



C-ROADS PORTUGAL

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Main 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 and governance and business models.
- ⌚ Framed by the overall approach of the C-Roads Platform

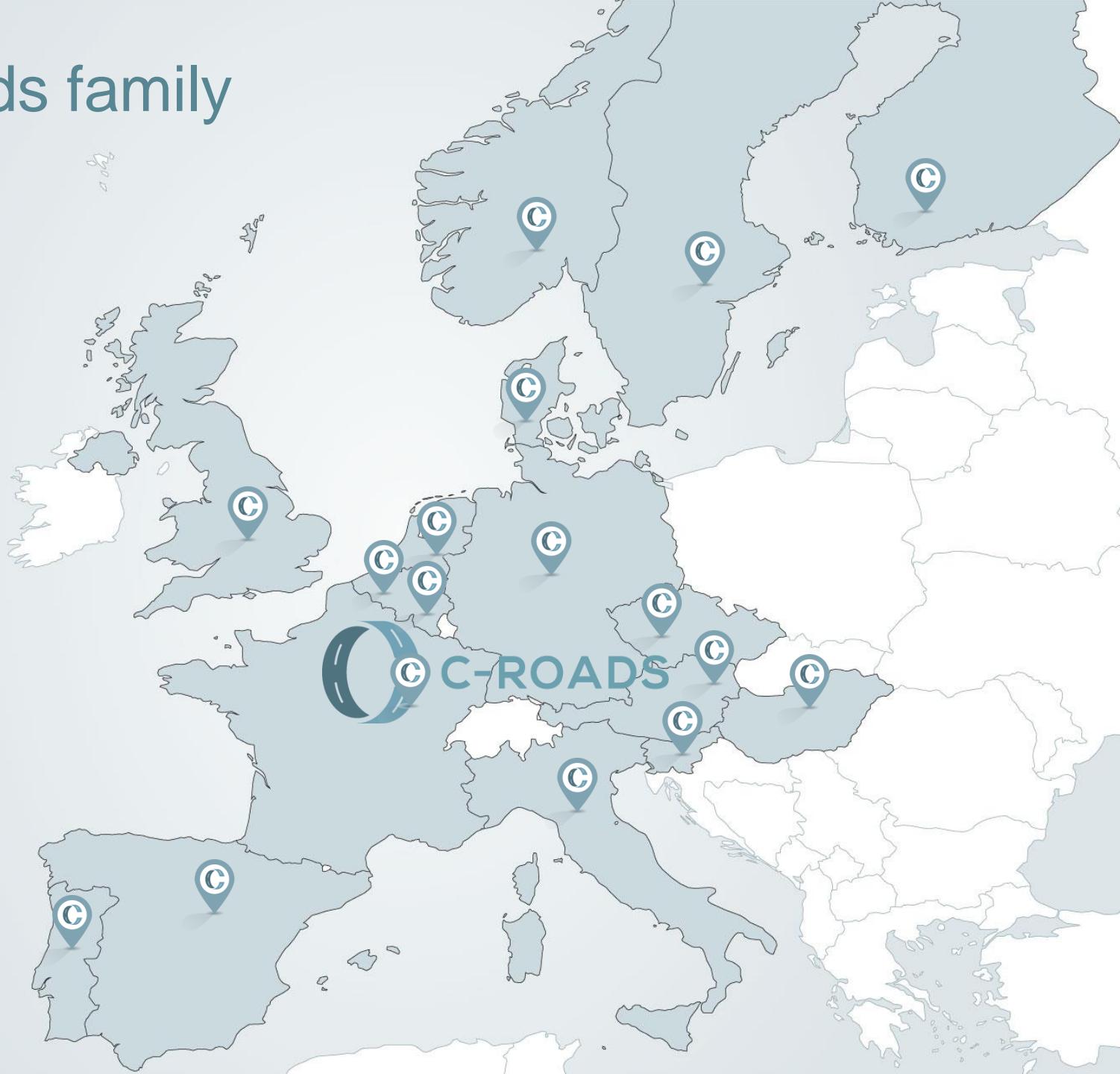
The aim of the C-Roads Platform



- ⌚ linking all C-ITS deployments
- ⌚ develop, share and publish common technical specifications (including the common communication profiles),
- ⌚ planning intensive cross-testing to verify interoperability
- ⌚ develop system tests based on the common communication profiles by focusing on hybrid communication mix, which is a combination of ETSI ITS-G5 and operational cellular networks.

