Transport
Innovative Technologies
The company was founded in 1990 by a group of scientific workers from institutions and specialists from aerospace industry.

Diagnostic tools (brand INFOTRANS) form the basis of traffic safety.

- Automated diagnostic tools of technical objects of the railway infrastructure
- Complex analytical and informational systems

According to the latest developments the company has:
- Patents
- Certificates for software

Scientific and technical cooperation.
Projects of technical equipment and production

Russia
Ukraine, Belarus, Kazakhstan, Uzbekistan, Latvia, Estonia, Armenia, Georgia

Germany
Poland
France
China

more than 250
The Research and Production Center of Information and Transport Systems (INFOTRANS) is the leading Russian enterprise in the development and production of innovative scientific and technical products for railway transportation and plays a key role in providing of train safety. The company was founded in Samara in 1990 and built on a core of scientists from universities in Samara along with specialists from the aerospace industry.

The company employs more than 500 highly qualified specialists in the field of applied scientific researches, engineering developments, development of software products and systems, organization of production. In complex it provides an effective activity of the enterprise at all stages of the product life cycle. Business partners of the enterprise are dozens of companies producing modern equipment worldwide. Methodological and technological issues are resolved in close cooperation with railway scientific organizations.

The company’s traditional areas of business are the development and production of a variety of systems and diagnostic tools for railway infrastructure in addition to the development of new technologies for their application. Modern and reliable technical solutions are the result of many years of development, scientific and technical research, and thorough prototype testing. Its scientific and technical potential, coupled with an integrated approach to problem-solving, allows the company to successfully design promising diagnostic tools, while its modern testing facilities are geared toward the creation and development of prototypes. On the one hand, goods produced by the company are distinguished by modern technical equipment, high accuracy and speed characteristics, high degree of the process automation of decoding and evaluation, on the other hand - ease of use, reliability, unpretentiousness and ability to work in a wide range of weather and climatic conditions.
The company manufactures automated diagnostic tools with a variety of versions to monitor railway track infrastructure, catenary, telecommunication, control-command and signalling systems. As a rule, all monitoring systems are developed personally by the company.

Over 120 of INFOTRANS production vehicles in a variety of fields work to provide for transportation safety in Russia, Ukraine, Belarus, Kazakhstan, Uzbekistan, Latvia, Estonia, Armenia, and Georgia. The diagnostic systems of infrastructure for speed and high-speed railways have been developed and successfully operated.

INFOTRANS handles its products at every stage of their life cycle, from developing a measuring system, software, and equipment, to creating and developing and adjusting prototypes, producing and certifying stock-produced items, training, repair, and technical support. The company has created an effective system of technical support for all our products. Vehicle Car crews, distance specialists, services, diagnostic and monitoring centres are trained by qualified specialists in the certified training INFOTRANS centre. There are two technical support and maintenance centres at INFOTRANS (Moscow and Novosibirsk).

INFOTRANS difference from other companies producing diagnostic tools and supplying equipment «As is», is that, when we complete a contract to deliver diagnostic tools, we do not just deliver the equipment, but a complete system providing for transport safety. This system is designed to meet the client’s particular needs, and includes both the diagnostic tools themselves and an informational and analytical complex that services railroad subdivisions and the decision-makers for railroad infrastructure.

INFOTRANS long and vigorous history designing, developing, and perfecting the standards for evaluating the parameters for all transportation infrastructures, including high-speed rail systems, has greatly assisted our development, coupled with intimate cooperation with scientific organizations in the industry and their leading specialists.

Diagnostic technologies offered by INFOTRANS, differ from other by integrated approach, based on advanced mathematical apparatus and used the most progressive equipment. Today INFOTRANS expands its activities in the regions of Europe and Southeast Asia.

Nowadays the innovative technologies are successfully advancing and we are cooperating with Germany, Switzerland, Austria, France, Poland, Latvia. Concrete plans of cooperation with China and South Korea, are mapped out.
In 2014 the new generation diagnostic complex RAILab of Deutsche Bahn was equipped by INFOTRANS diagnostic systems. Certification of manual multifunctional diagnostic complex RPI is carried out in Germany.

INFOTRANS European offices are effective working in Germany and Latvia.

INFOTRANS is a laureate and winner of numerous international and industry exhibitions and competitions on the field of products for railway transport.

The multifunctional diagnostics train **ERA** is the best endowed in terms of measuring systems. It is designed to periodically inspect and acquire the entire spectrum of parameters necessary for overall monitoring of the condition of railroad infrastructure, forecast its development, and carry out timely maintenance. Fitted to monitor the entire range of parameters for railway infrastructure, aerial contact lines, communications, and automation and remote control systems, trains with the capability of running diagnostics on such a wide assortment of parameters at such a high level of automation for processing and evaluation procedures do not even exist anywhere else in the world.

