# AUTOSTRADE PER L'ITALIA (ASPI) OBJECTIVES

Applying technologically advanced solutions to enhance the quality of the motorway service and boost its resilience, while responding to climate change challenges, in compliance with European transport, sustainability, security and resilience objectives:

o **Guarantee 360° safety on roads**, at construction sites and workplaces.

o **Ensure the highest quality standards** throughout the value chain, from planning to execution and operation.

o **Strengthen digitalisation**, to improve operational management of infrastructure and efficiency of transport.

o **"Put the customer first"**, by offering new services to travelers throughout their journeys.

o **Develop a green and smart mobility** for the future, in accordance with sustainability criteria.

ASPI'S MAINTENANCE PROCESSES
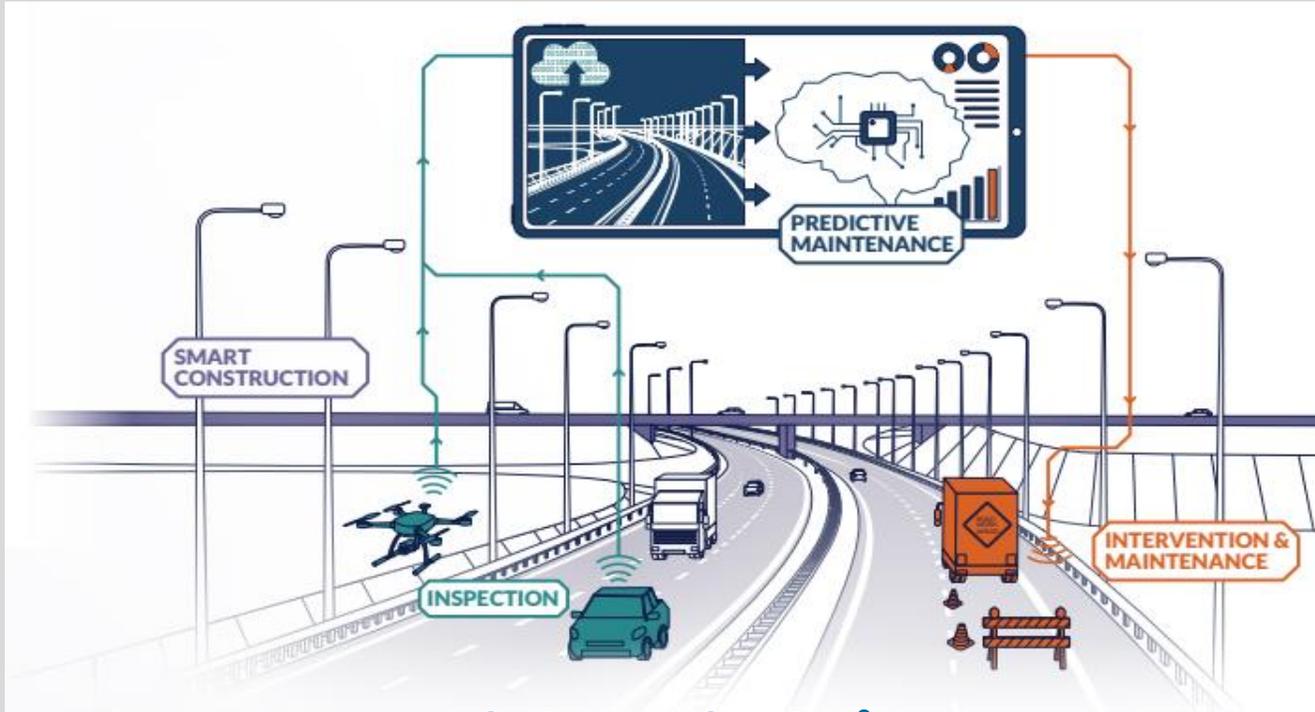
A full set of solutions

o **Need** to undergo a deep **regeneration of highway network,** due to ageing and heavy traffic.

o **Need to minimize the impact on traffic**, reducing risks and duration of road worksites.

o **Need to optimize all operations** related to maintenance, with the highest safety levels, while reducing personnel risks and their exposure.