➔ And by doing so C-Roads will pave the ground for making Cooperative, Connected and Automated Driving reality

C-Roads family



Day 1 Services



Close cooperation with C2C CC



**CAR 2 CAR
COMMUNICATION CONSORTIUM**

C-ROADS

Administration of the Memorandum of Understanding

5. This MoU shall last until the end 2020. It may be renewed upon mutual written consent of both parties when new Rules of Procedure are adopted in either party, or when particular procedures are adopted at world-wide level. It may also be amended upon mutual written consent of both parties in the light of experience and technical developments.

Notwithstanding the foregoing, this MoU may be terminated by either party upon 90 day's written notice to the other. Upon any termination or expiration of this MoU, all the rights granted pursuant to this MoU shall cease immediately and the parties shall cease from distributing any information received pursuant to this MoU. Notwithstanding anything in this MoU or otherwise to the contrary, the provisions of this MoU related to ownership of rights shall survive any termination or expiration of this MoU.

Any difficulties arising shall be agreed wherever possible at the working level between the relevant Group Chairmen. Matters which cannot be resolved at working level shall be subject to discussion between the two organisations at the level of the General Manager of the CAR 2 CAR Communication Consortium and the C-Roads Platform chairperson of the Steering Committee.

The MoU shall not be deemed or construed to be modified, amended or waived, in whole or in part, except by written agreement of both parties. Neither party may assign this MoU or any of its rights, obligations or duties hereunder, without the prior written consent of the other party.

The relationship between the CAR 2 CAR Communication Consortium and the C-Roads Platform shall be that of independent signatories, and nothing in this MoU shall be construed to constitute either party as an employee, agent or member of the other party. Without limiting the foregoing, neither party shall have authority to act for or to bind the other party in any way, to make representations or warranties or to execute agreements on behalf of the other party, or to represent that it is in any way responsible for the acts or omissions of the other party.

6. The practical contacts and decisions for the application of this MoU will be taken by the General Manager of the CAR 2 CAR Communication Consortium and the Chairperson of the C-Roads Platform Steering Committee.

