



Intelligent Road Asset Management Platform

# Safe intervention: V2X communications and road safety



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16.01.2025 | Madrid

**OLD ROADS,  
NEW TECHNOLOGIES**  
safe and intelligent road asset management

# What is V2X communication?

## Roads that talk to vehicles

Cooperative Intelligent Transport Systems (C-ITS), on which cooperative mobility is based, is enabled by V2X communication.



Sharing of information between road managers and the infrastructure



Coordination of actions to improve efficiency and safety on the roads



Paving the way to the deployment of autonomous mobility

## Two main channels of communication available

- ITS G5 / 802.11p:
  - “Wi-Fi” based
  - Short range
  - Low coverage
- 3G/4G/5G:
  - Mobile technology
  - Long range
  - High coverage

# C-ITS architecture: I2V communication

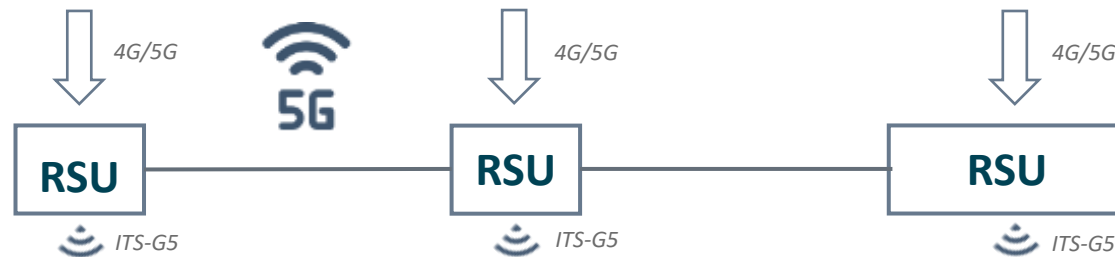
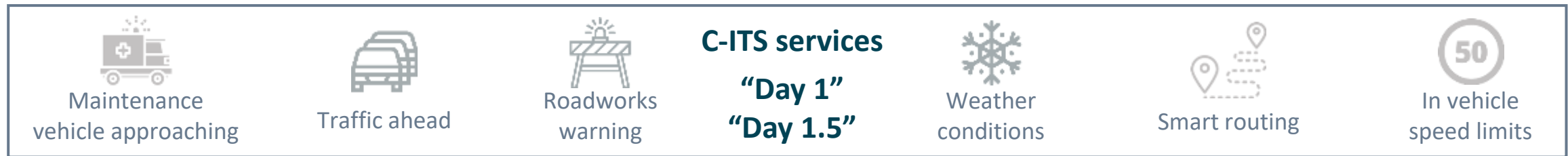
The C-ITS control centre consolidates data from diverse sources and formats into a unified system

**Control Centre (C-ITS)**

## Sources of information

Traffic data	Weather information	General information
Maintenances services	Road works	Traffic emergencies

↓ DATEX II, ECO-AT, BSM, CAM, CPM data formats



Vehicles receive real-time updates on traffic conditions, roadworks, optimal routes, and more via their On-Board Unit (OBU), using C-ITS messages transmitted by the Road-Side Unit (RSU)

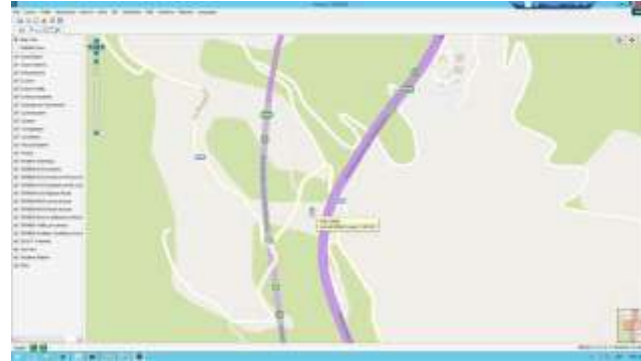


# Road Deployment: V2X equipment

Road Side Unit (RSU)



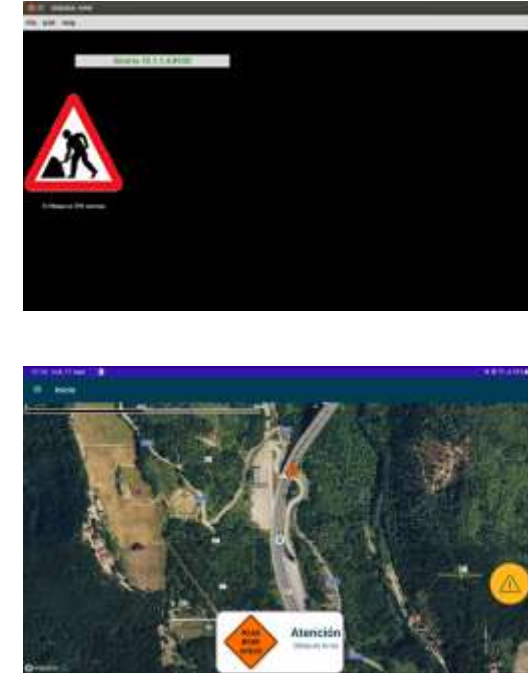
Control Centre (C-ITS)