Another product and one of the latest developments of INFOTRANS is the self-propelled track-measuring lab SPL-ChS200 which is built on a converted double-sectioned ChS200-08 electric locomotive. The goal of the development was to achieve automated monitoring of railroad conditions, primarily for rapid and high-speed lines operating at speeds of up to 200 km/h, and with an increased thrust load of 19.5 tons. For the first time, equipment for monitoring railroad infrastructure was installed directly into a locomotive operating with an increased load and moving at real speeds.

The **EXPERT** system for complex diagnosis and monitoring is a unique development of the company. It is designed to collect data from all automated diagnosis systems, and a accumulate, synchronize, and process it with the goal of running a later technical and economic analysis of infrastructure conditions, followed by planning for repairs, keeping in mind the track category, traffic volume, and set speeds.

Works are underway to create diagnostic tools, including universal, to control the condition of automobile roads and city rail transport.

INFOTRANS is a laureate and winner of numerous international and industry exhibitions and competitions on the field of products for railway transport.
# Mobile Diagnostic Tools of the Railway Infrastructure

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**Russia – Project 2015**
The joint project of Siemens and INFOTRANS

- Russia
- Ukraine
- Uzbekistan

- Russia
- Baykal-Amur Railroad
- Project 2014

- Russia
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## Mobile Diagnostic Tools of the Railway Infrastructure

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<th>Multifunctional Diagnostic Locomobiles</th>
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**Products, Projects**
PRODUCTS, PROJECTS

REMOVABLE (MANUAL) DIAGNOSTIC TOOLS OF THE INFRASTRUCTURE

MULTIFUNCTIONAL DIAGNOSTIC LOCOMOBILES

- Complex of parameters of gauge geometry
- Parameters of rails
- Parameters of the ballast section and roadbed
- Obstruction clearance
- Dynamics of interaction
- Geo-radiolocation
- Video monitoring of the railway track
- High-speed video inspection of railway superstructure
- Catenary system
- Automation and telemechanics
- Video monitoring of devices of automatics
- State of cellular and train radio communication
- Video-, thermal imaging, ultraviolet control of catenary system

Russia
Germany
China, South Korea
Multifunctional diagnostic train „ERA“

Diagnostic train «ERA» represents the twin-coach complex, each of its two car-laboratories can work independently as finished measuring module and intended for the decision of problems about expanded control of technical objects condition of an infrastructure. It can be completed with various systems according to solved problems and requirements from customer:

- **KVL-P** – monitoring of the technical objects condition of a railway infrastructure (KVL-P2.1, KVL-P3.0);
- **KVL-ARKS** – monitoring of the overhead system condition, automatics and communication systems.

The prominent feature of complex is that each of its two cars-laboratories can work independently, under the schedule.
During one test, diagnostic train «ERA» provides monitoring of over then 120 parameters with binding for railway and geodetic coordinate systems (GLONASS/GPS):

- **Conditions of railroad track:**
  - rail track geometry: basic parameters, long irregularities, longitudinal profile of the track;
  - rails parameters on the way: short irregularities, rail joints, actual railhead cross section, canting value, railhead wear;
  - conditions of rail structure and road bed: ballast section and road bed parameters, geo-radio-sounding, unstable segments identification in ballast section and road bed, railsleeper lattice.

- **Sizes of bridges, tunnels, intertrack space and approximation construction sizes**

- **Changes in interaction between railway and rolling stock (measurement of body and journal-box acceleration)**

- **Overhead contact system conditions:**
  - contact aerial geometry;
  - dynamic parameters in interaction between pantograph and overhead contact system;
  - overhead contact system electrical parameters.

- **Devices condition of railway automatics**

- **Connection and telecommunication conditions (train radio communication)**

- **Complex video monitoring:**
  - video monitoring of railway;
  - video-, ultraviolet monitoring and thermovision monitoring of overhead contact system;
  - video monitoring of condition of rails and fastenings;
  - video monitoring of condition of insulated joints, connectors of rail joints, fasteners of throttle wires, points of connection of SAUT stubs.

Diagnostic train «ERA» provides about 140 parameters of automatic estimated results and analytical processing functions.

Data obtained from ADK-I «ERA» is used for certification and effective planning of the maintenance and repair of infrastructure.
The self-propelled track-measuring laboratory STL-ChS200 on basis of re-equip electric locomotive ChS200-08 is designed for the purpose of automated control of railway track, first of all, of high-speed directions with the operating speeds up to 200 km/h with higher axial load of 19.5 tons.

STL-ChS200 is the fastest means of diagnosis in the railway network of the “Space 1520” and has no analogues.

STL-ChS200 consists of two sections, one of which (diagnostic) is dismantled locomotive equipment and installed:

» automated information-measuring system;
» service module;
» crew life support system (heating, air conditioning, bathroom unit);
» additional electrical equipment for energy conservation of the automated information-measuring system and life support systems of the diagnostic section.

