# The evolution of C-ITS solutions and the strategic role of infrastructure

MOVYON
Tech the Future

# MOVYON

## Gruppo Autostrade per l'Italia

## DIGITAL ENGINEERING FOR SMART MOBILITY

We are an Italian company leader in development and integration of Intelligent Transport Systems Solutions and Centre of Excellence for Research and Innovation of Autostrade per l'Italia Group.

## Our numbers

**300+**
highly skilled professionals

**Active projects**
in Europe, South America and Africa

**450+**
Free Flow gantries and Stop&Go plazas in the world

**460.000+**
events managed in 2021 by Movyon Traffic Management Platform

**3.800**
Bridges and tunnels inventoried with ARGO

## Our solutions

Traffic e Safety Management

Infrastructure Management

Tolling

Smart Cities

Smart Roads

# MOVYON is the technological enabler for Autostrade per l'Italia's Mercury Programme



MERCURY
SMART
SUSTAINABLE
MOBILITY

INTELLIGENT ROADS

SMART TOLLING

GREEN SOLUTIONS

URBAN MOBILITY

CONNECTED INFRASTRUCTURE

MOVYON

# Successful pilot on Autostrade per L'Italia motorway network

**34**
Roadside units
ITS-G5

**52 km**
(Firenze, Bologna)

**500**
Vehicles/day *

**200k+**
Cooperative
Awareness
Messages/day*

**Day-1 Services**
- Hazardous Location Notification
- Road Works Warning
- Probe Vehicle Data

*Coming soon 2023:*

Genova A10 – 52 km

Firenze-Bologna – 86 km
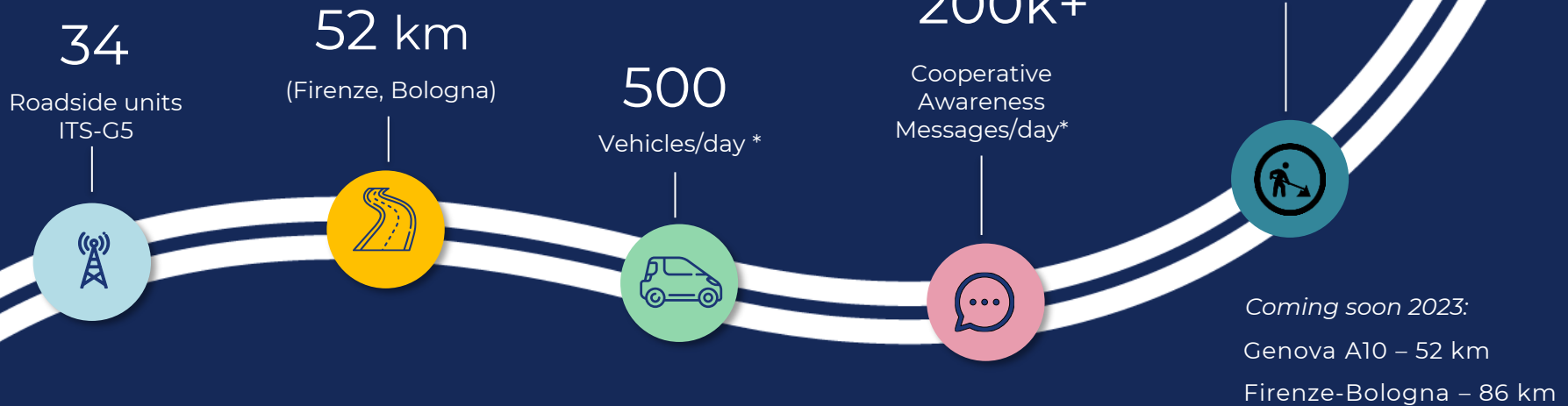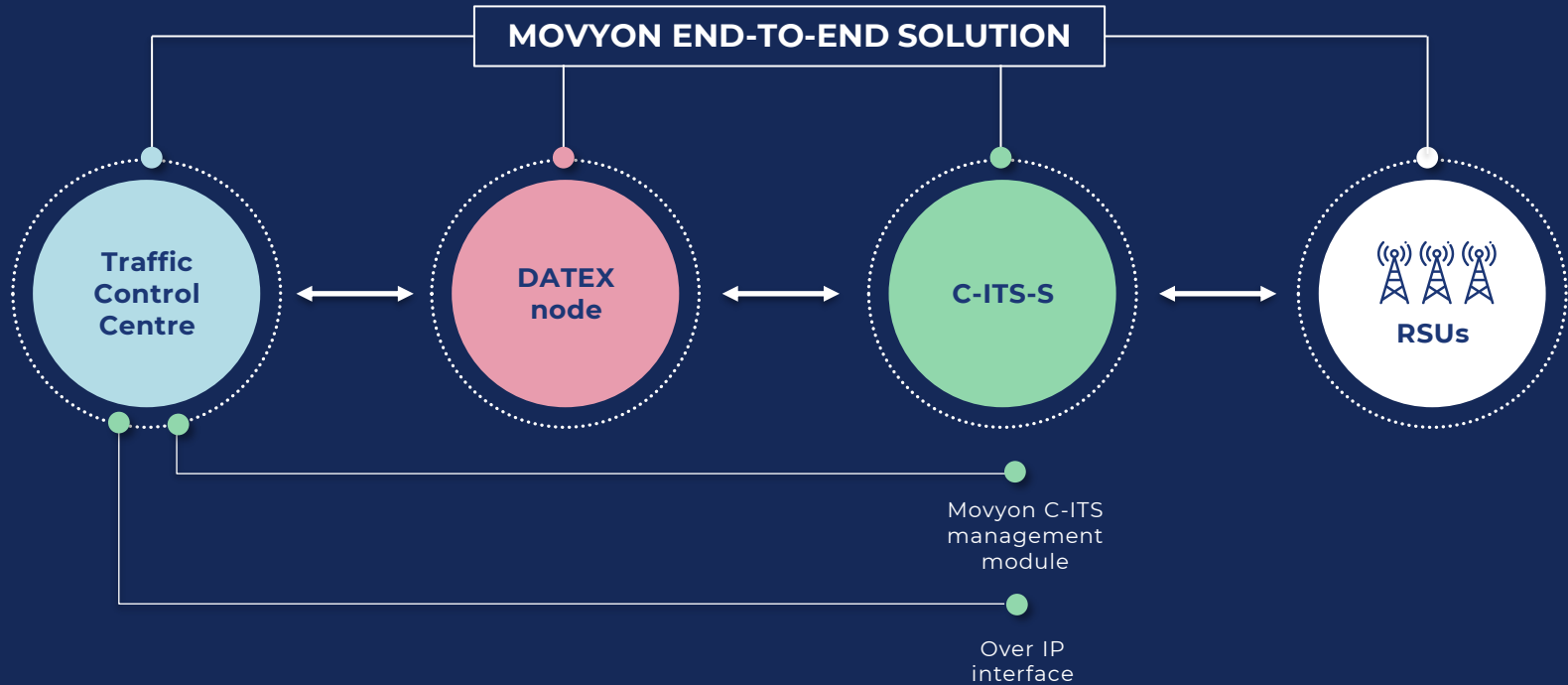
Ready for
«over-ip»
service

Compliant with
C-Roads
specifications

Contract
with C-ITS PKI
*(Trusted Secure Source)*

*data from
Jul to Oct 2022*

MOVYON

# C-ITS system architecture



**MOVYON END-TO-END SOLUTION**

**Traffic Control Centre** ⟷ **DATEX node** ⟷ **C-ITS-S** ⟷ **RSUs**

Movyon C-ITS management module

Over IP interface

# C-ITS management module



C-ITS management module entirely developed *in house*.

It can be easily adapted and customized to the specific needs of the concessionaries and integrated with any other software platforms (e.g., service providers).

