International Conference on Road Safety

A commitment to the present and a challenge for the future

C-ROADS PORTUGAL - COOPERATIVE SYSTEMS LINKING CITIZENS TO ROADS TOWARDS ZERO ROAD SAFETY FATALITIES

Ricardo Tiago – Institute for Mobility and Transports (IMT)

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WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE

IMT INSTITUTO DA MOBILIDADE E DOS TRANSPORTES, I.P.

C-ROADS

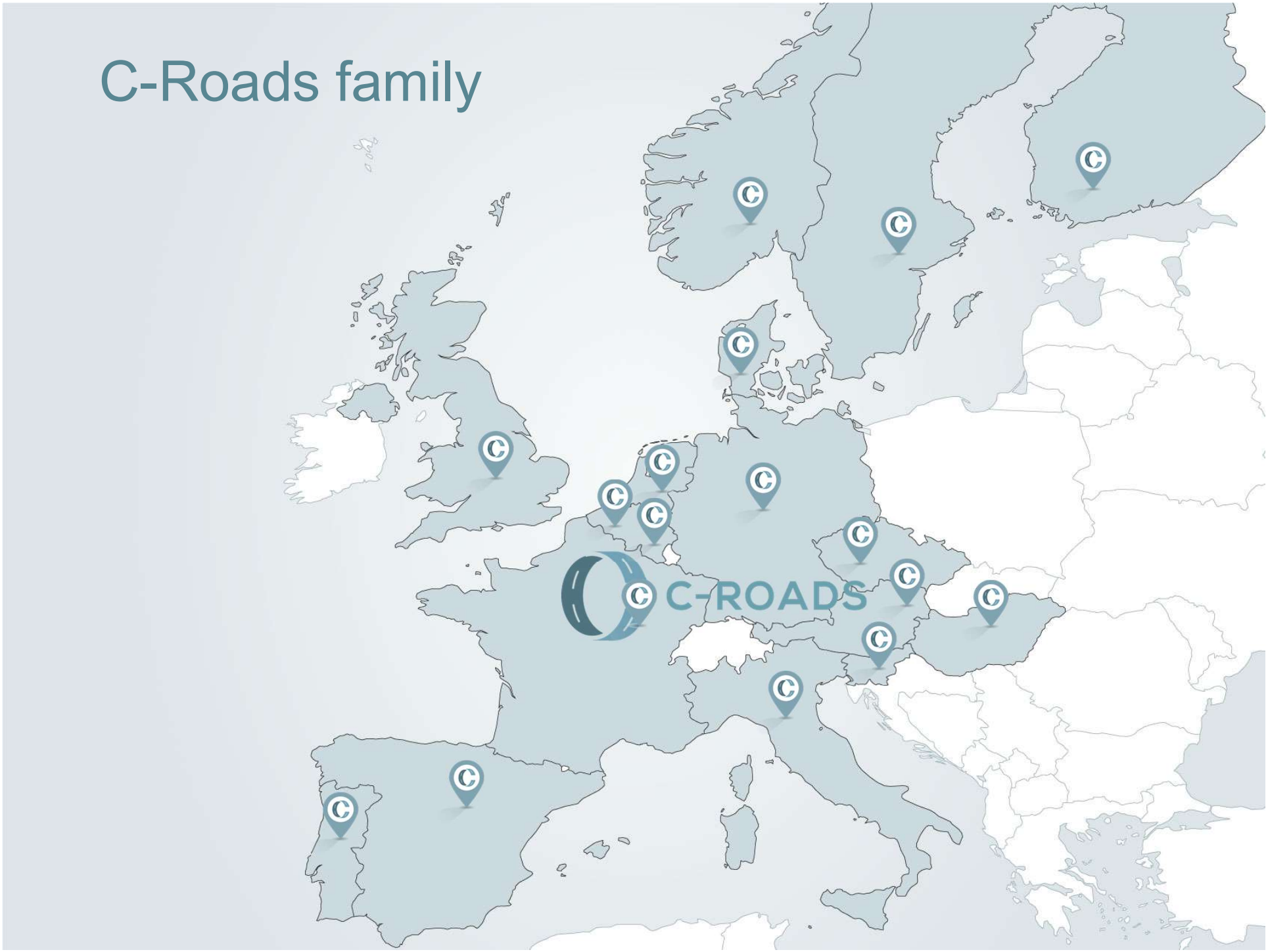
Topics

- C-ROADS Platform
- C-ROADS Portugal
- New and Connected World
- CCAM
- Conclusions