Dated: 20/07/17


Niels Peter Skov Andersen
General Manager
CAR 2 CAR Communication Consortium

Dated: 20/07/17

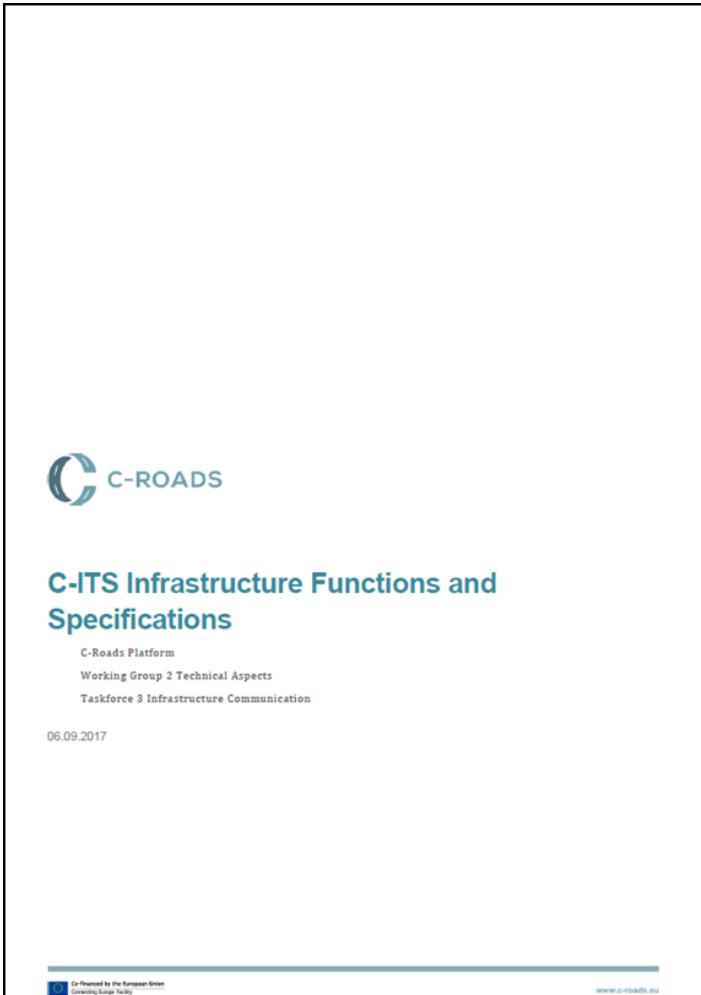

Karl-Oskar Proskawetz
Administrator
CAR 2 CAR Communication Consortium


Eric Ollinger
Chairperson
Signed on behalf of the C-Roads Platform


Martin Böhm
General Secretary
Signed on behalf of the C-Roads Platform

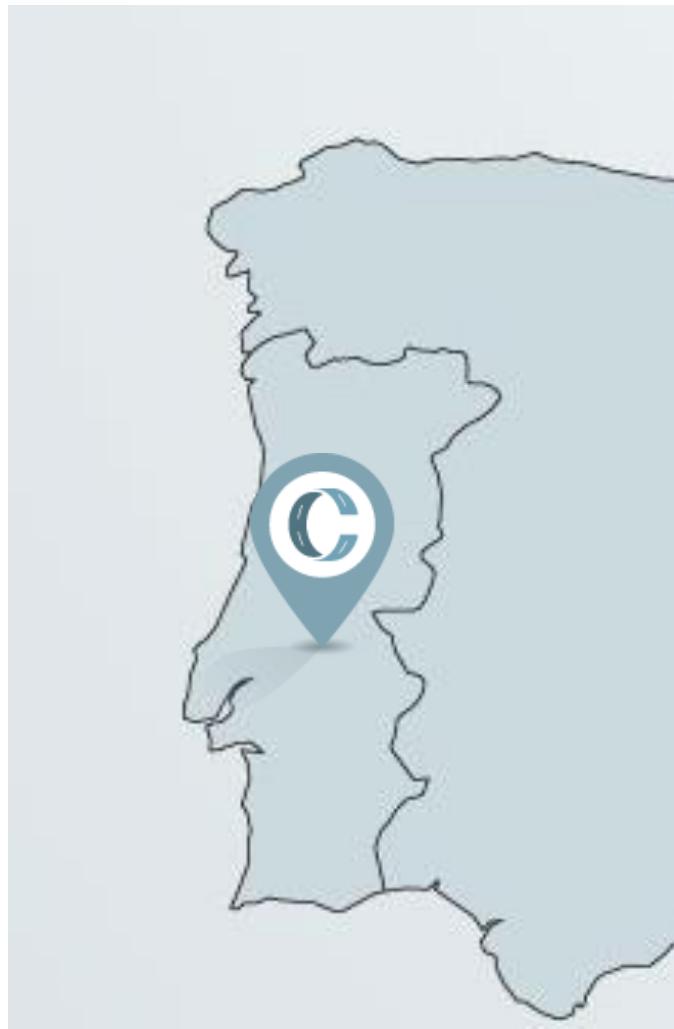
MoU between C2C-CC and C-Roads Platform 3 June 2017

Publication of the Communication Profile for ITS-G5



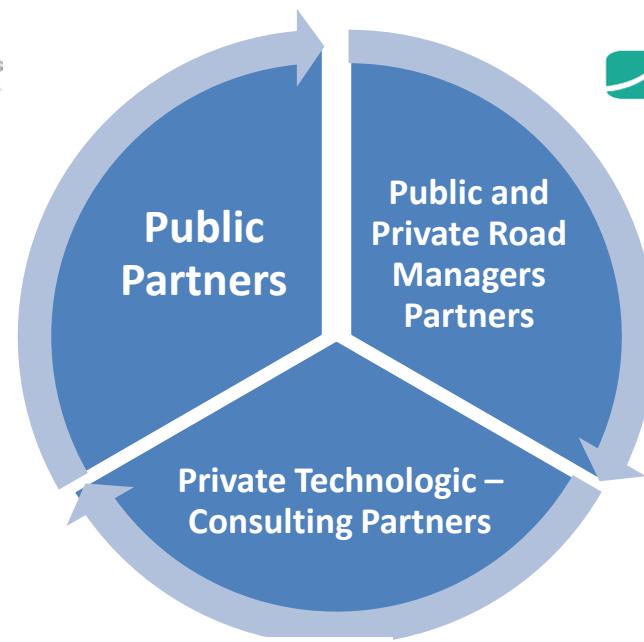
- Published on 14th of September
 - Covering
 - RWW – Road Works Warning
 - IVS – In Vehicle Signage
 - OHLN – Other Hazardous Location Notifications
 - GLOSA – Green Light Optimal Speed Advisory
 - Available via www.c-roads.eu

