

# ➤ Kontron Solutions@Work

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## ➤ Central supervisory control system for Moscow monorail transportation system (MMTS)

An experimental Moscow monorail transportation system, which is currently deployed in Moscow, represents a modern high-technology urban means of transportation, to develop which the latest achievements of science and technology not only in the field of means of transportation themselves (new kinds of rolling stock, traction engines etc.) but also in the field of automated control of complex transportation systems were used. The experimental line of Moscow monorail represents a complicated technical complex: the monorail itself, including 12 passenger stations, about 10 monorail trains, a depot with a transporter bridge (a kind of turntable), a number of traction substations along the way, automatic crossing pieces and movement safety devices, communication systems etc. Certainly, a Supervisory Control System is required to manage such a complex structure. Although every train has its own control computers for local control of train automation in manual, semi-automatic and automatic modes (built using Kontron's CompactPCI modules), there exists a number of global tasks which are solved by MMTS Central Supervisory Control System (CSCS), namely:

- generation of train schedules depending on traffic flow, time of day, presence of trains in working order etc.;
- automated control (dispatching) of trains traffic in accordance with specified schedules in manual, semi-automatic and automatic modes;
- monitoring and visualization of trains and ground systems conditions based on data both from train board computers and ground systems and sensors;
- execution of algorithms of accident prevention during train operations;
- diagnostics and analysis of MMTS trains and ground systems conditions;
- execution of corrective actions to eliminate abnormal situations on the line;
- acquisition and storage of documenting information about every event on the line.

A redundant industrial server with RAID arrays is a basis for CSCS, providing required processing power to execute control algorithms and required reliability of data storage in an industrial database (Industrial SQL). Automated workstations of the Central Operator and Traffic Control Operator are PC based using Citect's SCADA system



and are extended with large-sized plasma displays for data visualization and traffic events audio notification system. CSCS communicates with train board computers using fiber-optic cable laid along the rail and radio devices for permanent connection with trains via radio Ethernet. Interaction between CSCS and various ground systems and sensors is realized using Modbus, Profibus, OPC-on-Ethernet open protocols. Currently, the system passed off-line tests, and RTSoft CJSC works on CSCS installation and comprehensive checkout direct on Moscow monorail.

## About Kontron

Kontron AG is a worldwide leading manufacturer of embedded computer technology and robust solutions for mobile use. It supplies leading OEMs, system integrators, and application providers in a wide variety of market segments such as data and telecommunications, automation, measurement and control technology, traffic engineering, medical and military technology, as well as aviation and energy. Kontron's goal is to enable customers to significantly reduce their time to market and to create clear competitive advantages through products such as high-performance open computer platforms and systems, single board computers, HMIs, and mobile computers. Kontron employs over 1,900 people worldwide with production facilities in Europe, North America, and the Asia-Pacific region. The company is listed on the German TecDAX 30 with the company symbol "KBC". Kontron is the only company based in Europe which has premier status in the Intel® Communications Alliance and, thus, has early access to leading Intel technologies and preferred engineering support. For more information about Kontron, visit the company's website: [www.kontron.de](http://www.kontron.de).

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