



# Digital innovation for railway tracks maintenance

# Railway track maintenance



**Railway track maintenance** - one of the most important types of track work carried out continuously throughout the year in order to prevent railway track disorders, identify and remedy faults and their causes, as well as ensure that all elements of the railway track are intact

**Tamping of railway tracks** is one of the most usual maintenance works

# Repair of railway tracks

correction of the position of the track in the plan and profile with ballast compaction under the sleepers

## Manual repair

The alignment of the track is carried out with the help of hand tools such as hydraulic jacks, crowbars, etc.

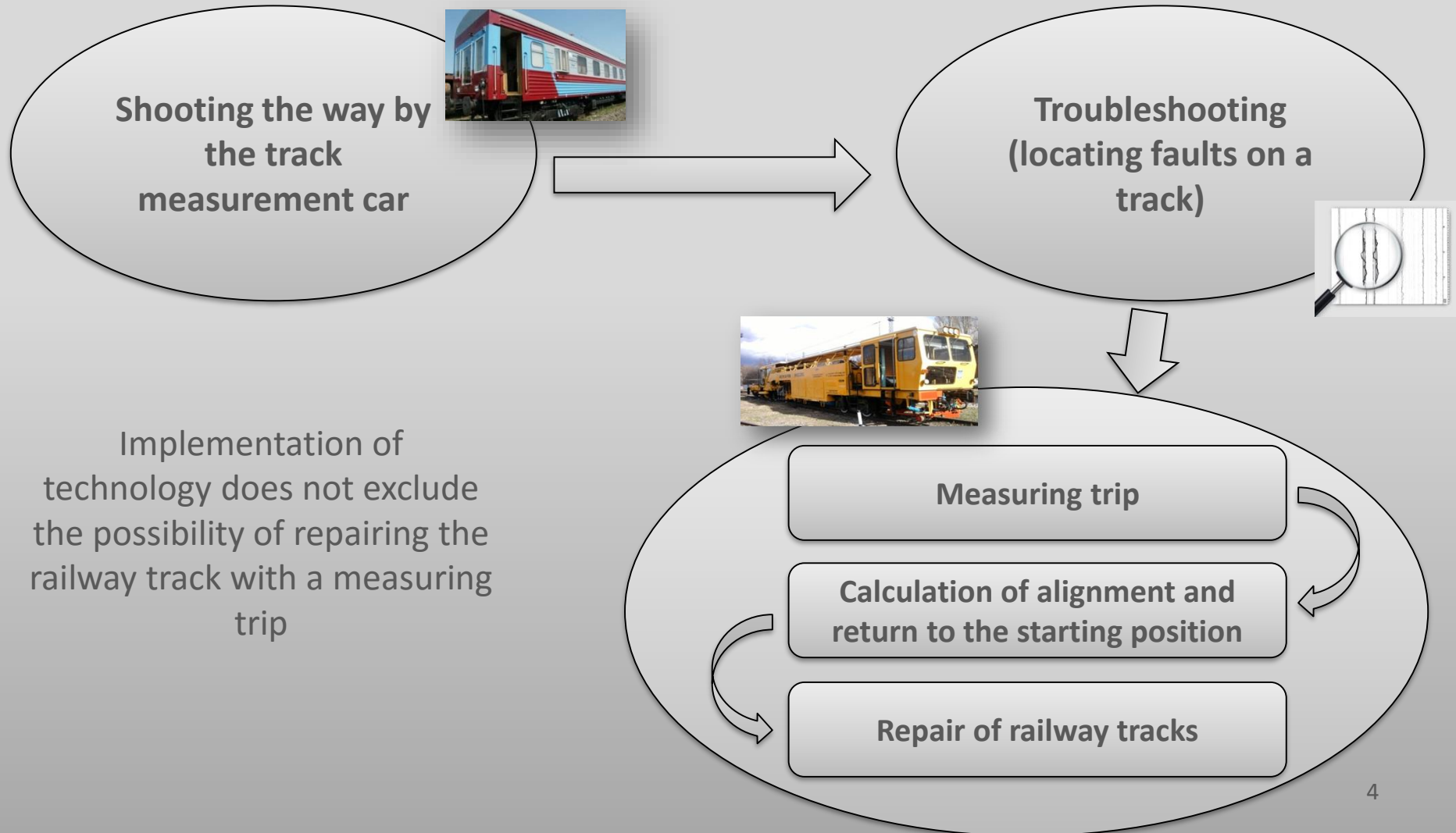


## Mechanical repair

It is carried out with the help of a tamping machines.



# Conventional track alignment technology



# Track Alignment Technology using coordinate methods

**Shooting the way by  
the track meter car**



**Troubleshooting  
(locating repairs)**



**Measuring track  
geometry by trolley.  
Logging  
repair results**



**Measuring track  
geometry by trolley.  
Calculation of the  
alignment tracks**

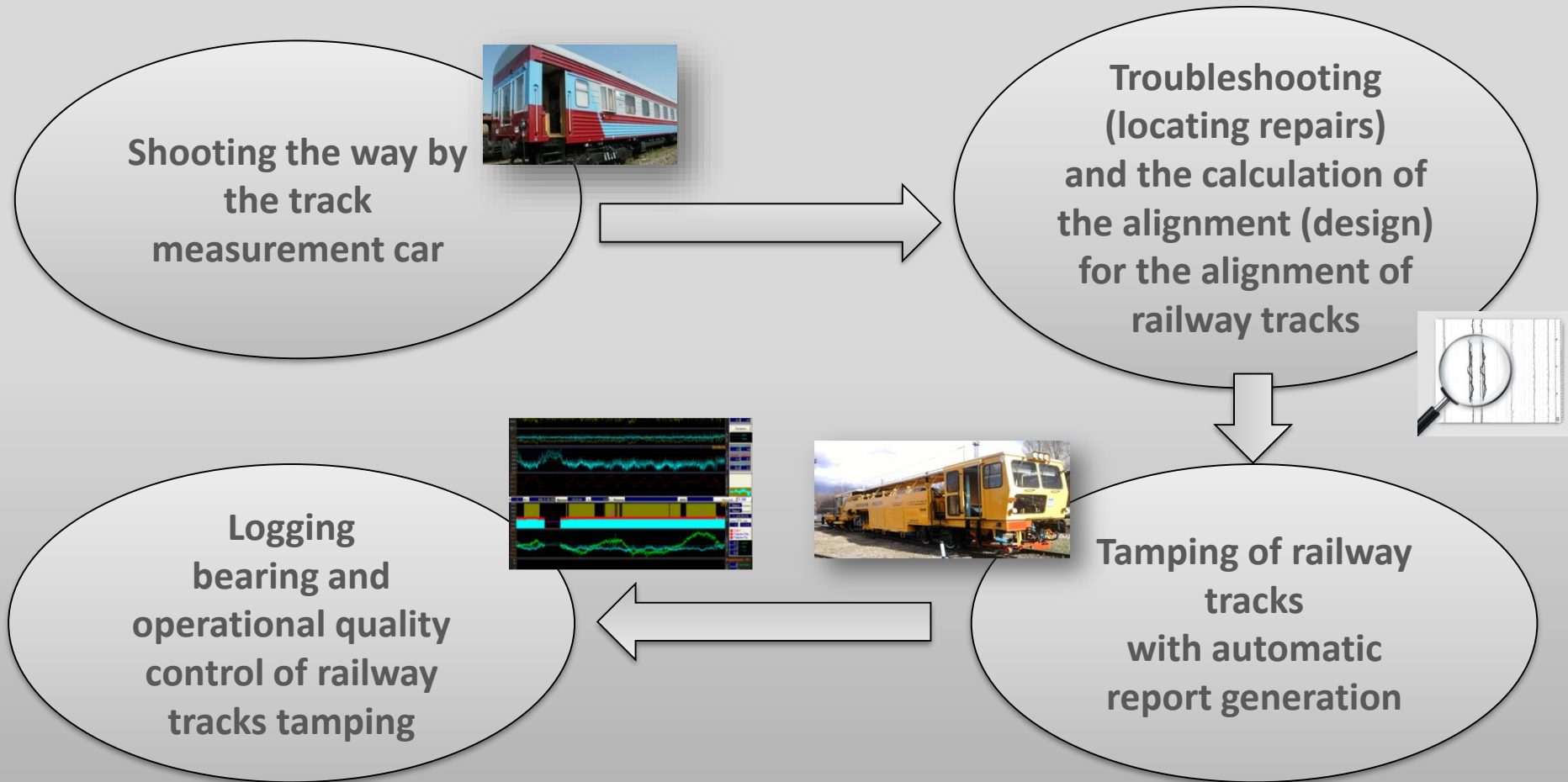
**Measuring track  
geometry by trolley.**