C-Roads Portugal



Partners

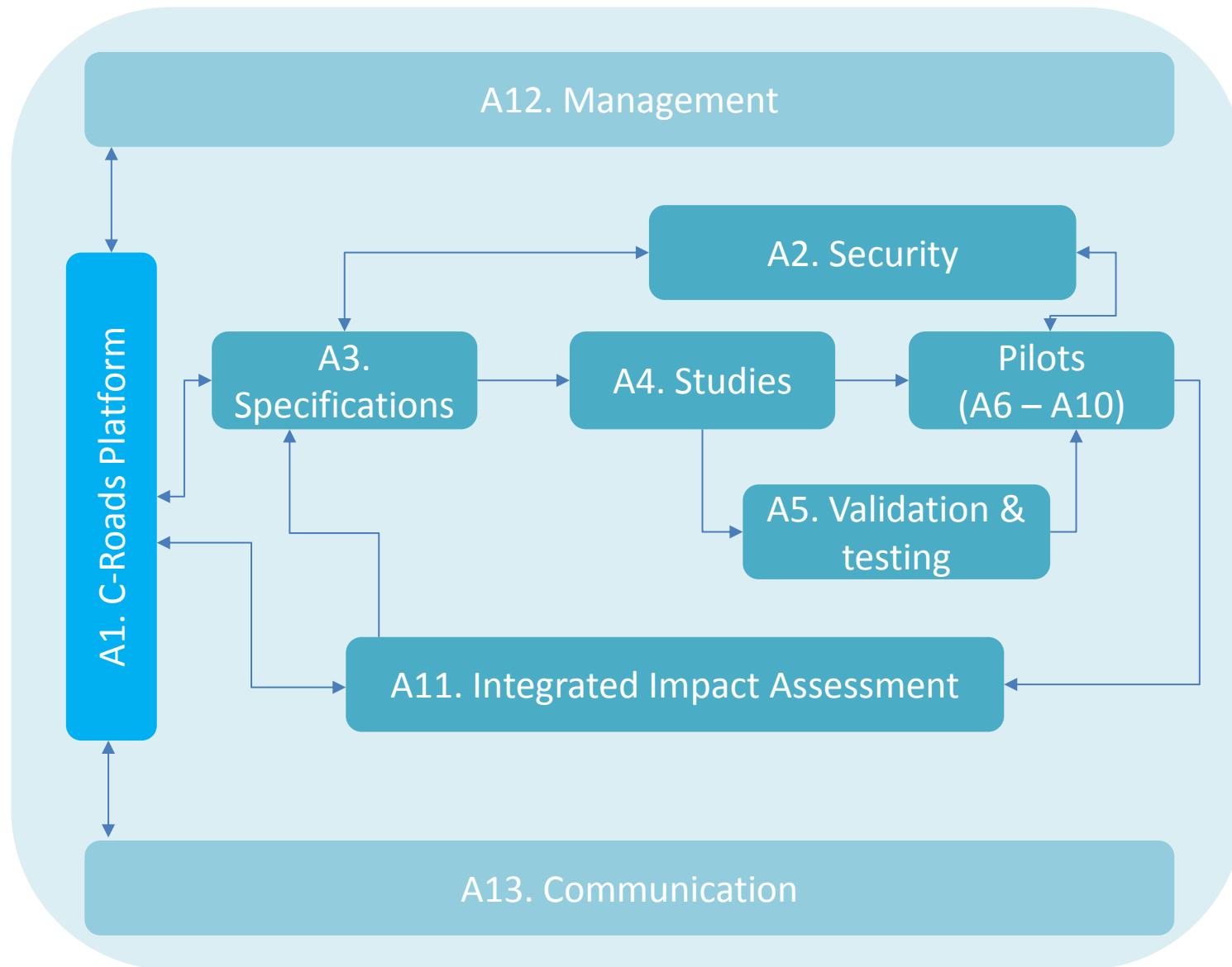
31 implementing bodies >> large effort of cooperation and collaboration at national level