OMICRON aims at fostering the industrialisation and automation of road construction, inspection, and maintenance technologies.

OMICRON IN A NUTSHELL

Towards a more automated and optimized maintenance, renewal and upgrade of roads by means of robotized technologies and intelligent decision support tools.

Consortium: 16 members from 7 countries. Experienced and multidisciplinary team with a highly diverse skill set.

Budget: 5 M €.

Duration: 45 months, May 2021 – January 2025.

Project Coordinator: **CEMOSA**

Project Officer: **CINEA**

Road Operators & Owners

Road Contractors & Civil Eng. Experts

Dis., Com. And Ex. Experts

ICT Integrators

Research Institutions & Technology Developers

Innovative Infrastructure for Europe

www.omicronproject.eu

https://twitter.com/H2020Omicron

https://www.linkedin.com/company/omicronh2020

Integration of a broad portfolio of solutions from inspection to execution

Expected Impacts (KPI):

☐ Increase of road network capacity.

☐ Overall reduction of maintenance costs.

☐ More efficient road intervention processes and reduction of traffic disruptions.

☐ Increase of safety in road interventions actions, for road users and personnel.

Demonstration Stages:

4 Technical Demos & 1 Final Demo (TRL 7).

○ **Stage 1**
Preliminary TRL 4-5 Testing.

○ **Stage 2**
Technical Demonstration. TRL 5 to 7.