The aim of the C-Roads Platform

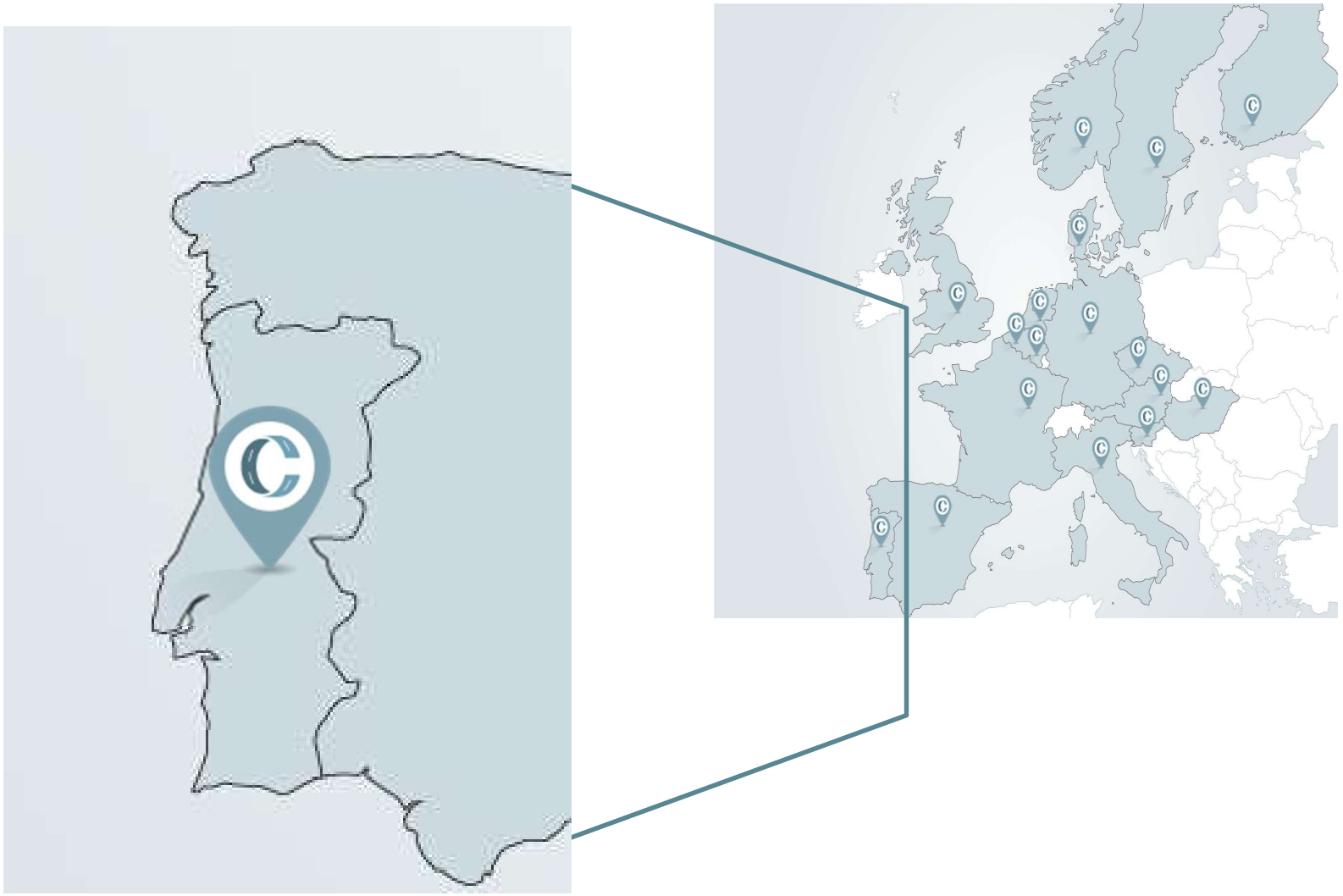
- Test and implement C-ITS services, linking all C-ITS deployments across MS;
- Develop, share and publish common technical specifications (including the common communication profiles);
- Planning intensive cross-testing to verify harmonisation and interoperability;
- Develop system tests based on the common communication profiles by focusing on hybrid communications, which is a combination of ETSI ITS-G5 and operational cellular networks.

C-Roads family



C-Roads family

C-Roads Portugal



Main Description and Objectives

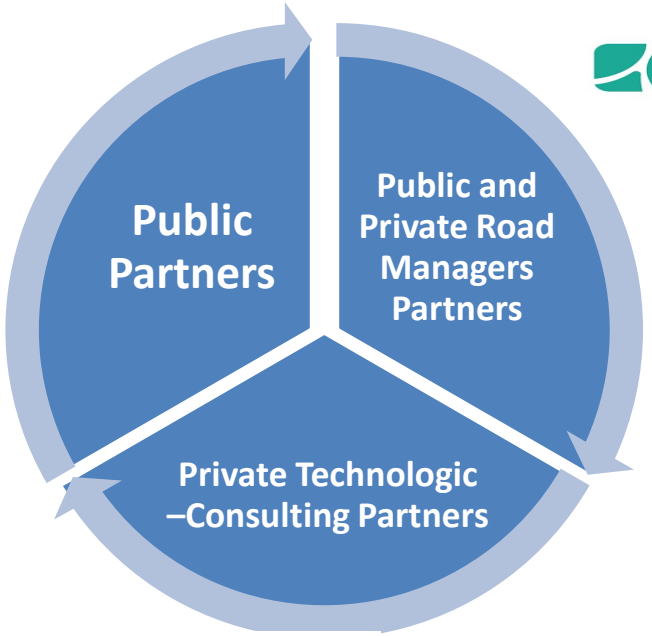
- C-Roads Portugal consists in the deployment of **5 C-ITS macro pilot cases**, in the Atlantic Corridor in Portugal, covering relevant sections of the core and comprehensive network and of its two urban nodes;

- Combined with the testbed pilot cases, the project will also develop the feasibility study for the National large scale deployment of C-ITS services, notably its long term viability, cost-efficiency, governance and business models;

- Framed by the overall approach of the C-Roads Platform.

Partners

- 31 implementing bodies >> large effort of cooperation and collaboration at national level



Partners

- 31 implementing bodies >> large effort of cooperation and collaboration at national level