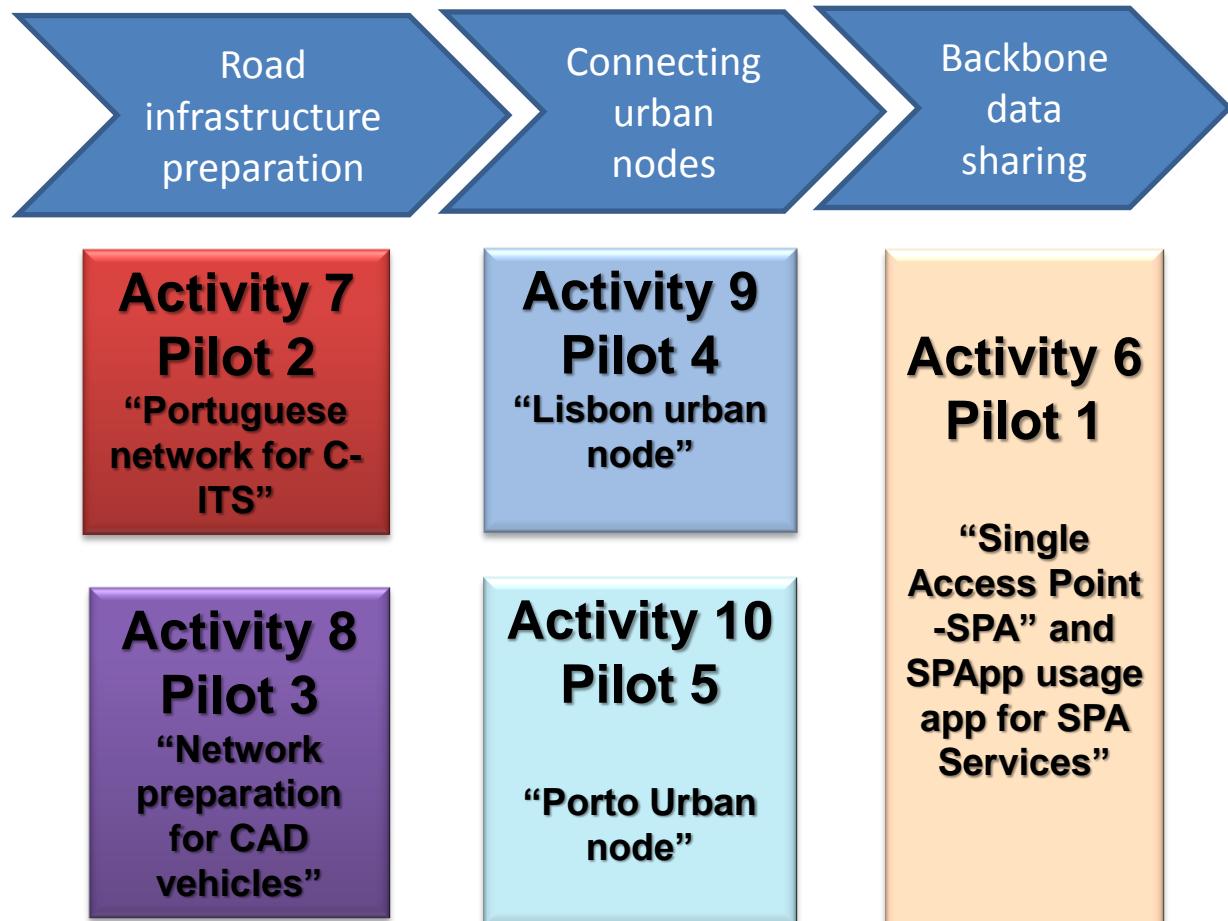
Partners

- C 31 implementing bodies >> large effort of cooperation and collaboration at national level
-
- C IMT, CM LISBOA, CM PORTO, EMEL, STCP
- C IP, BRISA, GRUPO ASCENDI, AE NORTE LITORAL, AE ALGARVE, LUSOPONTE, BRISAL, AEDL, AE ATLÂNTICO, SCUTVIAS E NORSCUT
- C IP TELECOM, A-TO-BE, GMV, ARMIS, SIEMENS, DMS
- C FEUP
- C CAETANOBUS, VIAVERDE SERVIÇOS, VIALIVRE
- C TIS