Travel App (Smartphone)



Visualization App (Tablet)



Connected Vehicle and On-Board Unit (OBU)



# Tests in the A-2 Highway in Guadalajara

## Location

A-2 Highway in Guadalajara  
(40°40'31.1"N 3°06'00.2"W)



## Test development

Tests on the A-2 Highway validated RSU integration with Indra's mobility platform to simulate roadworks warnings. Ten trips confirmed real-time notifications on a tablet and smartphone, showcasing seamless data transmission and effective event alerts

- 1 RSU installed
- 1 connected vehicle
- Deployment of simulated Roadworks warning C-ITS message
- Reception of message in Smartphone App and Tablet App

## Visualisation



## Partners



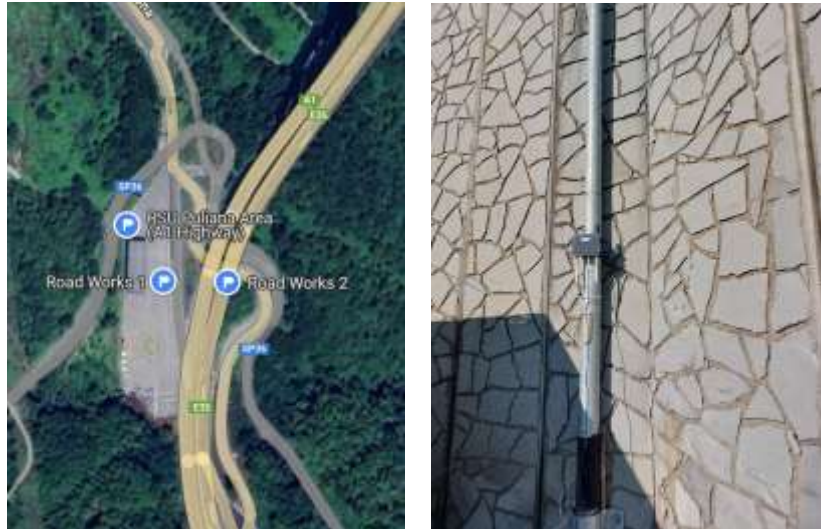
# Tests in the A-2 Highway in Guadalajara



# Tests in the A-1 Highway in Florence

## Location

A-1 Highway between Florence and Bologna  
(44°01'32.4"N 11°13'17.3"E)

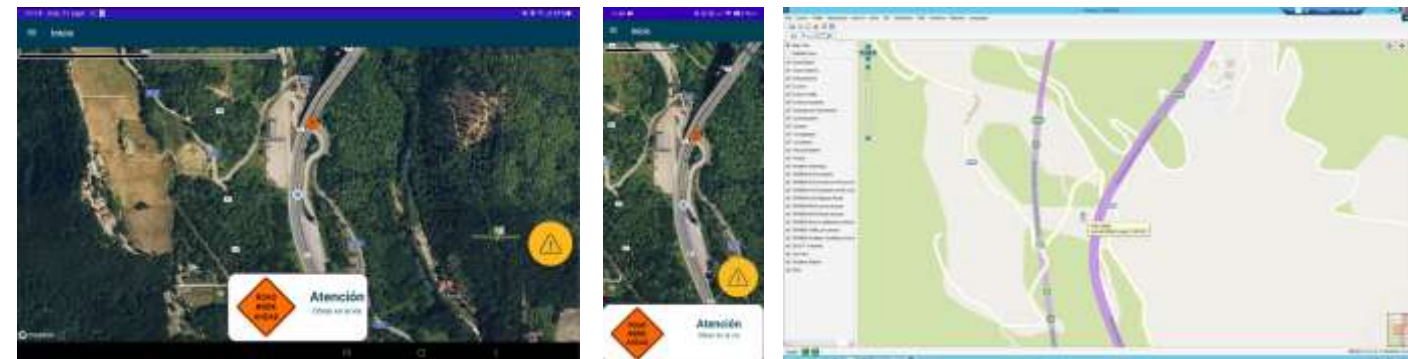


## Test development

Two scenarios were implemented: one in the **controlled Puliana Area** to test C-ITS Roadworks Warning messages and system connectivity, and another on **the A-1 highway under open traffic** to validate real-world performance:

- 1 RSU installed
- 1 connected vehicle
- Set of tests to deploy **Roadworks warning C-ITS message**
- Reception of message in **tablet and Smartphone App**

## Visualisation



## Partners



# Tests in the A-1 Highway in Florence





# Results and conclusions



## Enhanced Detection Distance

Detection range increased by V2X technology, enabling vehicles to detect events over 2 minutes earlier at 500m range



## Reduced Traffic Disturbance

Early alerts improve speed adaptation, enhancing safety, reducing emissions, and cutting fuel consumption



## Expanded Real-Time Data

V2X integration adds maintenance and weather data, boosting available sources by 15% within the C-ITS platform

**V2X enhances safety during maintenance** by providing real-time updates, enabling seamless communication among stakeholders, and offering scalable solutions based on connected vehicle adoption



Intelligent Road Asset Management Platform

# Thank you



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