Information on the move
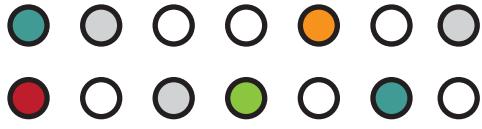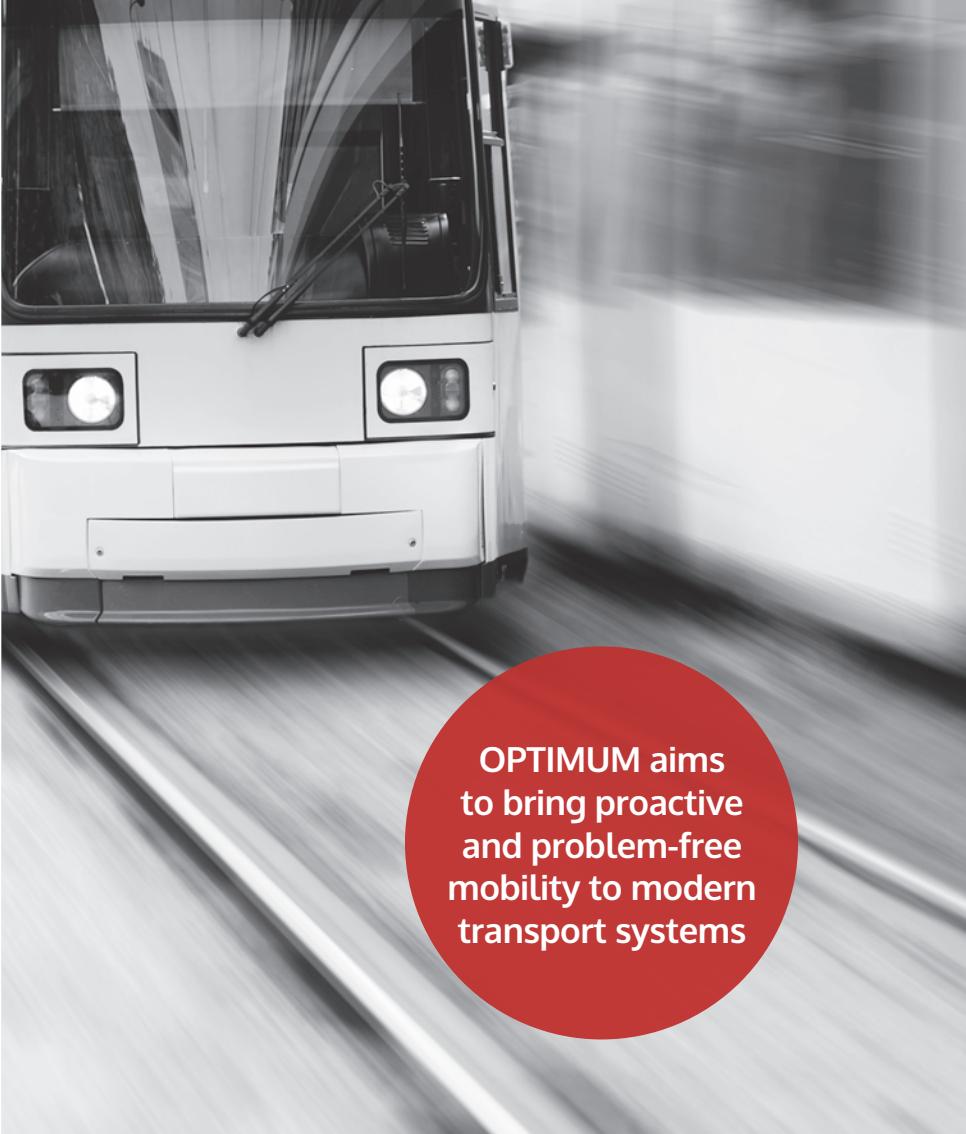
about OPTIMUM

"Multi-source Big Data Fusion Driven Proactivity for Intelligent Mobility", or "OPTIMUM", is an EU-funded project that looks beyond state-of-the-art IT solutions to improve transit, freight transportation and traffic connectivity throughout Europe. OPTIMUM aims to bring proactive and problem-free mobility to modern transport systems by introducing and promoting interoperability, adaptability and dynamicity through its tailor-made applications.

Operating in an environment of ubiquitous connectivity, OPTIMUM is building a largely scalable architecture within which to manage and process multi-source big data. The goal is to enable the continuous monitoring of transportation system needs while facilitating proactive decisions in a semi-automated way.