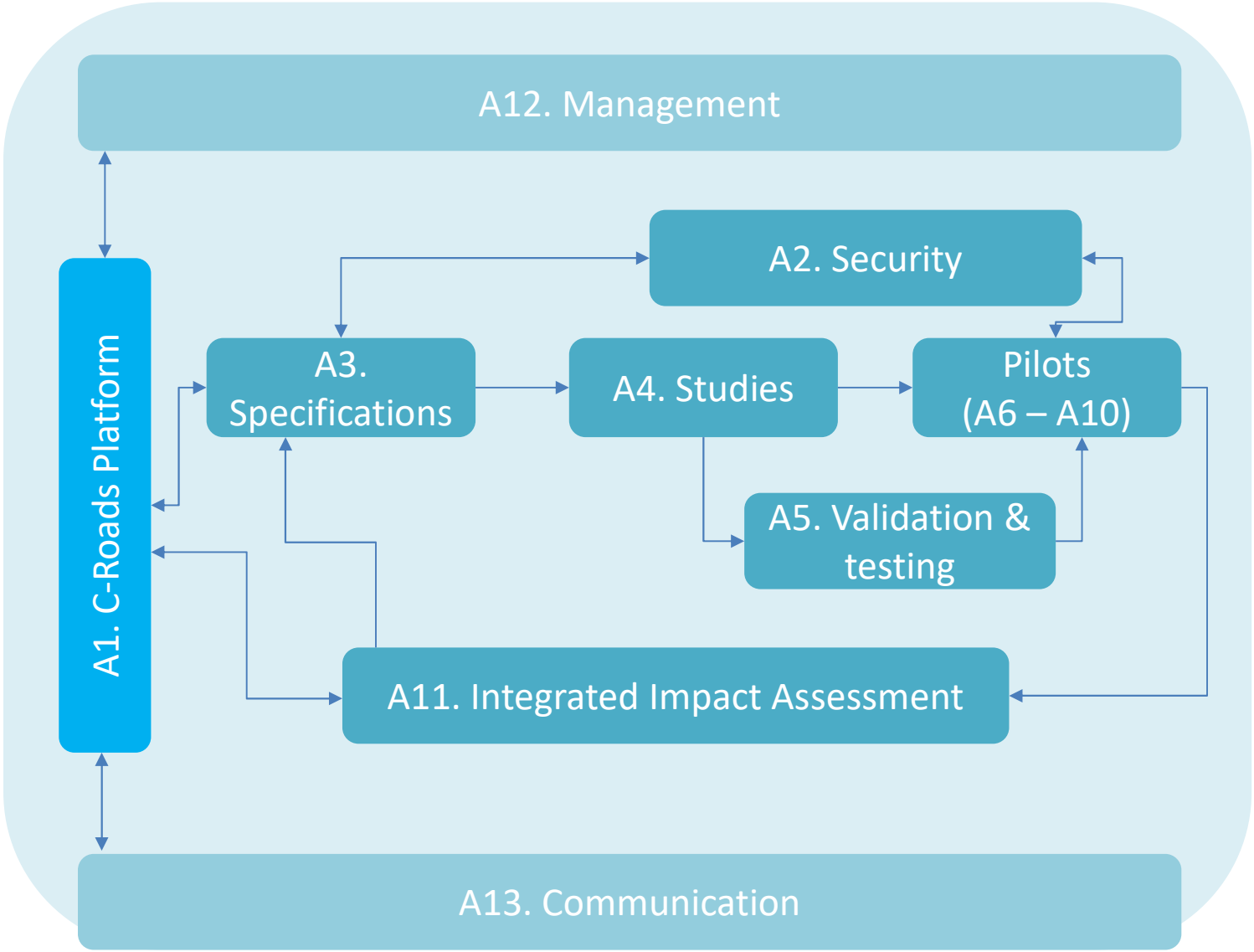
- IMT, CM LISBOA, CM PORTO, EMEL, STCP
- IP, BRISA, ASCENDI (5), AE NORTE LITORAL, AE ALGARVE, LUSOPONTE, BRISAL, AEDL, AE ATLÂNTICO, SCUTVIAS E NORSCUT
- IP TELECOM, A-TO-BE, GMV, ARMIS, SIEMENS, DMS
- FEUP
- CAETANOBUS, VIAVERDE SERVIÇOS, VIALIVRE
- TIS

Day 1 Services

Day 1,5 Services

Day 1.5 C-ITS services list
☐ Information on fuelling & charging stations for alternative fuel vehicles;
☐ Vulnerable road user protection;
☐ On street parking management & information;
☐ Off street parking information;
☐ Park & ride information;
☐ Connected & cooperative navigation into and out of the city (first and last mile, parking, route advice, coordinated traffic lights);
☐ Traffic information & smart routing.

Integrated approach



5 macro pilots = 15 pilot activities

Road infrastructure preparation

Connecting urban nodes

Backbone data sharing

Activity 7 Pilot 2
"Portuguese network for C-ITS"

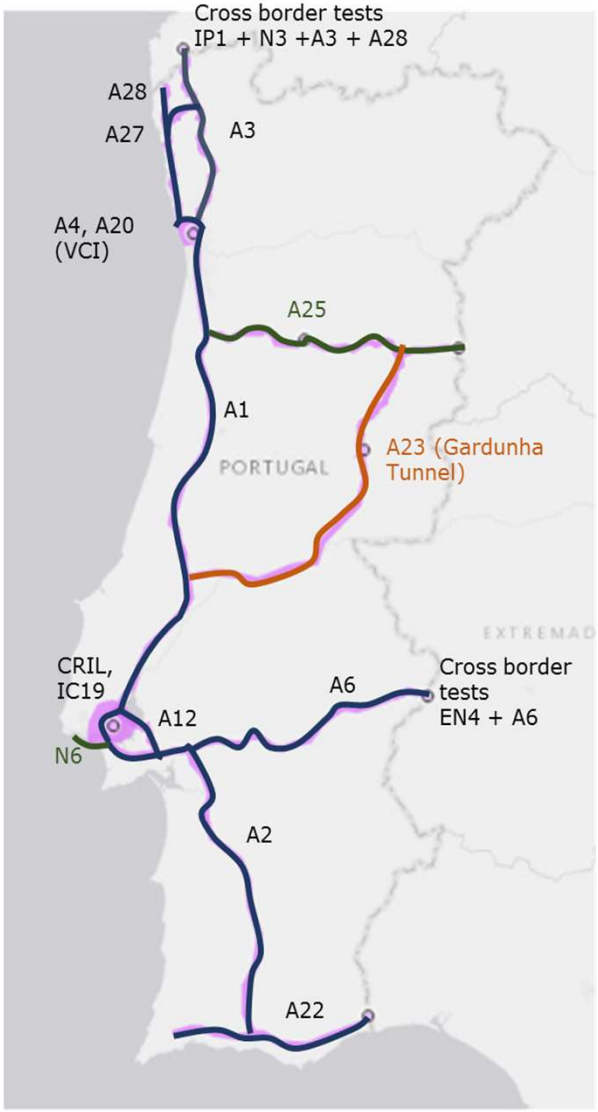
Activity 8 Pilot 3
"Network preparation for CAD vehicles"

