

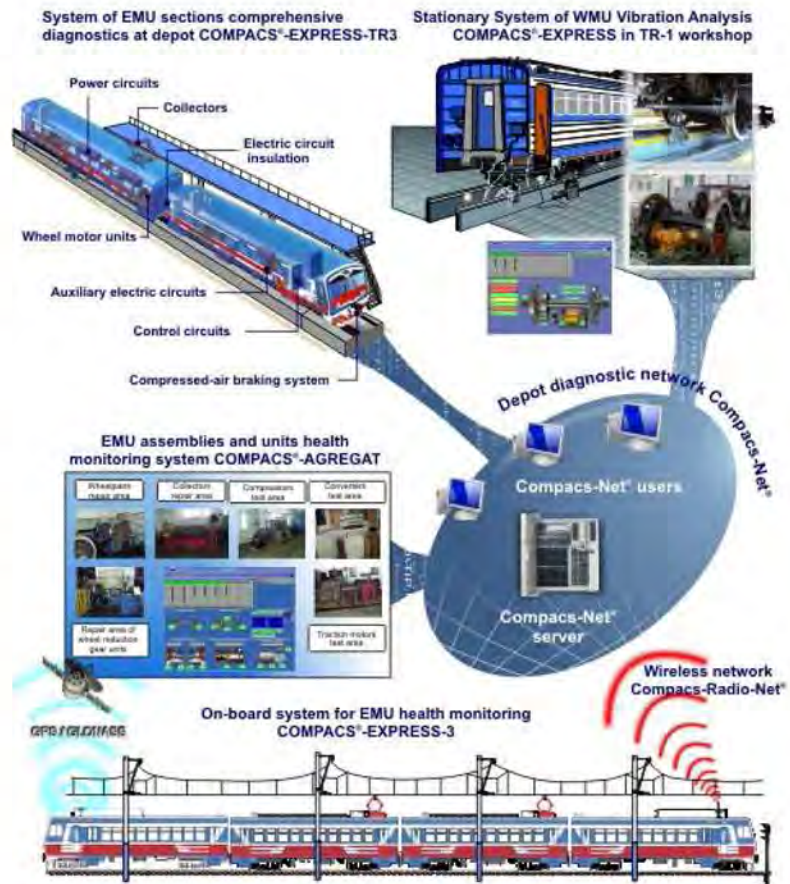


### The ACS SMSRTM™ EMU COMPACS®

Substantial reduction of unscheduled repairs and, consequently, lower operation expenses can be reached by diagnostic systems installation in depots in order to provide quality of production and repair, as well as maintenance, repair and rolling-stock assemblies health monitoring systems, working within the equipment operation.

### The stationary system for vibration analysis of wheel-motor units COMPACS®-EXPRESS

Wheel motor units repair depots and plants widely use stationary diagnostic stations on the basis of the vibration analysis monitoring systems COMPACS®-EXPRESS with an electric drive of an automatic traction electric engine (TEE). The system allows to evaluate timely the equipment quality and/or repair of wheel motor and wheel reduction gear units of electric locomotives and electric trains cars, to reveal hidden defects of bearings, reduction gears, quality and lack of lubrication, as well as balancing, centering and assembly fastening defects, to forecast the wheel motor unit health for the closest period of operation till the following repair.



### The comprehensive system for diagnostics of EMU-trains sections COMPACS®-EXPRESS-TR3

In 2005 on the basis of the COMPACS®-EXPRESS system, the EMU-trains sections comprehensive after-repair diagnostic system COMPACS®-EXPRESS-TR3 has been created. The system allows to solve the following problems on the depot test station:

- wheel motor units and axle equipment vibration analysis;
- automatic evaluation of brake equipment health;
- diagnostics of collector power and time characteristics in operating altitude range within rise and fall;
- diagnostics of electric circuits insulation;
- diagnostics of control circuits with a power controller sequence check;
- diagnostics of power and auxiliary electric circuits.

### The system for diagnostics of electric multiple units assemblies COMPACS®-Agregat

SPC "Dynamics" has developed and implemented at Russian enterprises an area COMPACS®-Agregat for repair quality diagnostics in depot conditions, which includes:

- subsystem for wheelsets axle equipment diagnostics;
- subsystem for wheel reduction gear units diagnostics;
- subsystem for traction electric engines diagnostics;
- subsystem for piston compressors diagnostics;
- subsystem for transducers (voltage dividers) diagnostics;
- subsystem for collectors diagnostics.

### The comprehensive system for EMU-trains diagnostics COMPACS®-EXPRESS-TR1

The comprehensive diagnostic system COMPACS®-EXPRESS-TR1 has been designed for efficient evaluation of an electric multiple-unit health within maintenance works (TO-3) and a current repair (TR-1) in the depot. The system provides an express-evaluation of health and detection of electric trains units and assemblies defects without cars uncoupling.

Problems to be solved with the help of the COMPACS®-EXPRESS-TR1 are as follows:

- wheel motor units diagnostics;
- express-diagnostics of high-voltage electric circuits insulation;
- pantographs diagnostics;
- automated evaluation of electropneumatic brake system health;
- automated evaluation of control circuits health;
- express-diagnostics of power electric circuits.

### **The on-board system for electric multiple-unit trains equipment health monitoring COMPACS®-EXPRESS-3**

In 2008 the on-board system COMPACS®-EXPRESS-3 has been developed for real-time electric multiple-units health monitoring, which has allowed a timely detection of malfunctions occurrence and development with data issuing on a display located in a driver's cabin.

The system hardware and software are remarkable by a high reliability in severe operation conditions. The system widely uses wireless technologies, which allows an efficient transmission of data on particular assemblies and units health without interference in the train construction. The system contains a GPS-navigator, detecting location of the train and the nearest station. As the train is getting closer to the terminal station, the data is transmitting to the depot server and the personnel in charge of the electric multiple-unit diagnostics.

The on-board monitoring system allows to obtain the full health information on bearing assemblies, compressed-air braking system and electric multiple-units electric circuits during the motion, as well as observe the defects level and development, form recommendations to locomotive and repair crews on the required maintenance and measures to be taken.

### **The Compacs-Net® depot diagnostic network**

The level of industrial-engineering discipline can be increased by means of permanent stations connection to the Compacs-Net® diagnostic network in order to transfer to all the interested offices and administrative levels the reliable data on production quality in real time, which plays the leading role in efficient money-saving. The Compacs-Net® diagnostic network – is a powerful tool of the equipment health data (diagnosed by COMPACS® system) transmission and presentation.

The data derived from the equipment health monitoring is transmitted by means of the Compacs-Net® to the enterprise heads and concerned departments in order to control the correct operation and the personnel work.

The Compacs-Net® diagnostic network is one of the main elements of MDRS equipment health operation technology, as soon as a timely gathering of the equipment health information allows to control the repair and maintenance processes and refuse from schedule-based preventive repairs.

### **The ACS SMSRTM™ EMU COMPACS® system economic benefits**

The main benefits gained from the ACS SMSRTM™ EMU COMPACS® implementation are as follows:

- increase of the electric multiple-unit and its equipment run-to-failure (profit from an extra volume of conveyance);
- reduction of the electric multiple-unit equipment failures during operation as well as breakdowns and downtime losses;
- reduction of the electric multiple-unit and its equipment repair duration and materials consumption.

If the systems service life is 10 years, the payback period of the systems complex per depot does not exceed **2 years**.