

## Intelligent control makes airport more efficient

Terminal II, Shanghai Hongqiao Airport, equipped with KNX



The control system takes into account natural daylight to implement efficient lighting

*In China, the aeroplane is experiencing a rapid increase in use as a fast means of travel and transport. Hongqiao airport, located in the conurbation of Shanghai with 25 million inhabitants, was extended by a second runway and a second terminal to meet this demand. Since 2010, the Shanghai Hongqiao International Airport can handle 300,000 flights and 40 million airline passengers per year. Terminal II, with a main building and boarding corridors with distances of 1.8 and 0.5 kilometres, is designed for 30 million passengers. This tremendous scale indicates the extensive lighting system with approximately 6,000 lighting circuits and their energy consumption. Installing an energy-efficient control system represented a considerable and interesting challenge for the company Shanghai Longchuang Automation Control System Co. Ltd. The perfect solution to this difficult task was presented with the Energy Efficiency Award 2012 by KNX.*

It was already evident during the planning phase of the project that the annual energy costs in Terminal II for the lighting alone amount to hundreds of million yuan. A more efficient use of energy with the help of intelligent controllers was therefore called for. These controllers should provide a comfortable level of brightness, which takes into account the daylight streaming in through the glass surfaces and switches on only the artificial lighting when it is required. KNX has already proven itself as a standardised system that is suitable for large airports all over the world. The KNX Technology Team of Siemens Building Technologies in China lent their support to the companies carrying out the installation. The extensive system required more than 3,000 KNX devices distributed across 60 KNX lines to be installed, configured and commissioned. Interior and exterior lighting sensors undertake central functions as well as logic controllers which achieve optimum lighting conditions with efficient use of energy. By using external sensors for the waiting areas near the windows, an exact

adaptation of the brightness level can be achieved. Halogen metal discharge lamps are switched on or off via two brightness thresholds which are automatically adapted to the seasons with a high or low level of sunlight. Lighting circuits are also switched dependent on the flight schedule. To do so, the KNX control communicates with the management system via an OPC server. The brightness level is reduced in areas that are less frequented taking into account the departure or the arrival of the flights. Unnecessary energy consumption is particularly avoided in the period between 21:00 and 8:00. The time- and date-dependent controllers are further energy-saving functions. Lights are switched on or off according to the working days, holidays and time-dependent use. A central control point was implemented using visualisation with the Elvis software and therefore, all the lighting functions can be operated and monitored from here. Time programs can also be modified, setpoint values can be adjusted and loads can be evaluated. The extensive installation is divided into five areas to provide a better overview. The consumption data is regularly transferred to the control unit. Trends in consumption are displayed in graphs which are then used for energy optimisation. Longchuang concludes that KNX has proved itself in this project to be an efficient, reliable and extendable system: "All the requirements of an intelligent lighting control system for efficient energy use could be met. An evaluation of the energy consumption shows that an investment in KNX automation will payback in three to five years".

Winner  
KNX Award 2012  
Category  
Energy Efficiency



### Benefits provided by KNX in this project

- Energy-efficient lighting control for over 6,000 lighting circuits
- Energy saving through the use of daylight and time- and date-dependent control
- Individual areas can be illuminated precisely according to the flight schedule
- Adapted, comfortable lighting conditions
- Safety through coupling the workplace lighting and emergency lighting with the fire alarm system
- Simple installation, secure investment, extendable system
- Evaluation of the energy consumption via a central visualisation unit

### Technical refinements

- Precise adaptation of the brightness level in the window area using external sensors
- Modification of the brightness setpoint values according to the seasons with strong or weak sunlight
- Communication with the flight schedule via OPC server
- Evaluation of the energy consumption via a central visualisation unit

### Companies involved

**Building owner:**  
Shanghai Airport Authority

**Services Engineers, Electrical Engineers, KNX System Integrator:**  
Shanghai Longchuang Automation Control System Co., Ltd

**Area of application:**  
Airport

**Functions:**

- Lighting
- Energy management
- Visualisation
- Interfaces to other systems

**Scope**  
Number of KNX devices: 3000, Siemens

**Costs:**  
600,000 euros