OPTIMUM aims to bring proactive and problem-free mobility to modern transport systems

- Multi-modal routing
- Transport modelling
- Dynamic toll charging
- Efficient transport systems
- Data analysis and interpretation
- Smart mobility services
- Decision support system
- Smart sensing
- Big data processing
- Persuasive strategies
- ITS business models

OPTIMUM identifies the following as keys to achieving its stated aim of continuous situational awareness:

- Develop a **smart sensing** system and data infrastructure able to cope with huge amounts of heterogeneous data in real time.
- Interpret acquired data and predict the status of transport networks over short- and medium-term horizons with **dynamic and context-aware forecasting**.
- Employ mechanisms to integrate **adaptive charging** and crediting models, real-time **multi-modal routing** and navigation algorithms.
- Offer **persuasive strategies** to support proactive decisions and sustainable transportation behaviours.
- Establish a **decision support system** that generates, properly formats, filters and delivers actionable information in real time to end users.
- Deploy proposed solutions in **real-life pilots** for improving transport system quality and efficiency.
- Ensure long-term project impact by generating **business models** to commercialise results beyond selected end-user pilots.

project goals

OPTIMUM is building a largely scalable architecture to manage and process multi-source big data

intelligent transport systems

Modern transportation systems have to mitigate problems emerging from complex mobility environments and their intensive use, such as excessive CO_2 emissions, high congestion levels and diminished quality of life. Solutions to these problems will require collected, processed and broadcasted data from various sensors, systems, service providers and crowdsourcing. Furthermore, digital-age transport systems will have to anticipate situations in near real time in order to prevent problems before they emerge.

Intelligent transport systems (ITS) can help us to operate cleaner, safer and more efficient transport systems. Directive 2010/40/EU defines ITS as systems in which information and communication technologies (ICT) are applied in the field of transport. The ITS Directive establishes a framework of coordinated and coherent action in four priority areas:

- ◎ Priority Area I **Optimal use of road, traffic and travel data**
- ◎ Priority Area II **Continuity of traffic and freight management ITS services**
- ◎ Priority Area III **ITS road safety and security applications**
- ◎ Priority Area IV **Linking vehicles with transport infrastructure**

ITS can help us to operate cleaner, safer and more efficient transport systems

pilot 1 –
multi-modal travelling

Background: Urban transportation networks already offer a multitude of modalities and travel options. An ideally integrated transportation network will allow citizens to move easily from point to point, thus reducing the need for private cars. Existing travel planners, however, fail to fully integrate all available modes of transport; nor do they take traveller interactions adequately into account.
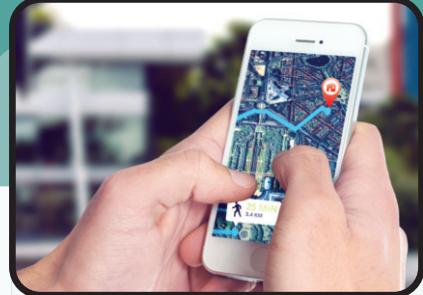
Solution: OPTIMUM will implement a smart multi-modal transit concept involving up to 500 users in three greater urban areas: Vienna, Birmingham and Ljubljana.

Impact: The integration of various real-time traffic data sources will provide the required information to realise traffic-state-aware routing to guide travellers towards their destinations. Travellers will receive proactive recommendations for personalised trips or re-routing based on personal plans, traffic information and historical data, while city authorities will be able to plan dynamic responses to anticipated traffic situations. The aim of this approach is to achieve a system-wide equilibrium while offering a truly integrated, sustainable transportation mix.

An ideally integrated transportation network will allow citizens to move easily from point to point

Background: The current volume of cars on European roads damages health and the environment, leads to congestion, and increases travel times and the number of accidents. Optimal usage of existing networks is vital for sustaining ever-growing demand for mobility. Dynamic pricing can reduce congestion by shifting some traffic demand to alternate times, routes or modes, or by eliminating trips. Logistics companies, main users of road networks, repeatedly request flexibility in toll pricing.

Solution: OPTIMUM will develop dynamic charging models for road use by freight vehicles based on real-time conditions. The solution will be tested on Infraestruturas de Portugal's toll system using a fleet of 10 Luís Simões freight trucks in Portugal.

Impact: OPTIMUM's dynamic charging model will combine historical and real-time data to produce a model that will incorporate a multitude of variables. The model will be integrated in the OPTIMUM platform and provide actionable information to the end user — that is, the road logistics operator. Smarter logistics will reduce fuel consumption, congestion and infrastructure maintenance costs, while outcomes can be adapted to a wider range of end users.

pilot 3 – dynamic toll charging

pilot 2 – smart motorhomes

Background: Adria Mobil produces outstanding, high-tech motorhomes that feature up to 60 sensors that feed data to aid decision making. As motorhome tourists often travel in groups, special infrastructure and knowledge of optimal routes can ease congestion-related problems during holiday season.

Solution: OPTIMUM will develop and test intelligent assistance for dealing with the complexities of multi-sensor environments and CAR2X communication for long-distance trips involving a fleet of at least 18 motorhomes with full sensor setups.

Impact: "Smart" motorhomes that employ deep analytics can react to problems autonomously, use resources more efficiently, and provide users with enhanced safety, comfort and easy navigation. The cognitive behaviour tested in these leisure vehicles will be integrated into other vehicles in the public transport sector.

partners

Adria Mobil

Austrian Institute of Technology GmbH

Birmingham City Council

Fluidtime Data Services GmbH

Infraestruturas de Portugal SA

Institute for the Development of New Technologies

Institute of Communications and Computer Systems

INTRASOFT International SA

Jozef Stefan Institute

Kapsch TrafficCom AG

Ljubljana Public Transport

Luís Simões, Logística Integrada SA

Nissatech Innovation Centre

Regional Environmental Center

TIS Transport, Innovation and Systems Consultancy

TREDIT SA Transport Consultants

University of the Aegean

University of Wolverhampton

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