Activity 9 Pilot 4
"Lisbon urban node"

Activity 10 Pilot 5
"Porto Urban node"

Activity 6 Pilot 1
"Single Access Point -SPA" and SPApp usage app for SPA Services"

PT network for C-ITS



Pilot case: Portuguese network for C-ITS

Demonstration of C-ITS services in core and comprehensive network (including entrances in urban nodes)

- A1 – 30 km
- A2 – 30 km
- A3 – 40 km
- A4 – 30 km
- A20 - VCI (Porto node circular) – 11 km
- CRIL (Lisboa node circular) – 19 km
- IC19 (Lisboa node circular) – 17 km
- A6 – 20 km
- A12 – 20 km
- A22 – 90 km
- A27 –24,7 km
- A28 – 88,6 km

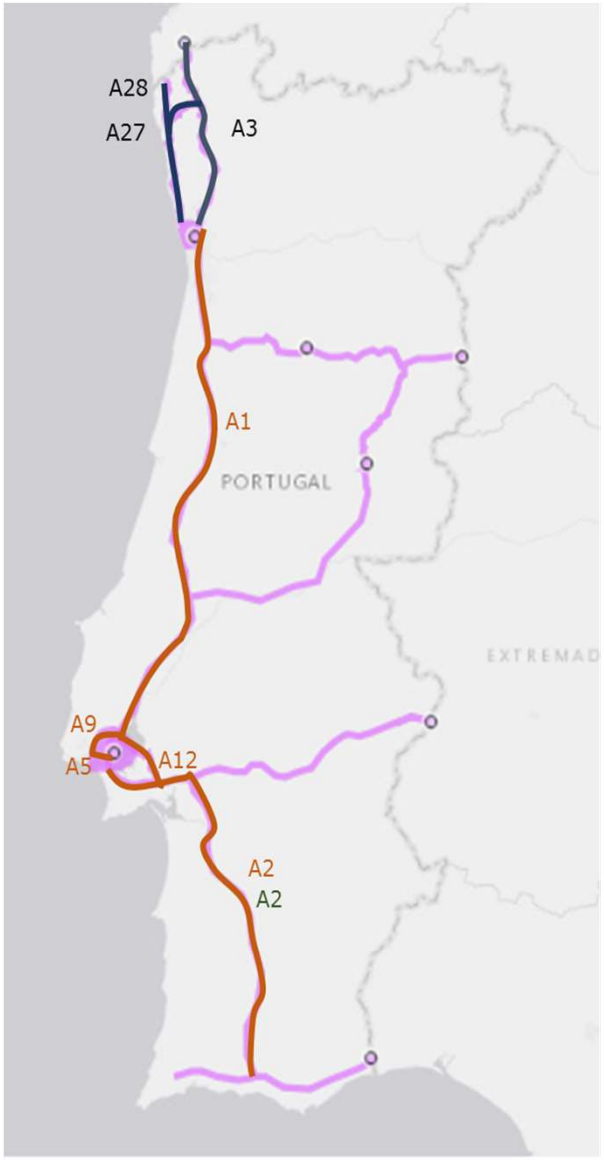
In-vehicle app to connect C-ITS server in TEN-T network and urban nodes connections