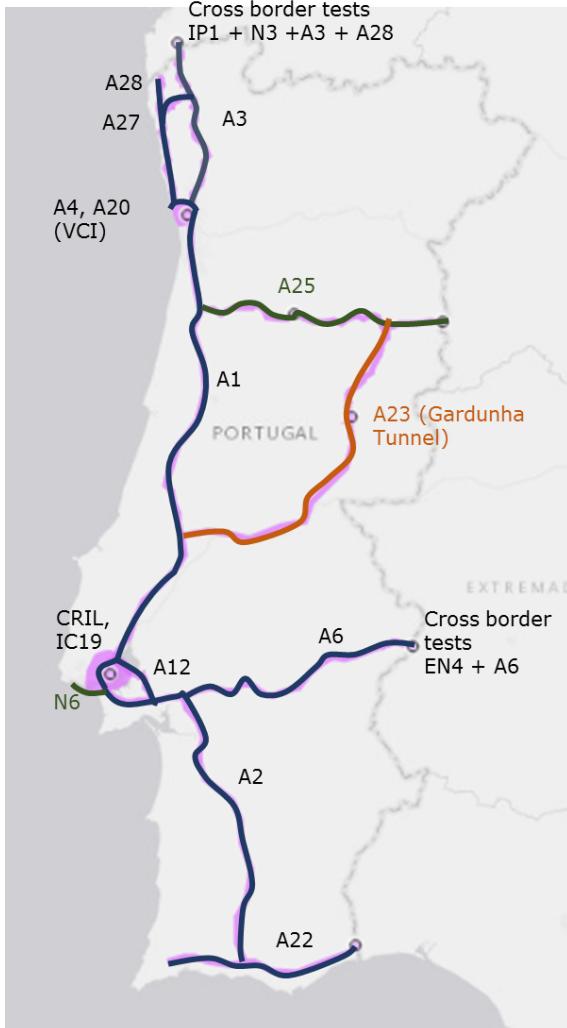
Integrated approach



5 macro pilots = 15 pilot activities



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 vehicles



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

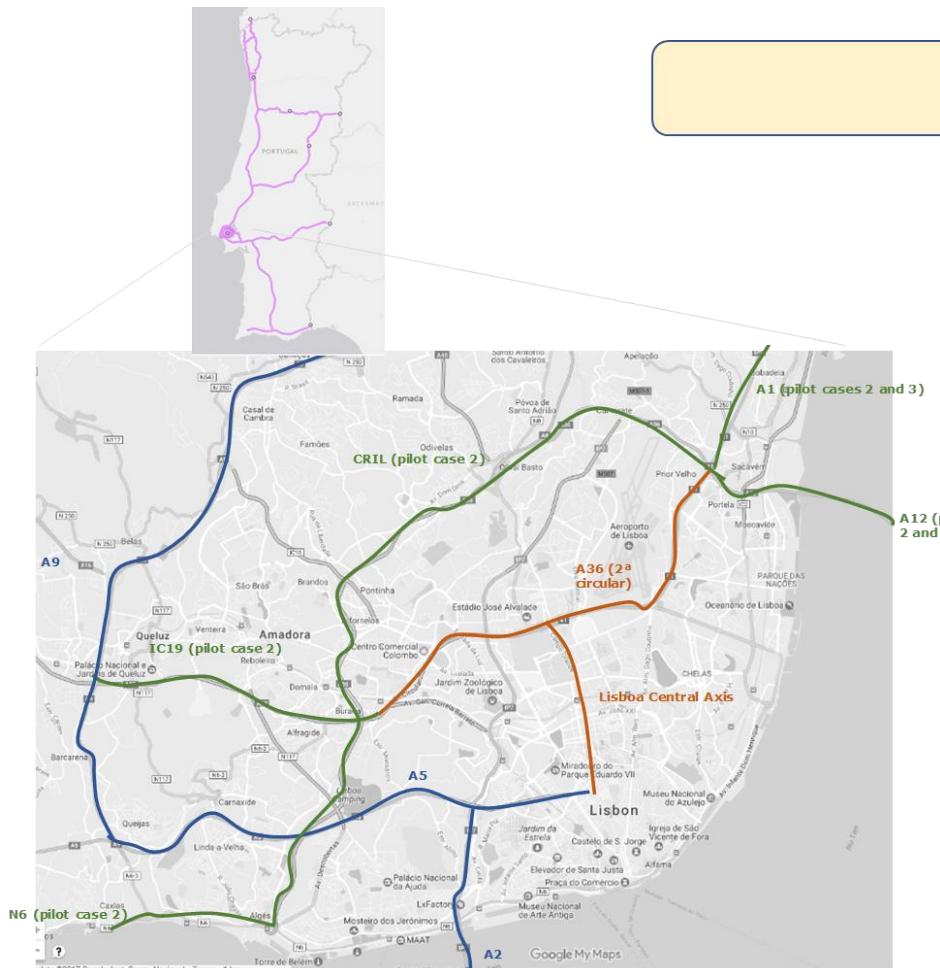
A2 the Holiday motorway