No licensed third-party software is used.
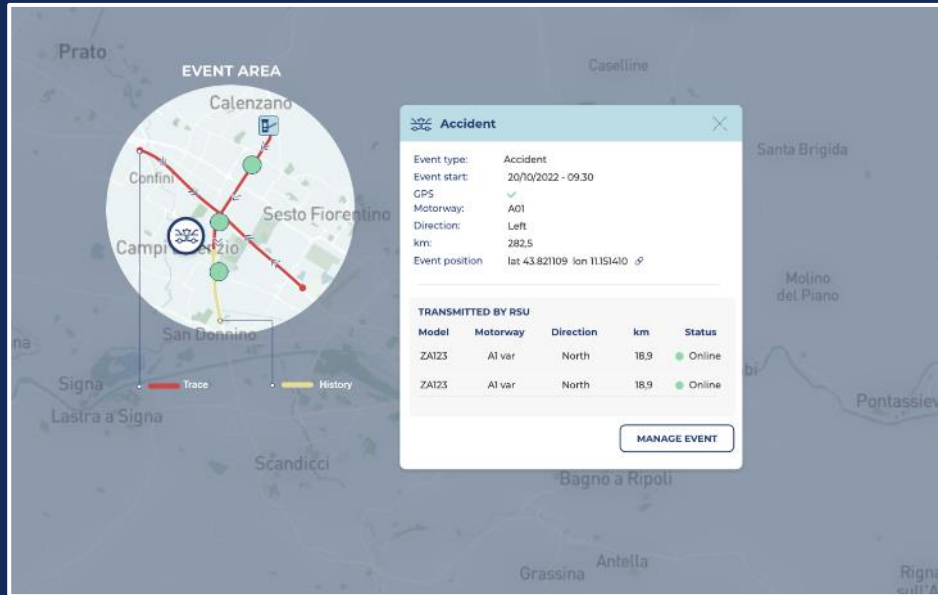
Picture shows C-ITS management module currently integrated with Movyon Traffic Management Platform

*History: area of the event*
*Trace: route entering the event area*

# V2X Roadside Equipment

The C-ITS V2X roadside unit from Movyon is entirely developed and manufactured by Movyon Electronics. It enables two-way wireless communication between the road infrastructure and the onboard unit, with high levels of safety and reliability in data exchange, for advanced monitoring of road events and efficient traffic management.
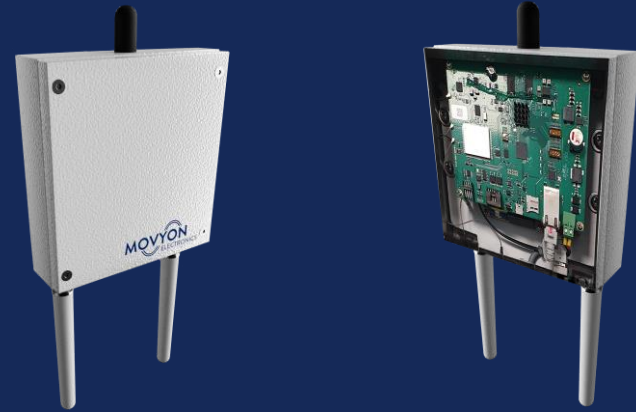
# Movyon value for C-ITS

**One-Stop-Shop for RSE and Platform**

● Highly customizable and easily interoperable with the Traffic Control Centres of Concessionaries and with the platform of service and content providers

● Dual-Protocol (ITS-G5 and C-V2X) proprietary RSU entirely designed and manufactured by Movyon