- A25 – 8 km (Viseu)
- N6 (Lisboa entrance) – 20 km

Development of C-ITS services in tunnels

- A23 – 20 km Gardunha Tunnel

Network preparation for CAD



Pilot case: Network Preparation for Connected and Autonomous Vehicles

Connected and autonomous vehicles in open roads

- A3 – 40 km
- A27 –24,7 km
- A28 – 88,6 km

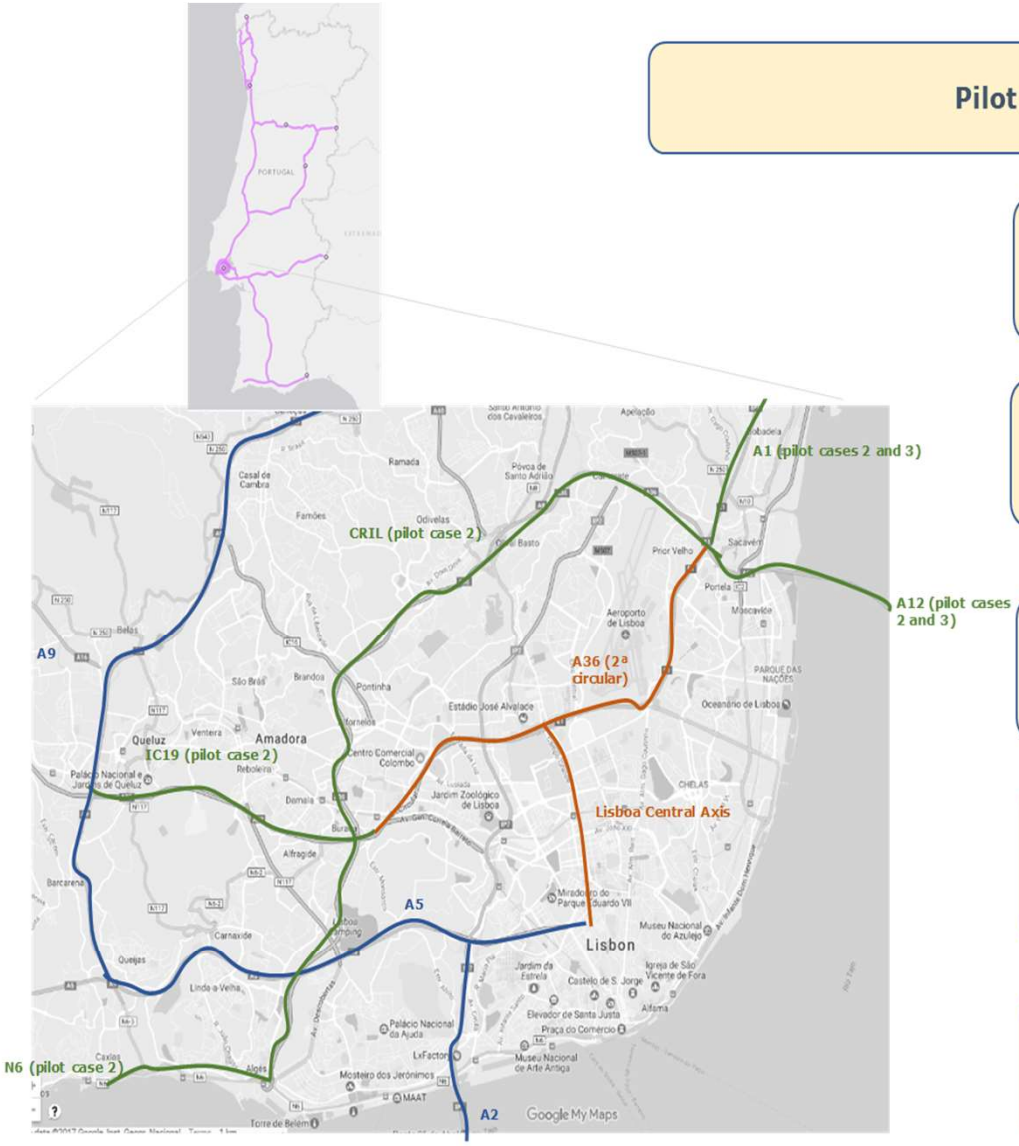
A2 the Holiday motorway

- A2 – 240 km

Connected vehicles for advanced services

- A1 – 66 km
- A2 – 54 km
- A5 (urban access) – 25 km
- A9 (urban access) – 35 km
- A12 – 24 km

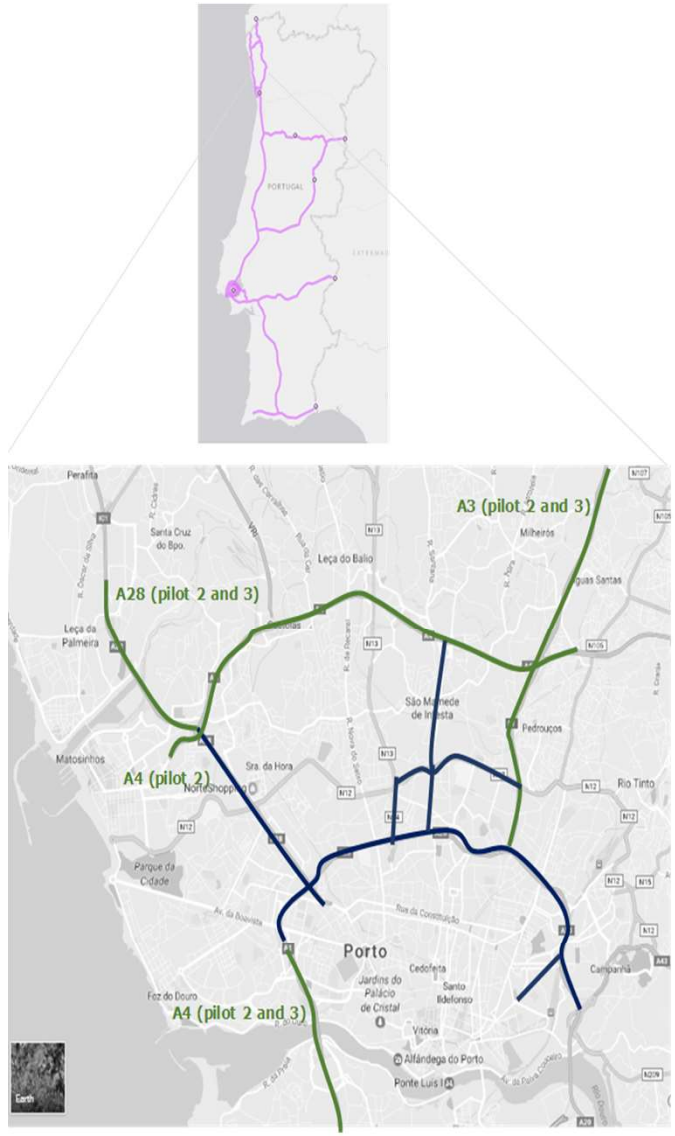
Lisbon urban node



Pilot case: C-ITS Pilot in the Lisbon Urban Node

Traffic service level monitoring and travel time prediction in Lisboa node	• A36 (2ª circular) – 10,5 km
Parking availability system in Lisboa node	• Lisboa central axis (Entrecampos – Marquês) – 2,7 km
In-vehicle app to connect C-ITS server in Lisboa node	• A36 (2ª circular) – 9,8 km
Signal corridors and bus corridors prioritization in Lisboa node	• Lisboa central axis (Campo Grande – Marquês) – 4,1 km
Mobility Hub in Lisboa node	• A2 (urban access) - 40 km • A5 (urban access) – 15 km • A9 (urban access) – 35 km

Porto urban node



C-ITS Pilot in the Porto Urban Node

Traffic service level monitoring in real time and 2-hour travel time prediction in the Porto node

- 5,9 km (central area)
- A28 – 6 km
- A20 – 17 km
- N14 – 5,2 km

V2I and I2V integration of the CaetanoBUS vehicle with the infrastructure in Porto node

- 1,4 km (central area)

Demonstration of C-ITS services in Porto node (see pilot 2)

- A4 – 30 km
- A20 – VCI – 11 km

(Pilot activity A.3.2)

