

# ➤ Kontron Solutions@Work

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## ➤ Dispatcher Operation Control System of the Moscow Monorail Transport System



In 1999, there was CJSC “Moscow Monorail” established and the program “Moscow Monorail Transport” approved which is aimed at developing a monorail transport system in Moscow, with the participation of the Government of Moscow and Federal State Unitary Enterprise “Moscow Institute for Heat Engineering”.

Moscow Monorail Transport System (MMTS) – is not just a new type of the rolling-stock, but it’s a new spin in the field of automation control of complex transport systems. In the framework of the project RTSoft company developed and implemented dispatch control system (DCS) at the first length of the railroad between the stations “Sergei Eizenschtein Street” and “Timiryazevskaya Metro Station”.

Moscow monorail is a sophisticated technical complex which is composed of a line with 12 passenger

stations, electro rolling-stock (ERS), a train shed with a transborder (a mechanism for leading trains out to the line), railroad substations, automated track switches, railroad safety devices, communication systems and many others. Dispatch control system is used to control such a sophisticated complex.

### Dispatch control system main functions:

- To work out timetable for electro trains depending on passenger traffic, time of the day, availability of the properly operating electro rolling-stock and other factors;
- To automatically control and manage electro rolling-stock traffic in accordance with the planned timetable in the manual, semi-automatic and automatic mode;
- To observe, visualize, as well as to make trouble-shooting and analysis of the electro rolling-stock operating condition and MMTS ground-based systems;
- To execute algorithms for save electro rolling-stock traffic and correcting procedures in case of contingency event;
- To gather and store documented data on all the events that occur on the railroad.

## Dispatch control system structure

- **Central dispatch control system** – provides the monitoring of the system on the whole and controls the electro trains timetable.
- **Path-control transducers system** – gathers the data from the path-control transducers which allows to define the station where the train is (the train's location is also could be defined by the automatic block system transducers and controlling system transducers).
- **Track switch control system** – provides the opportunity to control three track switches which are on the first line of MMTS (however the line itself doesn't have any forks, track switches are meant for leading trains to a train shed or a dead-end corridor).
- **Automatic block system** – defines trains location no to let the crash.
- **Electro rolling-stock controlling system** – controls the operating of electro rolling stock.
- **Automated electric power supply dispatch control system** – controls the operating of electric power substations.

Redundant industrial server with Raid-arrays is the core of the central dispatch control system. The server provides the necessary computational power for executing the steering algorithms as well as the required safety for data storage in the industrial data base of the IndustrialSQL Server (Wonderware).

**There are own controlling computers for local automated systems in each train which are based on the Compact PCI (Kontron) software. They are responsible for controlling electro rolling-stock in the manual, semi-automatic and automatic mode.**

Open protocols Modbus, Profibus, OPC, Ethernet are used to provide the interaction of the central dispatch control system and different ground-based

systems and transducers. Dispatch center software is based on the SCADA-system Citect.

E.Zhuchkova, Doctor of Engineering and Head of the Department of "Automatic Control Systems" at the Federal State Unitary Enterprise "Moscow Institute for Heat Engineering", said that "efficiency and reliability of the technical solutions, on which the software and hardware complex of the central dispatch control system based, could be confirmed by the long-lasting operation of MMTS in various weather conditions and with the constantly growing passenger traffic".

The novelty and peculiarity of MMTS is that it was conceived and is used as a system which provides passenger transportation in an automatic mode. It is the first system of its kind in Russia. While the electro rolling-stock controlling system operates in the semi-automatic mode, the safety of the joint electro rolling-stock traffic in accordance with the required passenger transportation timetable is provided by the central dispatch control system operating in an automatic mode.

Constructing the Moscow monorail transport system means organizing a third over-ground transportation level, which could provide a solution to a rapid transit in the streets of Moscow.

## About Kontron

Kontron designs and manufactures standard-based and custom embedded and communications solutions for OEMs, systems integrators, and application providers in a variety of markets. Kontron engineering and manufacturing facilities, located throughout Europe, North America, and Asia-Pacific, work together with streamlined global sales and support services to help customers reduce their time-to-market and gain a competitive advantage. Kontron's diverse product portfolio includes: boards and mezzanines, Computer-on-Modules, HMIs and displays, systems, and custom capabilities. Kontron is a Premier member of the Intel® Embedded and Communications Alliance. The company is a recent three-time VDC Platinum vendor for Embedded Computer Boards. Kontron is listed on the German TecDAX stock exchange under the symbol „KBC“. For more information, please visit: [www.kontron.com](http://www.kontron.com).

## ► Corporate Offices

### Europe, Middle East & Africa

Oskar-von-Miller-Strasse 1  
85386 Eching/Munich Germany

Tel.: +49 (0)8165/ 77-777  
Fax: +49 (0)8165/ 77-279

[sales@kontron.com](mailto:sales@kontron.com)

### North America

14118 Stowe Dr  
Poway, CA 92064-7147

Tel.: +1 (888) 294-4558  
Fax: +1 (858) 677-0898

[sales@us.kontron.com](mailto:sales@us.kontron.com)

### Asia Pacific

17 Building,Block #1,ABP.  
188 Southern West 4th Ring Road  
Beijing 100070, P.R.China

Tel.: + 86 10 63751188  
Fax: + 86 10 83682438

[kcn@kontron.cn](mailto:kcn@kontron.cn)

### RTSoft

Exclusive Partner for Kontron  
P.O. Box 158, Nikitinskaya, 3  
105077 Moscow, Russian Federation

Tel: +7 095 7426828  
Fax: +7 095 7426829

[sales@rtsoft.msk](mailto:sales@rtsoft.msk)

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