○ **Stage 3**
Final Demonstration of the Platform. TRL 7 (ASPI).
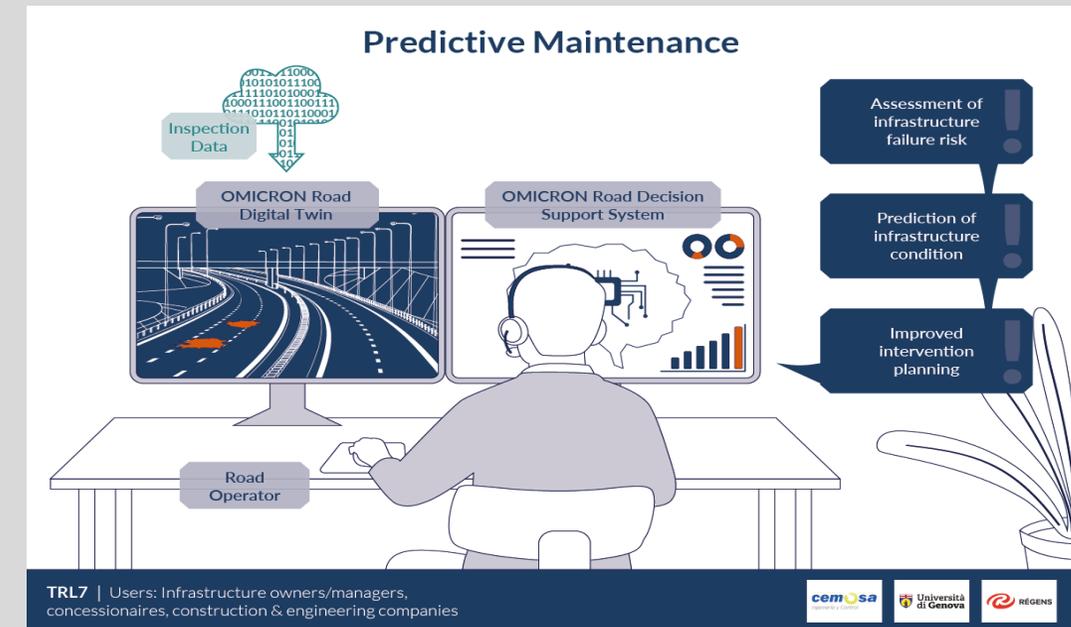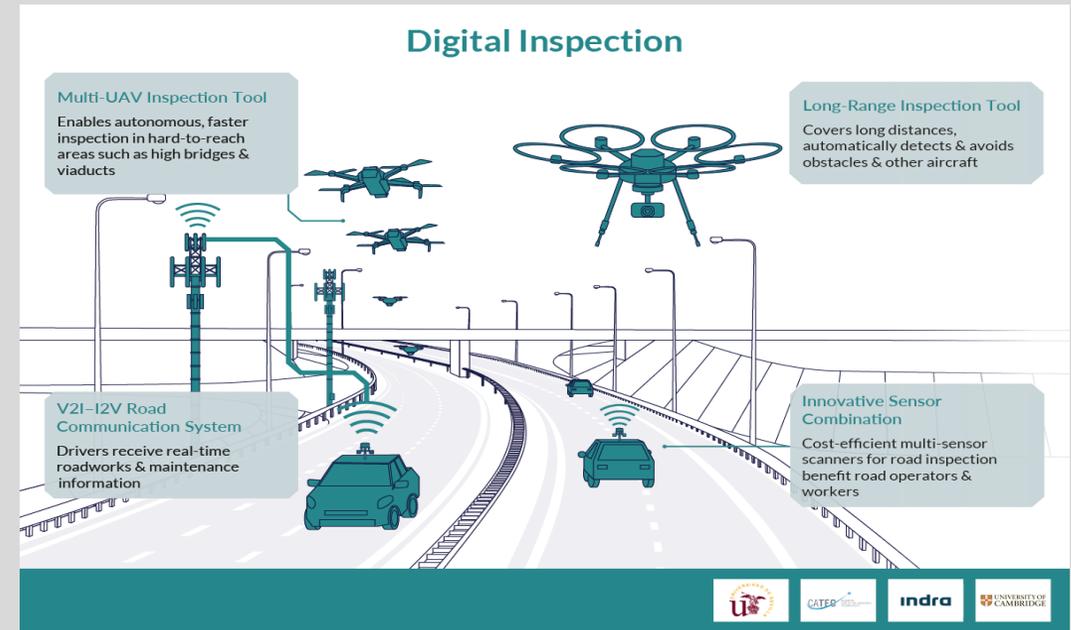
TECHNICAL SOLUTIONS (1/2)
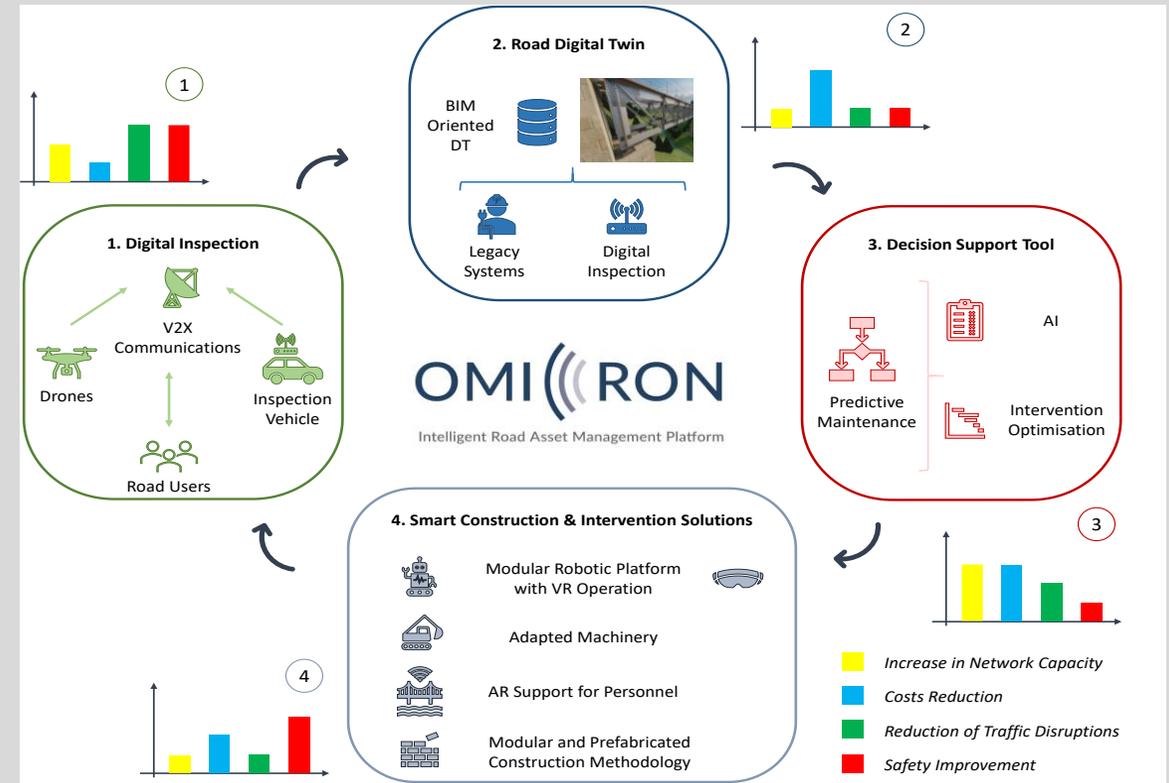
Digital inspections (Final Demo)

