be solved such as control of the door-level LED displays outside the spa treatment rooms indicating the remaining treatment time.

A very important aspect in a building of this class is simple operation of lamps, blinds, curtains, and audio/video equipment in the rooms and suites without requiring labels or instructions. International guests do not want to have to read the user guide in order to set the required comfort level. The innovative Beo5 remote controller with a small display communicates with the TV set via infrared, through which the room automation data is transmitted to the CX controller via a special protocol. In this way, guests have all the data available that are required for individual fine-tuning. Dolder Grand features a first in HD TV technology for a Switzerland hotel: All TV programs and Pay-Per-View TV programs are distributed via the IP network as streaming video to the decoder boxes in the suites. System integration for this complex installation was carried out by AVS Systeme AG.

Standard components enable customization

Some readers may well think that high-end building automation is only suitable for luxury buildings. Not so, as demonstrated in a wide range of other projects. Thanks to the modularity of the hardware and software used (tailored exactly to the requirements of each individual building), the availability of interfaces for all subsystems and the utilization of "normal" network technology available in any modern building, this solution also offers an optimal tool for first-class system integrators in office and industrial buildings, schools, cultural institutions, transport facilities and even networked homes. With the Dolder project, Panthek has proven its place in this top league. Until the hotel opens in April 2008, the system will no doubt be fine-tuned and optimized even further.

→ Dolder Hotel AG **www.thedoldergrand.com**
→ Panthek Building Automation AG **www.panthek.com**
→ Beckhoff Automation Switzerland **www.beckhoff.ch**