**Tamping**



**Design track  
geometry**

# Track Alignment Technology



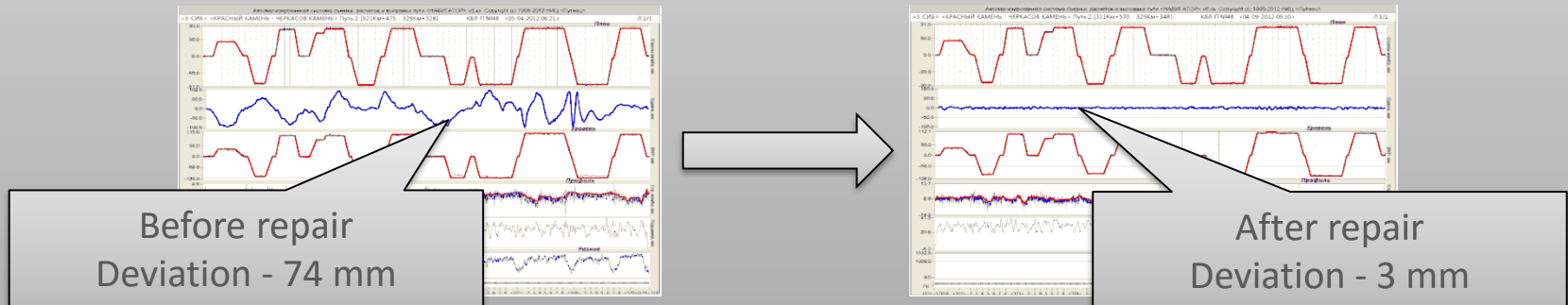
# Technology comparison

Types of operations	Conventional track alignment technology	Track Alignment Technology using coordinate methods	Track Alignment Technology
Collecting information from the railway track measuring car	+	+	+
Creation and / or verification of a geodetic reference network	Not required	+	Not required
Geodetic survey of the work site, including traditional methods and track-measuring trolleys	Not required	+	Not required
Designing of the railway track	It is performed by a tamping machine driver during straightening, taking time of service period of track (Curfew)	Designing of the project is carried out by the project organization within 1-5 months	Performed by a trained specialist within 3-5 days before straightening
Certain area preparation before tamping	No opportunity	+	+
Measuring trip for the calculation of the Stretch Program Task (SPT) for a railroad-tamping railway machine	It is performed by a straightening and tamping machine, taking time of the curfew	It is carried out by the measurement trolley before performing repair work on the railway track	Not required
Mechanical repair by straightening and tamping machine	+	+	+
Recording the process of tamping of the railway tracks	-	-	+
Executive survey of track alignment results	-	+	Not required

