

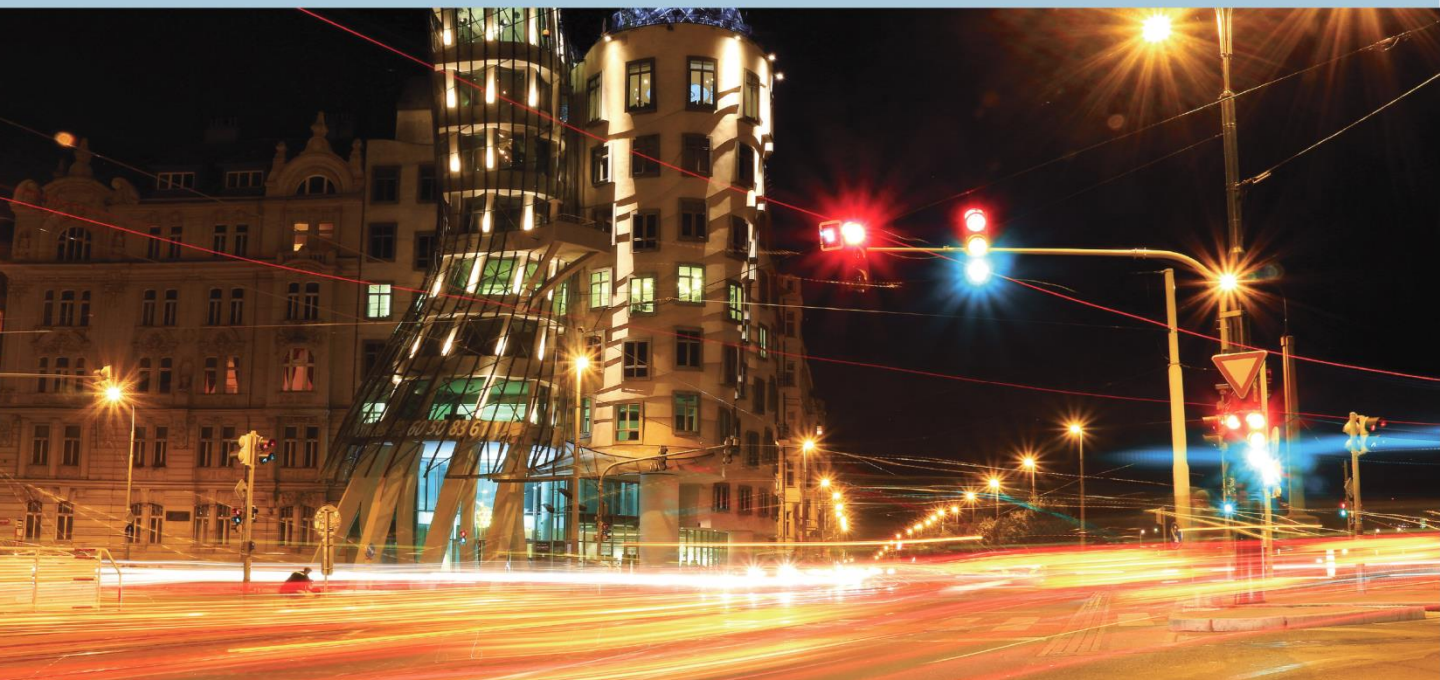


European
Commission

Network and Traffic Management Systems



Roadmaps



In Brief

Network and Traffic Management (NTM) systems are used for the optimisation and management of transport networks' operation. Bottlenecks across air, rail, road and water can result in system-wide capacity constraints, traffic jams and increased pollutant emissions and environmental impacts.

The transition towards an advanced multi-modal transport system requires better coordinated and organised traffic flows to optimise the entire transport network. This involves devices to detect real traffic conditions, traffic information sharing, optimisation processes and the distribution of control actions via end-user devices.

Digital technologies and the emergence of the connected traveller can influence real-time demand by encouraging off-peak travel and use of alternative routes through intelligent applications and user information services. Integrated urban traffic management and mobility information systems can therefore contribute to optimising transport flows both through cities and in rural regions.

The Strategic Transport Research and Innovation Agenda (STRIA) *Roadmap for Network and Traffic Management Systems* aims to develop an advanced multi-modal transport system by effectively optimising the entire transport network across new areas.