**Tested on a real motorway environment**

**Validated and approved by VOLKSWAGEN selling C-ITS equipped vehicles**
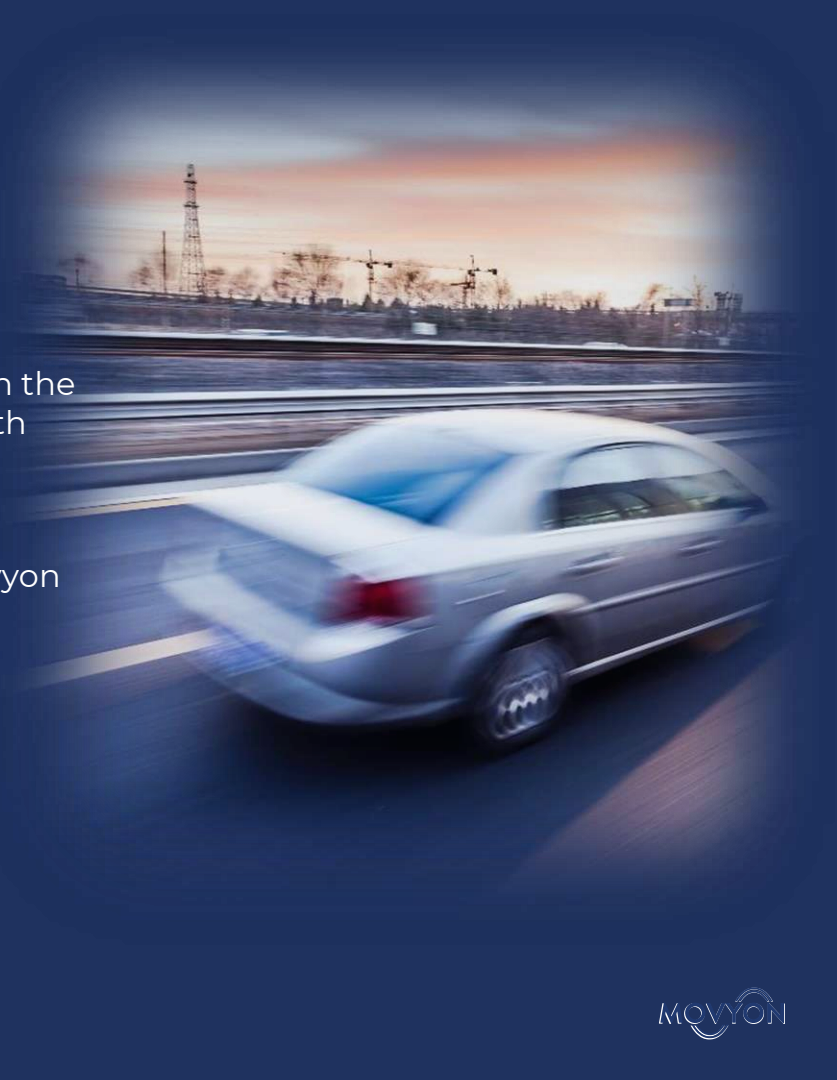
# Benefits

## For customers

## For concessionaries

**SAFER JOURNEYS**

Context-sensitive and certified **data made available where and when are actually needed** make journey safer.

**REPUTATION AND VISIBILITY**

Safer journeys improve reputation.

Vehicle infotainment might increase brand visibility for concessionaries and infrastructure managers.

**BETTER CUSTOMER EXPERIENCE**

Data available in the car enable new services, improve experience and the perception of customers of being cared.

**FUTURE-PROOF**

Conceive new business models to anticipate customer needs in smart mobility.

Ready for autonomous drive.

MOVYON

# New Services:
# Transportation of **dangerous goods** with the support of **C-ITS**

The current introduction and deployment of V2I and V2V communication, and thus C-ITS, may turn out to be the technology that will finally enable effective and efficient dangerous goods transportation management.

Our goal is to **define** and **test** use cases related to the **use of C-ITS services** to **manage** and **mitigate** the **risk** associated with the **transport of hazardous substances** by road (partnership with truck maker).



*August 2018 explosion. A1-A14 highway junction, Bologna.*

ITS-G5

Collection of statistical data on the type and quantity of substances transported