# The benefits of technology

## efficiency & quality

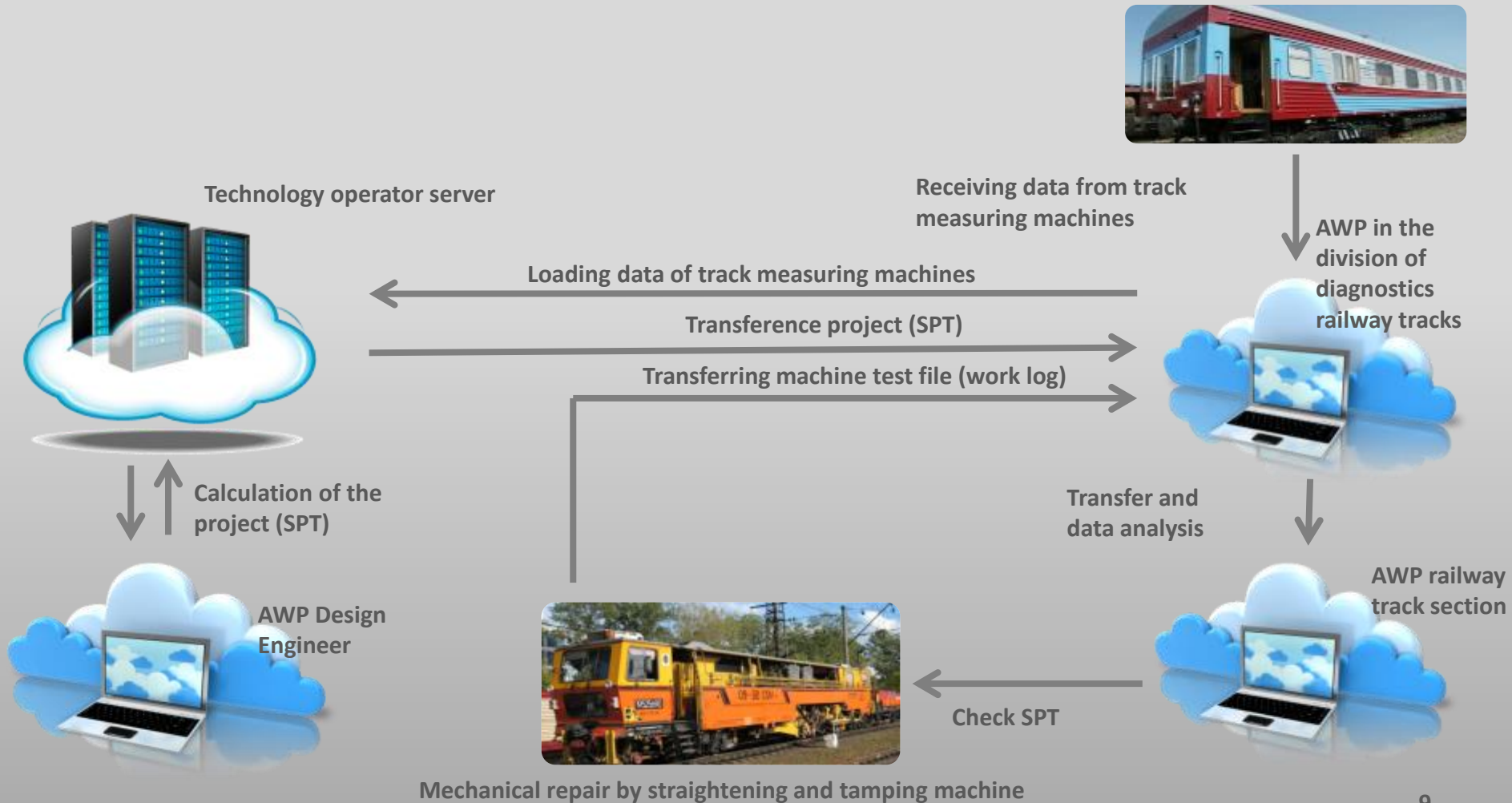
- The Stretch Program Task (SPT) (designed track alignment) is calculated within 3-5 days based on the results of the survey of the track measuring car
- Innovative hardware and software and qualified specialists ensure high quality of design work
- The final decision (SPT) on the parameters of repair is made in stationary conditions
- The influence of the “human factor” in the design (SPT) and repair of railway tracks is minimized
- Exclusion of the measuring trip and shooting the position of the railway before repair work
- High-quality and economical preparation of the repaired area is provided (targeted delivery of necessary materials, etc.)





