# Innovation driven development

The Russian Railways Group's R&D activities and innovation driven development follow the priorities set forth in the Company's Long-Term Development Programme until 2025, as well as the Group's Research and Development Strategy until 2025 and further until 2030 (the "White Book"), in line with the country's strategic development goals and global R&D trends.

**Key areas of the Group's innovation driven development:**

- developing a customer-focused transportation and logistics system in a unified transportation space;
- establishing and implementing dynamic transportation management systems using artificial intelligence;
- implementing innovative systems to automate and mechanise station processes ("intelligent station");
- developing and implementing advanced equipment and technologies for track maintenance infrastructure, railway automation and telematics, electrification and power supply, innovative information and telecommunication technologies;
- setting requirements for the construction and deployment of innovative rolling stock;
- developing the traffic safety management system and risk management methods associated with the transportation safety and reliability;
- developing and implementing equipment and technologies for promoting high-speed and ultra high-speed railway transport;
- promoting technologies for heavy-duty freight traffic management;
- improving energy efficiency of operations;
- implementing the best available technologies in environmental protection;
- promoting the quality control system.

The Group's Comprehensive Innovative Development Programme until 2020 (the "CIDP") is the fundamental document for innovation driven growth. It sets out efforts aimed primarily at implementing innovative technologies and processes. Russian Railways invested RUB 986.4 m in science and technology as part of its R&D plan for 2018, and RUB 241 m as part of its Digital Railway R&D project.

## Russian Railways' Contribution to the Digital Economy of the Russian Federation Government Programme

The Digital Economy of the Russian Federation programme was approved by the Russian Government's Order No. 1632-r dated 28 July 2017. It defines goals, objectives, areas, and timelines of the key efforts stipulated by the public policy for promoting Russia's digital economy development. Russian Railways works with entities responsible for the Digital Transportation and Logistics project.

**Russian Railways' key IT development areas are as follows:**

- creating a shared information space for freight transportation and logistics to raise the profitability of freight transportation and logistics;
- creating a shared information space for passenger services to raise the profitability of passenger transportation;
- generating end-to-end digital solutions for transportation management ("Digital Railway") to increase the railway transportation and infrastructure efficiency;
- establishing a unified integrated automated management system, streamlining corporate business management systems, reviewing and developing reporting practices for raising profitability;
- promoting foreign operations, improving social services and corporate governance.

**Russian Railways has set the following IT development targets for 2025:**

- implement platform solutions integrated with Russian Railways' production systems and, as part of the Russian Ministry of Transportation's Digital Transportation and Logistics project, ensure that they are aligned and interfaced with transportation digital solutions, and can be used for building digital services, electronic channels for interaction with the market (passengers, shippers, service companies) and federal executive authorities, as well as for cross-border cooperation (transport corridors);
- build web, big data, shared register, digital modelling, and artificial intelligence systems into Russian Railways' processes;
- create a new generation of mobile workspaces and establish electronic workflow in the production and management processes;
- upgrade the computing and telecommunication infrastructure that ensures guaranteed information services accessibility;
- implement a centralised information security framework based on solutions that are independent from imports;
- systematise work with new technologies (sourcing, piloting, prototyping, implementation) and promote high tech business within the Group.

**Russian Railways' Long-Term Development Programme until 2025 envisages the IT development capex of RUB 168 bn in 2018–2025, including:**

- RUB 99 bn on informatisation;
- RUB 65 bn on equipment and communication systems upgrade;
- RUB 4 bn on the Intelligent Railway Transportation Management System (IRTMS).

## Digital Railway Concept

As part of the Digital Economy of the Russian Federation programme, Russian Railways developed and approved a Concept for its Digital Railway Comprehensive R&D Project. Russian Railways' Digital Railway Project proceeds in accordance with the approved plan No. 289 dated 2 April 2018.

The list of 2018 activities under the project included the establishment of project management bodies, approval of payroll and regulations on the project management bodies, formation of a task force for estimating the economic effect, and arrangement of the project roadmap verification for 2019. In addition, 2018 saw the start of development and specification of the Digital Railway Station concept at the Chelyabinsk-Main Station of South Urals Railway, where smart systems are to be deployed in 2019–2020 to operate freight trains without human input. The Moscow Central Circle (MCC) and October Railway are rolling out a standard system for train traffic control and automatic routing at the station.

In 2018, the Smart Locomotive concept was approved. It covers the key functional requirements for new generation locomotives and scenarios of their operation without human input. A pilot run of an unmanned locomotive (the Computer Vision technology) was carried out at October Railway's Luzhskaya station, with the resulting data used to refine the equipment control algorithms that detect obstacles in front of the locomotive.

In 2018, the uniform corporate automated system was commissioned for locomotive stock control with a cartographic interface function displaying locomotive location and condition. Driver's Personal Account, a programme component, will be developed as a sub-project of the system.

The Company's priorities for 2019 also include the review of the Digital Railway IT projects and project roadmap update. Based on the results of this work, the Company will compile the list of demonstrably best-performing sub-projects, by implementing which it should achieve production and performance targets by 2025.