To reduce the exposure of personnel to traffic and improve road network availability: array of robotic solutions with **drones and automatic inspection vehicles** to make road inspections faster and safer.

Predictive maintenance (Final Demo)

o **Road Digital Twin** mirroring real road assets in all relevant aspects of their geometry, to enable a comprehensive analysis.

o **Road Decision Support System**, state-of-the-art tool for the optimal planning of road interventions and resources.

Digital Inspection

Multi-UAV Inspection Tool
Enables autonomous, faster inspection in hard-to-reach areas such as high bridges & viaducts

Long-Range Inspection Tool
Covers long distances, automatically detects & avoids obstacles & other aircraft

V2I–I2V Road Communication System
Drivers receive real-time roadworks & maintenance information

Innovative Sensor Combination
Cost-efficient multi-sensor scanners for road inspection benefit road operators & workers

Predictive Maintenance

Inspection Data

OMICRON Road Digital Twin

OMICRON Road Decision Support System

Assessment of infrastructure failure risk

Prediction of infrastructure condition

Improved intervention planning

Road Operator

TRL7 | Users: Infrastructure owners/managers, concessionaires, construction & engineering companies

TECHNICAL SOLUTIONS (2/2)

Smart construction

Pre-manufactured structural components and connections for road construction as well as automation technologies to support the process, for faster and more efficient road/bridge construction and reduced traffic disruptions.

Smart maintenance (Final Demo)

Use of robotic, automation and digitalisation technologies to enhance road maintenance works.

o Modular Robotic Platform to support multiple road maintenance actions, teleoperated with a web-based Virtual Reality platform: **to install road signals**, clean traffic signals and lights, **install safety barriers**, remove horizontal markings and seal pavements cracks.