# Description of technology

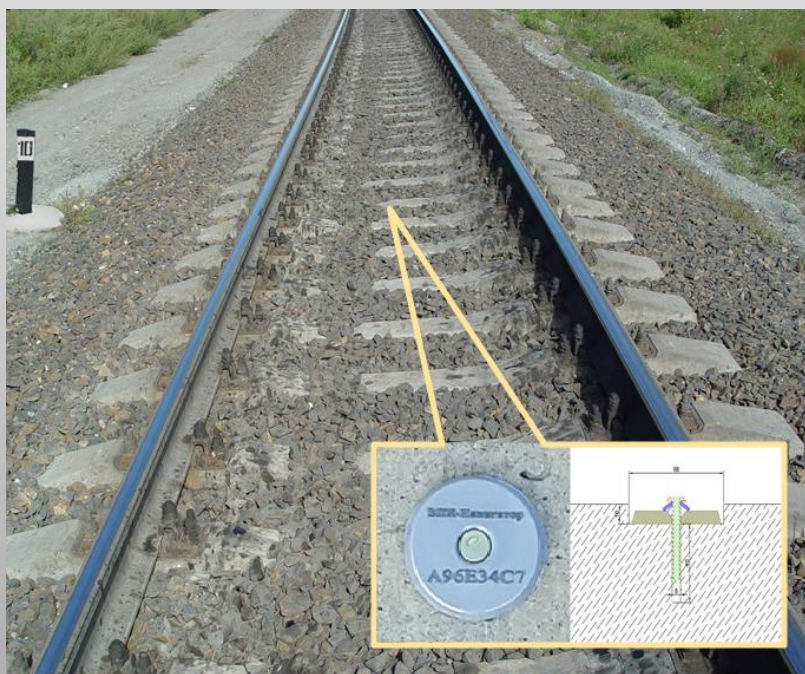
## Interaction scheme



# Description of the technology

## Electronic marks of railway track

To accurately link the readings of track measuring cars and tamping machine to the coordinate of the railway track a special electronic track marking is created, repeating the existing hundred-meter mark



On a continuous track electronic marks are installed on sleepers

A unique identification number is stored on the microchip of the electronic mark, which allows to determine its location - railway track, stretch , picket (hundred-meter mark)

# Description of technology

## Electronic Tagging Equipment

In order to synchronize the geometric information of rail track and SPT for straightening and tamping machines, they are equipped with scanners of electronic marks.

Track measuring car



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Straightening and tamping machines



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# Effects of technology

- Improved railway quality, predicted high quality results
- Improving the performance of the bearing (up to 168 m / h), saving time of curfew (service period of the track)
- Increase train speed
- Reducing the influence of the "human factor", rapid assessment and monitoring of work results
- Savings used for the repair of materials of the upper structure of the railway track
- Reducing the cost of traction trains (up to 37.5 thousand rubles per 1 km of railway tracks per year)
- Reducing the cost of maintaining materials for railroad tracks, depreciation of train wheelsets
- The design and calculation of the projects (SPT) is performed according to the track measurement car, reduces the time and cost of surveying for track design

# Cooperation offer

- **Equipment of automated systems with modern automated track alignment system**
- **Providing high-precision track alignment using technology in terms of the calculation of the projects (SPT)**
- **Implementation of the system on the railway network**
- **Provision of railway marking network with electronic marks**