- 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.

FILTROS

INFORMAÇÕES EM TEMPO REAL

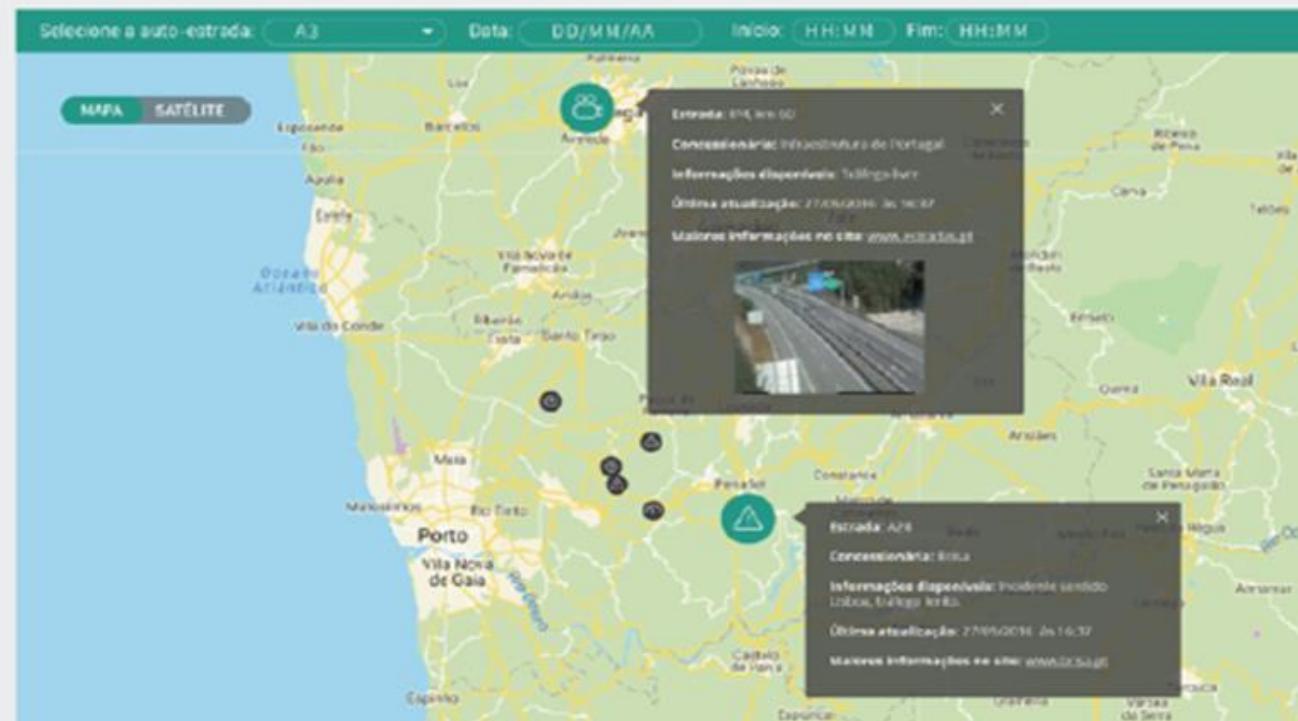
- Incidentes
- Condições de Estrada
- Volume de tráfego (%)
- Velocidade Média
- Congestionamento
- Tempo de Viagem
- Mensagens PMV
- Câmaras