o **VR and AR based tools** to support road workers in various tasks, aiming to reduce hazards related to machinery and traffic conditions.
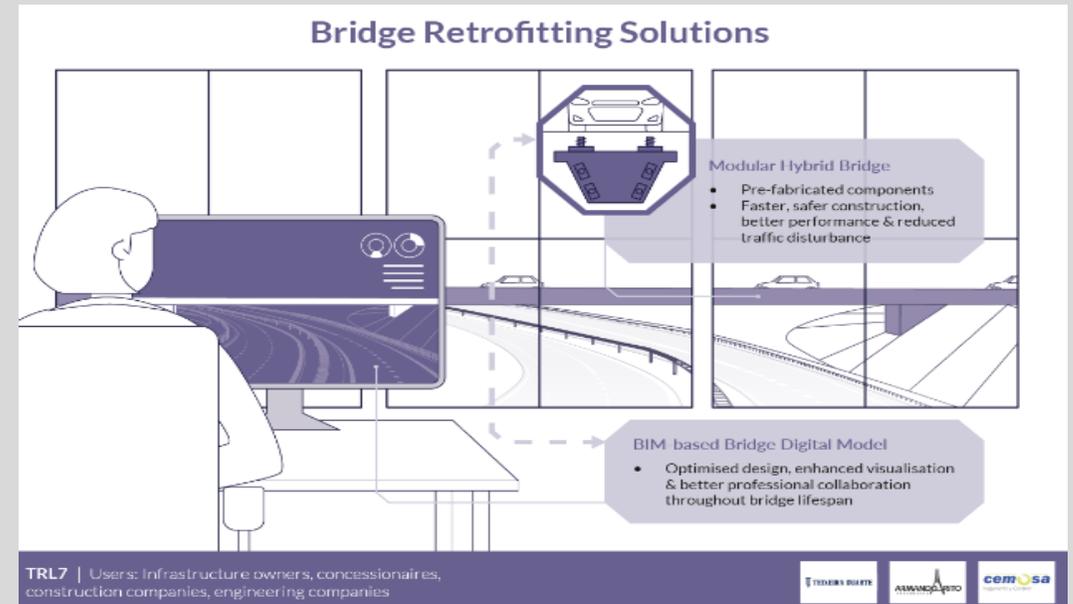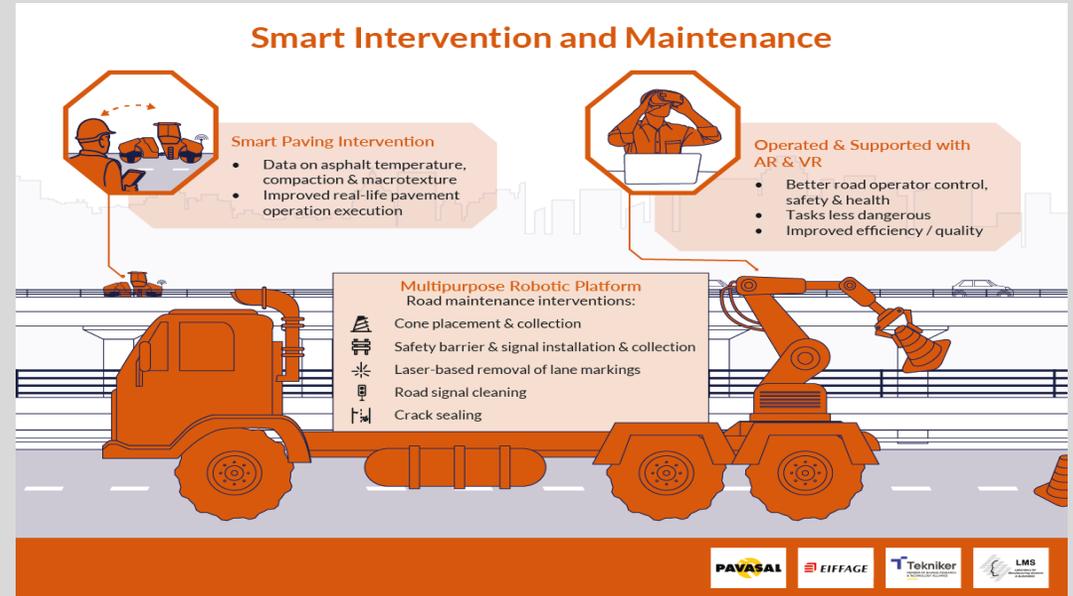
DEMONSTRATION A1
Panoramica

Solutions

- Digitalization of inspection activities.
  Use of robotised equipment, drones and other automated solutions.

- Automation of construction, repair and retrofitting works.

- **Development of a smart platform for road managers.**

- Decision support tools: predictive maintenance.

KPIs

- Increase availability of transport network.

- **Reduction of traffic disruptions.**

- **Reduction of maintenance costs.**

- **Reduction of workers exposure to live traffic and construction machines.**

Interface with current ASPI projects:

- Argo – Infrastructure Evolutive Research - integrated system.

- Best practice work-sites.

- integrated mobility management system.

- Travelling Control Centre (TCC) project.

- Hi.P.E.R. - Highway Pavement Evolutive Research - integrated system.

- Programme Mercury for the digitization of the network.