SPA: Backbone Data Sharing

Pilot case : SPA and SPApp usage app for SPA Services

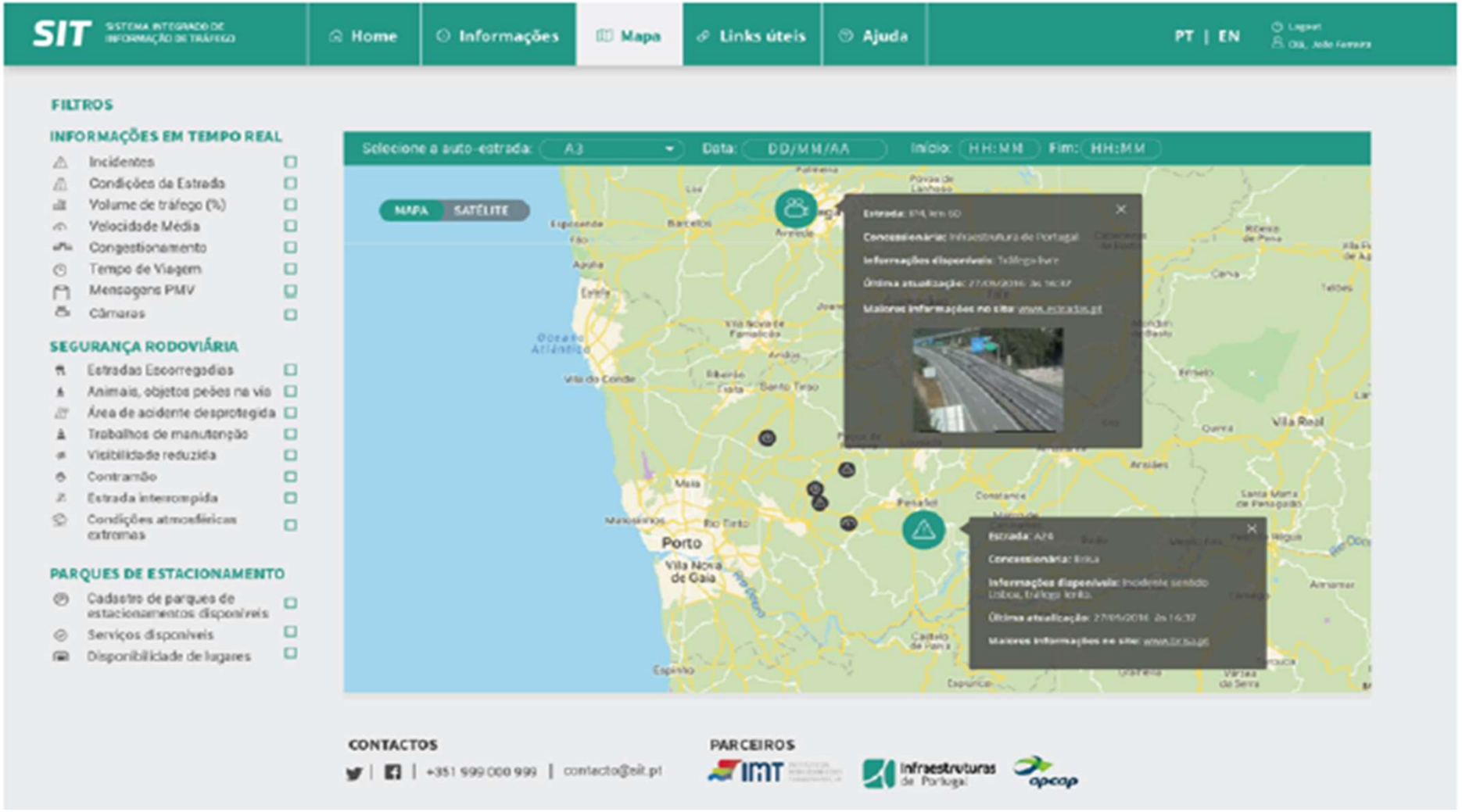
Backbone data sharing prototype

To identify the technical and effort requirements to establish the NAP, both in terms of hardware and software, specifically requirements identification and analysis, the system modelling including the data interfaces according to the DATEXII model, the normalization of the data frames sent by each road operator and the "discovery/search and browse" functionality. We also aim at developing a prototype to validate the approach and analyse the different required functionalities

SPApp usage app

Test the potentialities of a mapping system that aims to demonstrate de use case scenarios based in Google's Maps, helping uses to connect then self's to the connected roads understand their surroundings and path. The system will compile transportation data from the nodes provided by the SPA prototype to be used by a consumer-facing app, serving as a travel companion beyond the driver and the infrastructure. The app will offer real-time traffic updates, display upcoming road hazards, provide the locations of events.

The vision is to implement an **Integrated Traffic Information System ,** and create the **Portuguese Data Sharing Backbone**, paving the way for the implementation of the **Portuguese Single Point of Access** for the Delegated Acts.



Some deployment figures

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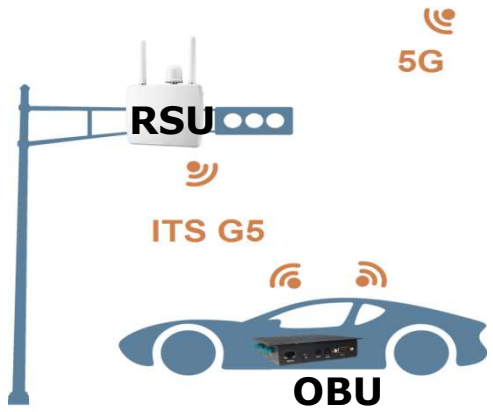
Day 1 services → **Day 1,5 services**

Core network / Comprehensive network / cross-border sections / access to urban nodes

204 RSU's
141 OBU's
140 Vehicles

~ 957 km

Hybrid communication (ITS G5 + Cellular)