Current Developments

Road: Investments in cooperative intelligent transport systems and connected driving technologies to improve the flow of road traffic on urban roads requires making progress in the movement of goods and people. This includes better vehicle management (i.e. from conventional to autonomous vehicles), vehicle fuel technologies (i.e. from fossil to alternative fuels), bicycle and vehicle sharing, public transport, walking and cycling, especially in large urban areas. On extra-urban roads, the requirements are to achieve a safe, efficient and sustainable road transport in order to offer connected mobility, less congestion, fewer accidents, less pollution, improved levels of European-wide multi-modal travel information services.

Rail: The increase of different international and local railway traffic flows requires an improvement in planning and management. These include improving cross-border sections (especially when using different signalling and train operating systems), rail terminals connecting rail with other transport modes (e.g. advanced rail-rail trans-shipment yards) and complex and heavily used conventional railway stations for passenger trains in urban areas (e.g. hosting local/high-speed/international/freight traffic).

Waterborne: Large-scale intelligent and interoperable water traffic management and information systems will improve existing and future infrastructure to optimise traffic flows with different vehicles.

Aviation: The aviation sector aims to achieve a Single European Sky to improve EU air traffic management. The sector suffers bottlenecks in hub capacity, management operations and *en route* coordination of traffic flows between/outside European hubs. There is a need to modernise, harmonise and coordinate air traffic management systems (e.g. better aircraft trajectory and route planning).

Common cross-modal key themes are: access to data, streamlining administrative boundaries, flexibility, resilience and ability to recover from disruptions.

Key Research Innovation Pathways

The roadmap focuses on ten action areas that will contribute to the optimisation of the European transport network that will help decarbonise the transport sector and meet European Union (EU) energy and climate targets.

Key Actions until 2050

The ten priorities will be implemented in three key phases.

1 Design

In the short-term, four research and innovation themes will be undertaken by the EU/industry. These are:

- Architecture and concept of operations for an efficient, resilient and adaptable multi-modal NTM system.
- Development of multi-actor organisational and business models with shared responsibilities.
- Research and validation of next-generation multi-modal NTM systems (including intra-modal optimisation and development of interfaces).
- Integration of infrastructures, vehicles, systems and services into a truly multi-modal network.

2 Optimisation

In the medium-term, three research and innovation themes will be undertaken by the EU, Member States and industry. These are:

- Demand-capacity balancing for efficient journey management (passenger and freight).
- Calibration of arbitration models for complex NTM scenarios and multi-actor settings (optimising multiple performance targets and user versus network needs).
- Traffic optimisation of conventional (semi-) automated and unmanned vehicles within a multi-modal NTM system.

3 Execution

In the long-term, three innovation themes will be undertaken by the EU, Member States and cities and regions. These are:

- Large-scale demonstration of fully multi-modal NTM capability in any operating environment (urban and non-urban).
- Resource and asset management optimisation for advanced NTM systems.
- Piloting an efficient multi-modal NTM system across European hubs/nodes (including the integration of non-EU traffic).



European Technology Platforms

Large-scale intelligent and interoperable traffic management and information systems are key to maximising the capacity of existing and future infrastructure and optimising traffic flows with different vehicles. The following platforms allow opportunities to improve transport systems:

SESAR

The Single European Sky Air Traffic Management Research is the collaborative decision-making and system-wide information management proposed for air traffic management.

ERTMS

The advanced signalling and Rail Traffic Management System.

SafeSeaNet

The Safe and Secure Maritime Traffic Monitoring and Information System.

RIS

The Real-Time River Traffic Information System.

C-ITS

The Cooperative Intelligent Transport Systems.

Galileo

The European Global Navigation Satellite System.



Transport Research and Innovation Agenda

The Strategic Transport Research and Innovation Agenda (STRIA) outlines future transport research and innovation priorities to decarbonise the European transport sector.

STRIA is one of five interlocking dimensions set out in the Energy Union strategy that provides a framework to achieve EU energy and climate goals. It supports the vision of a clean, connected and competitive European transport system.

In coordination with Member States and transport stakeholders, STRIA aims to set out common priorities to support and speed-up the research, innovation and deployment process leading to radical technology changes in transport.

STRIA builds on and integrates seven thematic transport research areas:

- Cooperative, connected and automated transport;
- Transport electrification;
- Vehicle design and manufacturing;
- Low-emission alternative energy for transport;
- Network and traffic management systems;
- Smart mobility and services; and
- Infrastructure.

STRIA is also the interface between other relevant sectors such as energy and information and communication technology.

About TRIMIS

The Transport and Research and Innovation Monitoring and Information System (TRIMIS) supports the implementation and monitoring of STRIA and its seven roadmaps.

TRIMIS is an open-access information system to map and analyse technology trends, research and innovation capacities, as well as monitor progress in the transport sector.

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