

THE NEW ERA OF RAIL INNOVATION

The rising demand for passenger and freight capacity, against a backdrop of rapid global urbanisation and digitisation, is shaping the future development of the rail industry's infrastructure, services and systems. While the introduction of innovative technologies will have far-reaching and positive impacts, making rail services more dynamic, efficient and environmentally friendly; the rail industry must rise to the technical, safety and security challenges posed by this evolution.

Which global trends are influencing rail's smart future?

International competition

- Improved transit time
- Competitive pricing
- High quality rolling stock

Rising expectations

- Real-time information
- Higher safety, reliability and efficiency
- Increased convenience and ease

Digitisation

- Smart technology
- New digital platforms
- Big data

Sustainability

- Green materials
- New fuel technologies to power trains
- Climate-change resilient infrastructure

Connectivity

- Interconnected systems
- Wireless communication

Urbanisation

- Population growth and megacities
- Strain on urban infrastructure
- Rail capacity demand growth

How could rail's smart future look?

Alternative power sources

- Solar panels for energy generation
- Wind turbines for energy generation

Predictive maintenance

- Condition-based planning
- Inspection and maintenance of infrastructure with intelligent robots
- Prevention of unexpected equipment failures

Driverless trains

- Automatically controlled trains
- Increased reliability and efficiency
- Optimisation of running time

Signalling technology

- Signals disappear from line-side
- Automatic train control

Real-time monitoring

- Usage of embedded sensors
- Real-time analysis of rolling stock and infrastructure
- Increased safety & security

Connected and smart devices

- Real-time journey information
- Instant travel disruption alerts

Integration across transport modes

- Seamless connections with other transport modes through Internet-of-things
- Delivery of accurate and linked passenger information

Sensors (cameras, radar, infrared etc.)

- Automate tasks
- Deliver real-time analysis

Which new challenges arise through smarter rail systems?



System integration

Smart systems need to communicate across rail services, transport modes and infrastructure.



Software development

Higher investment to satisfy increased customer needs and to ensure valid real-time data analysis.



Functional safety

Higher system complexity increases potential error rates and demands new functional safety approaches.



Sensor implementation

Identify optimal combination of various sensors (e.g. cameras, radar, infrared) to ensure seamless communication through all weather conditions.



IT security

More digitised and interconnected systems are exposed to numerous hazards and vulnerabilities.

How can TÜV SÜD help you?



One-stop service provider

Full range of testing services are provided – from assessment of the planning stage to final safety assessment.



Recognised worldwide

TÜV SÜD experts and test marks are well known by rail manufacturers, operators and authorities to demonstrate safety.



Multidisciplinary experts

Understanding of complex rail industry innovations to minimise risk and safe time.



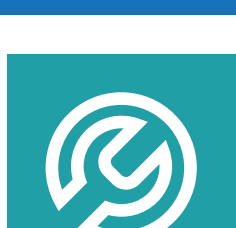
Global knowledge, local expertise

Communication and support in your language and timezone and benefit from global knowledge transfer.



IT security management

Detection of vulnerabilities and hazards to minimise risks and optimise countermeasures.



Tool development

TÜV SÜD provides proprietary innovative software and tools for real-time monitoring and predictive maintenance.



Purpose-built rail facility

Own rolling stock test center in Görlitz and Halle to conduct real driving tests.

SOURCES: United Nations World Population Prospects 2015 | UITP, World Report on Metro Automation, July 2016 | Arup, Future of Rail 2050, 2015



Find out more about TÜV SÜD's rail services

www.tuvsud.com/rail

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