Knowledge of real time transits on a road infrastructure

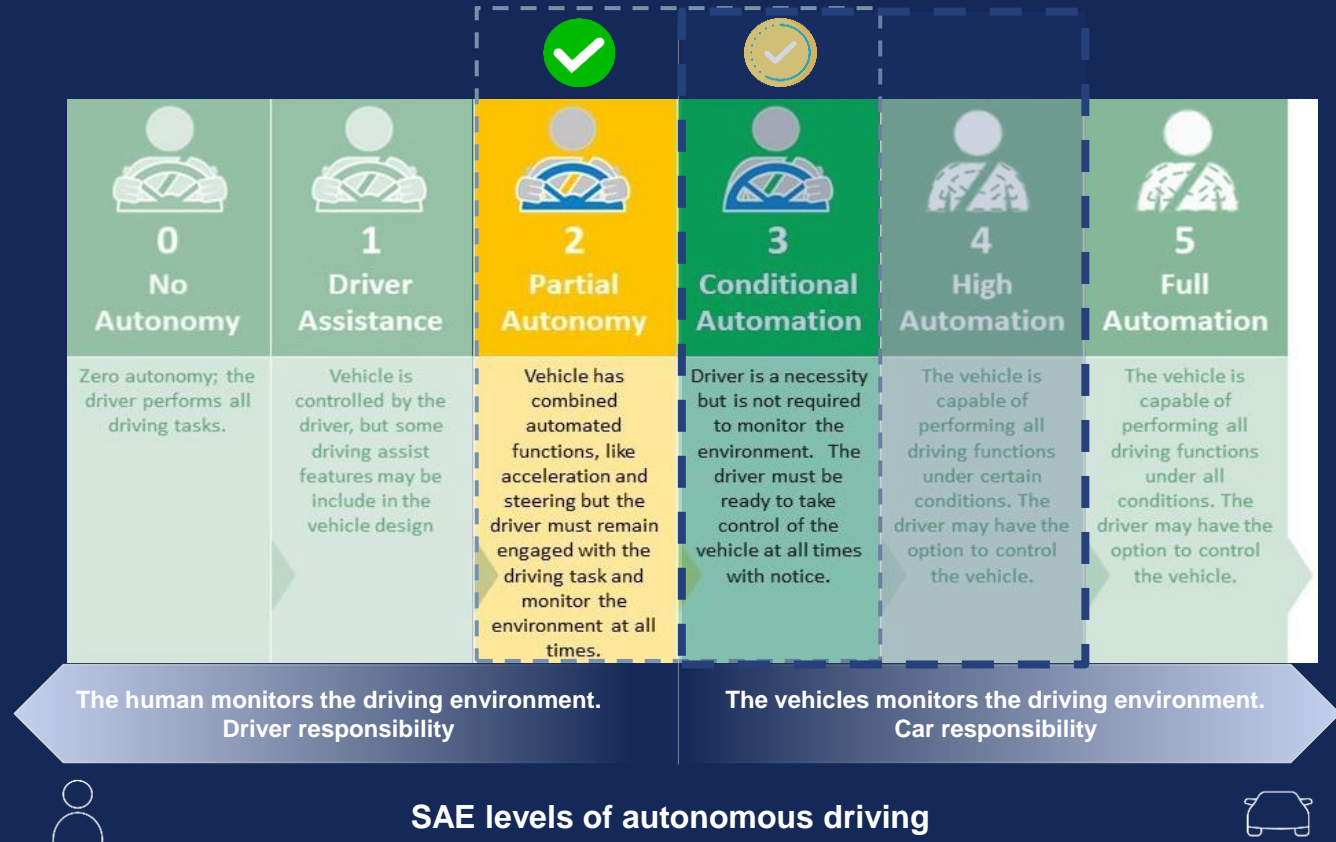Knowledge of which and how many substances are involved in a possible accident

**Preventive** Risk Management

**Protective** Risk Management

MOVYON

# New <u>Advanced</u> Services:
# C-ITS for assisted and autonomous driving

The research project promotes the active role of the road operator in enabling new advanced services to promote the development of autonomous driving (Lv. 3, 4 and 5 SAE), increasing the safety and efficiency of the network.



| 0 No Autonomy | 1 Driver Assistance | 2 Partial Autonomy | 3 Conditional Automation | 4 High Automation | 5 Full Automation |
|---|---|---|---|---|---|
| Zero autonomy; the driver performs all driving tasks. | Vehicle is controlled by the driver, but some driving assist features may be include in the vehicle design | Vehicle has combined automated functions, like acceleration and steering but the driver must remain engaged with the driving task and monitor the environment at all times. | Driver is a necessity but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice. | The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle. | The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle. |

The human monitors the driving environment.
Driver responsibility

The vehicles monitors the driving environment.
Car responsibility

**SAE levels of autonomous driving**

# **Precision positioning** and tracking to support **CCAM**: the role of road operator

Development of a **Proof of Concept** for **tracking** a moving **vehicle** through a **wireless road infrastructure equipped with C-V2X technology**, with the aim of demonstrating the potential of such systems and the **prospects for developing services based on precise positioning** (e.g., autonomous driving).

https://youtu.be/sJUhkPv_XNM