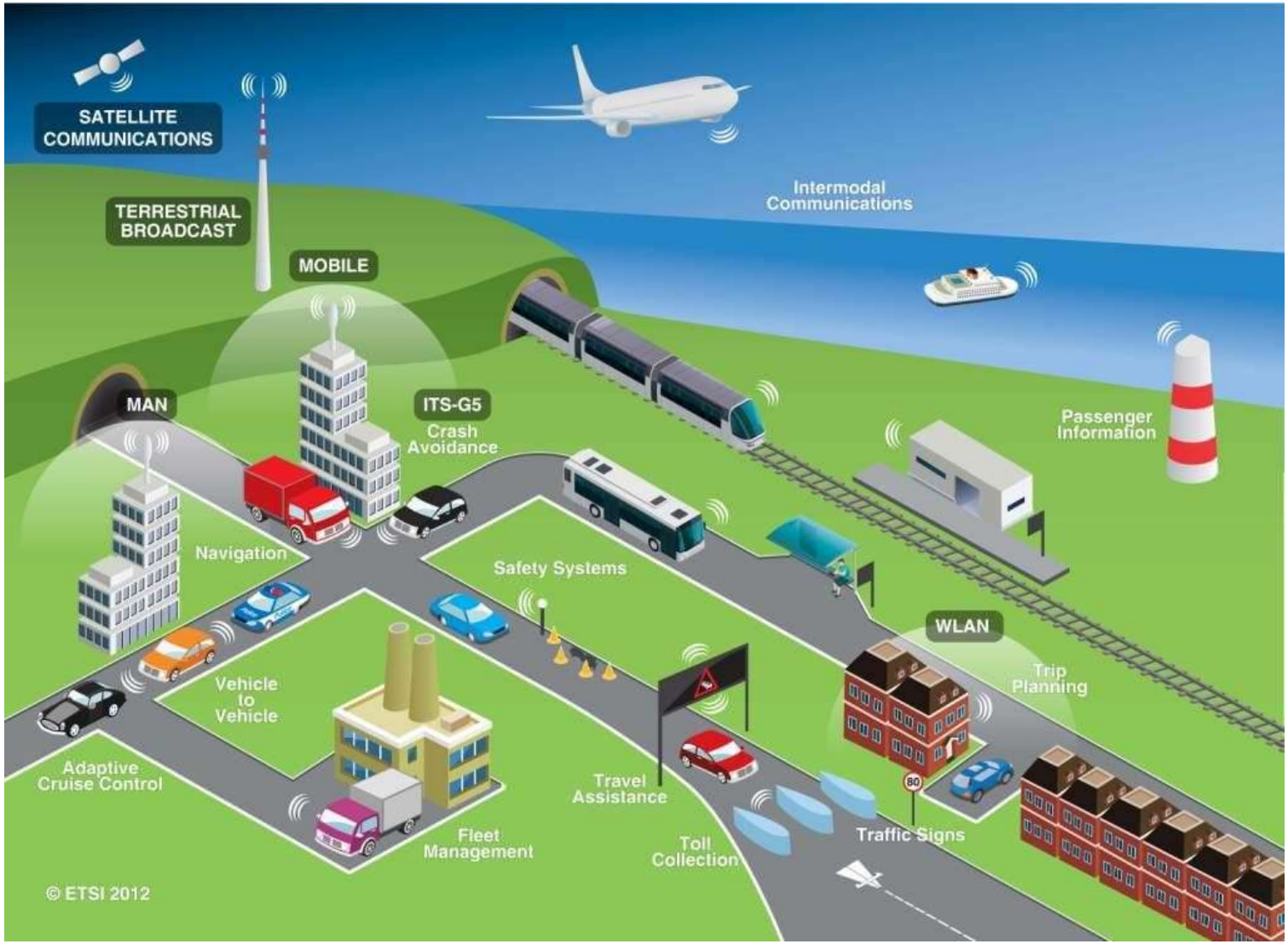


Urban nodes
Suburban commuting áreas

O/D matrix
In vehicle app
GLOSA
Mobility hub
Traffic prediction 2 hours
Smart Parking
Intelligent bus