SEGURANÇA RODOVIÁRIA

- Estradas Escorregadias
- Animais, objetos peões na via
- Área de acidente desprotegida
- Trabalhos de manutenção
- Visibilidade reduzida
- Contramão
- Estrada interrompida
- Condições atmosféricas extremas

PARQUES DE ESTACIONAMENTO

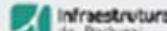
- Cadastro de parques de estacionamentos disponíveis
- Serviços disponíveis
- Disponibilidade de lugares



CONTACTOS

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PARCEIROS



The vision is to implement an **Integrated Traffic Information System (SIIT)**, and create the Portuguese Data Sharing Backbone, paving the way for the implementation of the **Portuguese National Access Point** for the Delegated Acts (A, B, C and E).

Day 1 Services

"SPA" and SPApp usage app for SPA Services		Portuguese network for C-ITS (incl. accesses to urban nodes)			Network Preparation for Connected and Autonomous Vehicles			C-ITS Pilot in the Lisboa Urban Node			C-ITS Pilot in the Porto Urban Node	
Backbone data sharing prototype	SPApp usage app	Demonstration of C-ITS services in core, comprehensive network and access to urban nodes	In-vehicle app to connect C-ITS server in TEN-T network and urban nodes connections	Development of C-ITS services in tunnels	Connected and autonomous vehicles in open roads	A2 the Holiday motorway	Connected vehicles	Traffic service level monitoring and travel time prediction in Lisboa node	Parking availability system in Lisboa node	In-vehicle app to connect C-ITS server in Lisboa node	Signal corridors and bus corridors prioritization in Lisboa node	Mobility Hub in Lisboa node
Day-1-services covered												
Emergency electronic brake light		x			x					x		
Emergency vehicle approaching		x	x		x	x	x		x	x	x	
Slow or stationary vehicle(s)	x	x	x	x	x	x	x	x			x	
Traffic jam ahead warning	x	x	x	x	x	x	x	x			x	x
Other hazardous location notification	x	x	x	x	x	x	x				x	
Road works warning	x	x	x	x	x	x	x		x	x	x	x
Weather conditions	x	x	x	x	x	x	x			x	x	x
In-vehicle signage	x	x			x	x	x			x	x	x
In-vehicle speed limits	x	x		x	x	x	x			x		x
Probe vehicle data		x				x	x			x		x
Shockwave damping		x								x	x	x
Green Light Optimal Speed Advisory (GLOSA) / Time To Green (TTG)									x			x
Signal violation/Intersection safety	x				x							
Traffic signal priority request by designated vehicles									x	x	x	x

Day 1,5 Services

"SPA" and SPApp usage app for SPA Services		Portuguese network for C-ITS (incl. accesses to urban nodes)			Network Preparation for Connected and Autonomous Vehicles			C-ITS Pilot in the Lisboa Urban Node			C-ITS Pilot in the Porto Urban Node	
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Day-1.5-services covered												
Off-street parking information		x	x	x	x			x	x			
On-street parking management and information								x				x
Park & Ride information	x	x			x	x	x	x	x		x	
Information on alternative fuel vehicles & charging stations			x			x	x	x	x		x	
Traffic information & smart routing			x	x		x	x	x	x	x	x	x
Zone access control for urban areas		x			x	x					x	
Loading zone management												
Vulnerable road user protection												
Cooperative Collision Risk Warning												
Motorcycle approaching indication												
Wrong way driving			x		x	x	x			x		
Connected and cooperative navigation	x				x	x	x			x	x	x

Some deployment figures

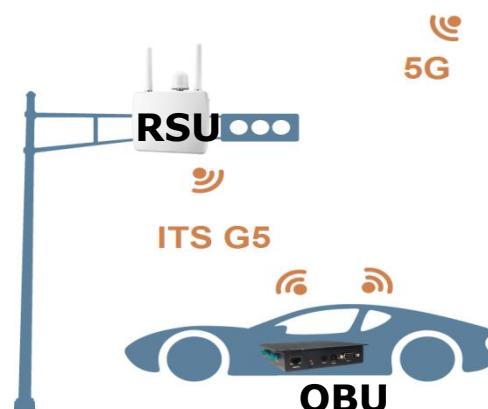
Day 1 services

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)



Day 1,5 services

**Urban nodes
Suburban commuting areas**

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

~116 km



OBRIGADO

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