The laboratory can be used at any time of year in the temperature range from minus 40°C to plus 55°C.
Main Types of Products

Manual Track Measuring Device (RPI)

RPI provides monitoring and estimation for conditions of geometric parameters at rail gauge, in track-measurement car format.

RPI is fully compatible with the existing control system of the railway condition, based on track-measurement cars KVL-P.

RPI (in basic complete set) provides:

- monitoring of track basic parameters (level, gage, horizontal and vertical sags of rails) and their evaluation in compliance with the current instructions;
- monitoring of the longitudinal profile of the track;
- monitoring of short irregularities (wave wear) on the active surfaces;
- availability of data binding between the marks with voice comments of operator and coordinate of the railroad track.

Optional (by special order) provides:

- monitoring of value of side rail wear;
- geodetic binding for measurable parameters (GLONASS/GPS);
- survey video observation system for fixing of an external condition of controllable site of a way;
- monitoring of rails temperature.

Data which RPI received as track recording car, is allowed for consumer to implement a new function: comparison of the measurement results of track in load (track recording car) and off-load (RPI) condition with a view to detect defects of the track structure.

RPI can be manufactured in a variety of designs in application to railways with any standard of track width.

Basic fields of application:

- control of rail gauge condition, including station, industrial and low used railway roads;
- data organization from the longitudinal track profile, including station railway roads;
- current repairs support from service units (fault lookup and control of fault removal);
- acceptance of newly laid railway track;
- initial data organization for machine straightening of the railway track and railway track approval after straightening;
- quality control of interim operations in the technologies of repair works of railway track;
- estimation of quality of rails processing by means of rail-grinding and rail-milling machines;
- identify of weak places of permanent way (based on comparison with the data of track-measurement car KVL-P);
- data organization of longitudinal track profile, including the station tracks;
- data organization of scale plans of the stations (in the extended configuration).
Main types of products

The information-analytical system of complex diagnostic and monitoring of railway infrastructure «EXPERT»

A full list of products can be found in the catalog or on the website: www.infotrans-logistic.com

The system is designed to collect data from automated diagnostic tools, to accumulate, synchronise, and process the data for further technical and economic analysis and maintenance scheduling taking into account track types, traffic load, and speed limits.

The main task of EXPERT is to provide data support for management of a given traffic process at a certain risk level with a specified maintenance system.

EXPERT is an expandable, easily scalable system open both at the lower (used diagnostic tools) and the upper (analysis and planning tools) levels.

The database of EXPERT is designed to contain information on the entire life cycle of infrastructure, such as:
- rated, design, and actual data for a commissioned project,
- diagnostic data (since track laying or reconstruction),
- traffic load and tonnage throughput,
- information on performed repairs and routine maintenance expenses.

The information of the system provides an opportunity to shift away from simple recording of faults and to define actual state of infrastructure and dynamics of its changes, forecast pre-fault states and assume measures to prevent faults instead. The system is web-based, therefore providing access for stored information practically from anywhere in the world.

It provides data for design organisations developing reconstruction projects.
Main types of products

Running line track condition (above, in yellow) for four years and forecast of its changes

Diagram of changes of track geometry condition on a 100 km section for four years

The EXPERT system includes three main process loops for effective solving of its main tasks:
- repairs scheduling management loop,
- traffic safety loop including interactions with routine infrastructure maintenance units,
- diagnostics tools management loop providing a necessary and sufficient scope of infrastructure diagnostics.

The main functions of EXPERT are:
- management of design and rated data,
- collection, synchronisation, integration, and storage of generations of data received from diagnostic tools, control of their accuracy and reliability,
- completeness analysis of diagnostic studies and scheduling of diagnostic tools operations providing a necessary and sufficient scope of studies,
- on-line control of infrastructure condition, communication with routine maintenance units on issues of revealed dangerous situations and control of troubleshooting,
- data support of integrated management of reliability, risks, railway transport life cycle costs, situation centres and infrastructure management centres.

The basic information task of the system is synchronisation and integration of diagnostic data. All data received by the system are synchronised with stored data with precise matching of coordinates. The data are integrated by means of data generations (a cross-section for a given point of time) created with specified frequency. Every generation includes the most reliable data precisely reflecting the condition of a facility for the time of creation of this generation.

The integrated data serve as an information basis for external applications and data support of integrated management of reliability, risks, railway transport life cycle cost (URRAN-RAMS). It allows optimisation of infrastructure maintenance costs basing of its actual condition and changes. External applications can be used, in particular, to implement alternative evaluation methods, calculate generalised factors of infrastructure condition, forecast condition of infrastructure facilities, prepare technical and economic analysis, schedule repairs etc,

There has already been developed and implemented a number of external applications for the EXPERT system, such as for detection of pre-fault infrastructure conditions based on track geometry and rail fastening (as part of URRAN-RAMS technology of integrated management of reliability, risks, railway transport life cycle costs), for evaluation of condition of integrated continuous welded rails, and the StabWay programme for monitoring of unsteady roadbed sections.