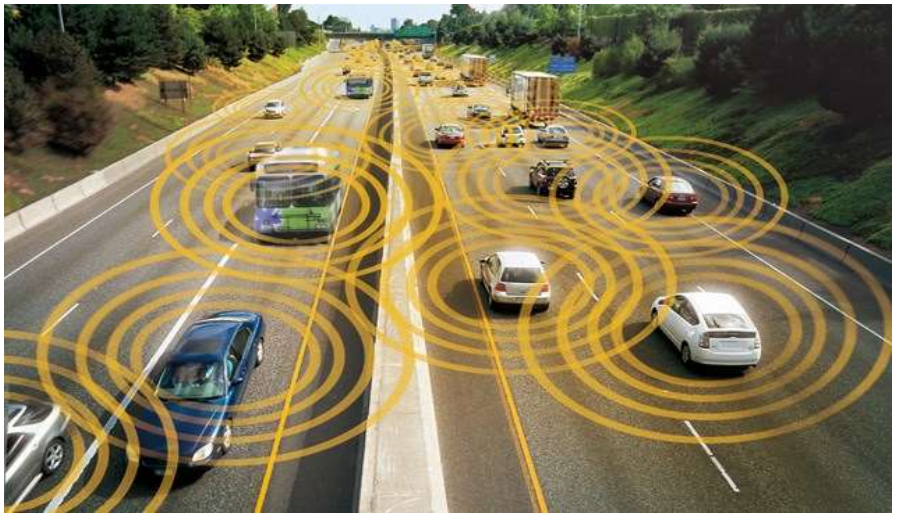
~116 km

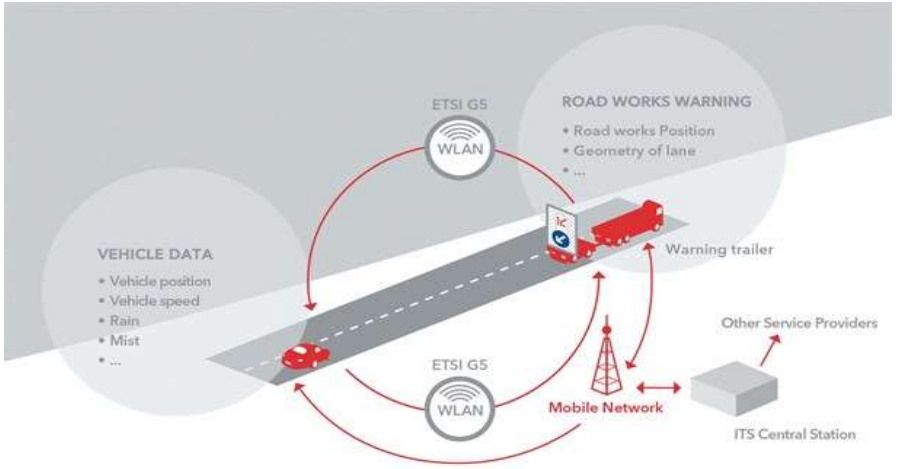
New and Connected World



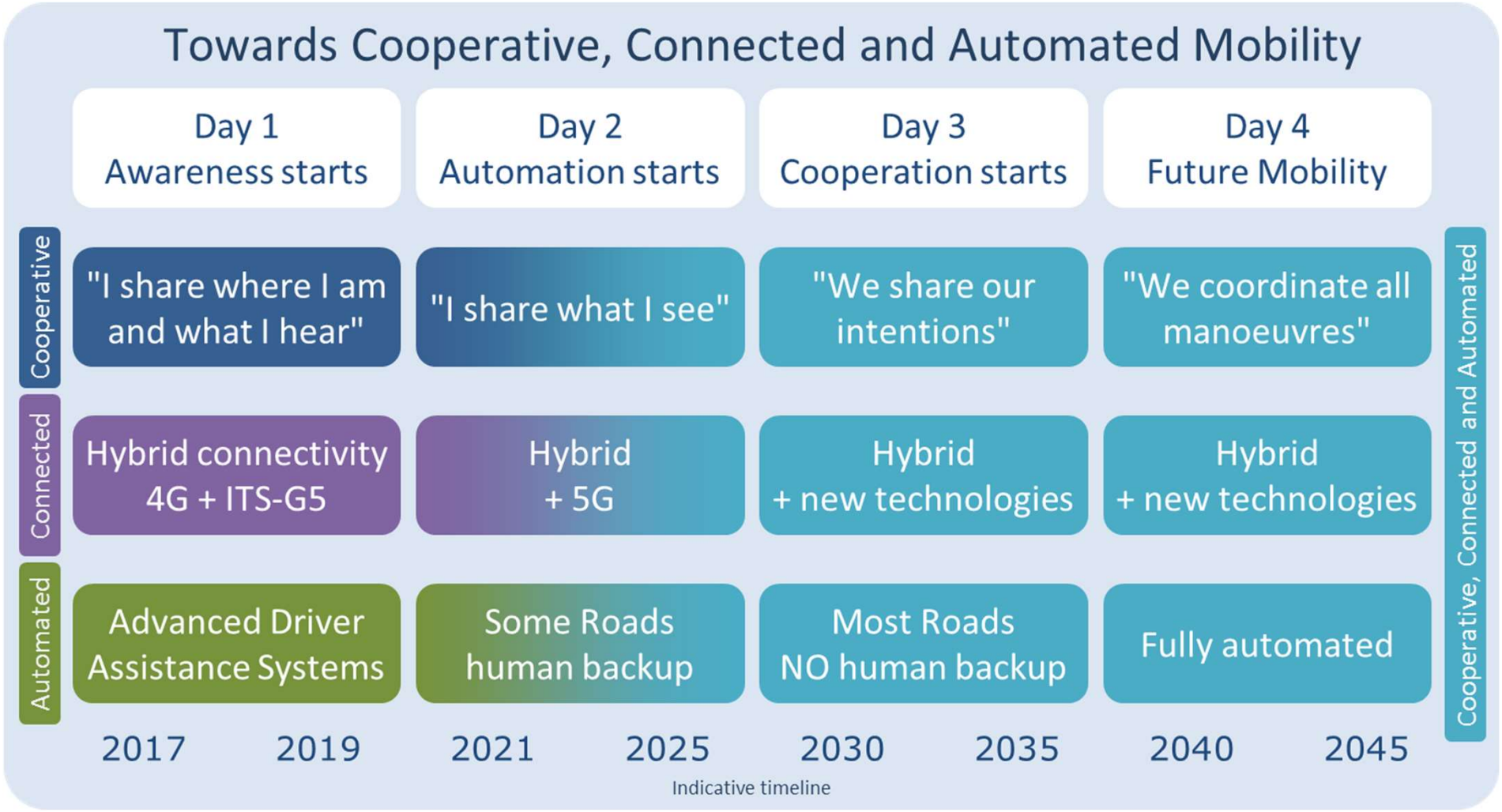
New and Connected World

C-ROADS





CCAM – future Day X services



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Visions

- Achieve Nacional (european) implementation on the future C-ITS and CCAM services, particularly on Road Safety;
- Connect everything, everyone, everywhere.

Challenges

- We need to think different;
- We need to Cooperate more;
- Step up from patchwork to a network of connectivity;
- Scale up from pilots to global deployment.

Commitment to the present and a challenge for the future

- Let's use C-Roads to pave the ground for the next generation of intelligent and safer roads
- Let's use ITS as the game changer
- Let's re-think Mobility

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THANK YOU

- Ricardo Tiago
- Direção de Serviços de Gestão e Contratos de Concessão
- rtiago@imt-ip.pt

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