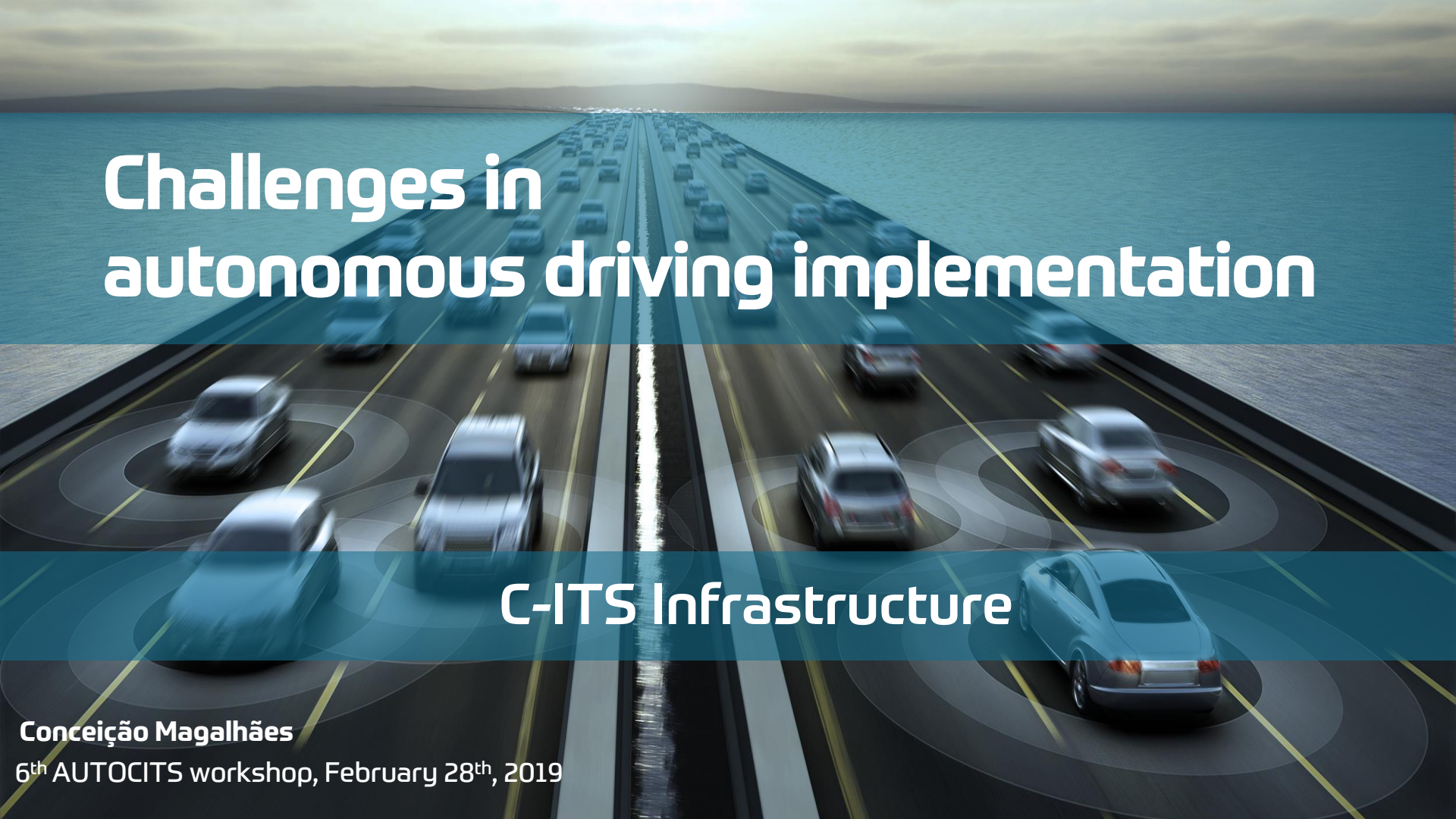


An aerial view of a multi-lane highway stretching into the distance. Numerous cars are visible on the road. Overlaid on the image are concentric circles around several cars, representing sensor ranges or communication zones. The background shows a body of water and distant hills under a hazy sky.

Challenges in autonomous driving implementation

C-ITS Infrastructure

Conceição Magalhães

6th AUTOCITS workshop, February 28th, 2019

EU initiatives on C-ITS

EU initiatives on C-ITS

EC

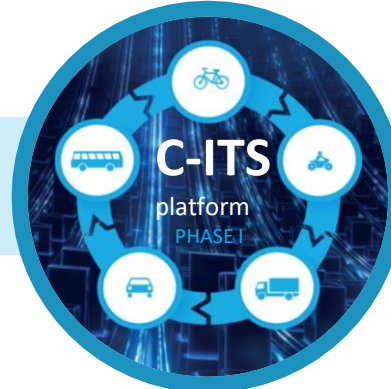
Nov
2014



Launch C-ITS platform

EC

Jan
2016



C-ITS platform Final Report Phase I

EC

Nov
2016



Published "A European Strategy on C-ITS"

In two years EC outlined an European strategy on C-ITS

EU initiatives on C-ITS

EC

EC

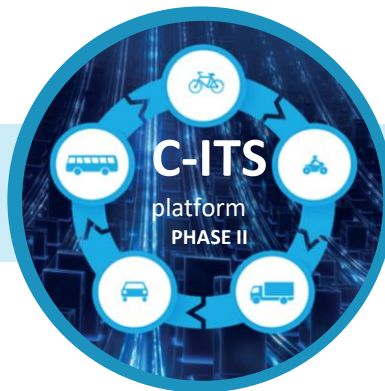
European Parliament

Mar
2017



Valetta Declaration

Set
2017



C-ITS Platform
Phase II Final Report

Mar
2018



Resolution on the
C-ITS European Strategy

In one year EP approved the European Strategy on C-ITS

Jun 2018

Common C-ITS Certificate Policy

Deployment and Operation of European C-ITS



2019



C-ROADS

C-ITS Day 1 Services deployed

2027

Cooperative Driving

Motorway concessionaires challenges



Road safety



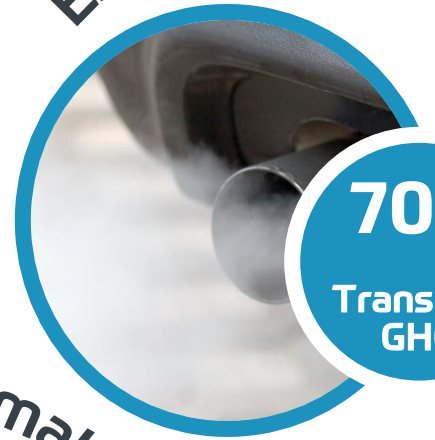
8%
on
motorways



Congestion

1%
EU GDP

Emissions



70%
Transport
GHG

Automation



7M
2030

Digital technologies



Lisbon Pilot goals



C-ITS

To contribute to
its implementation



C-ITS Interoperability

Ensuring it



Autonomous driving

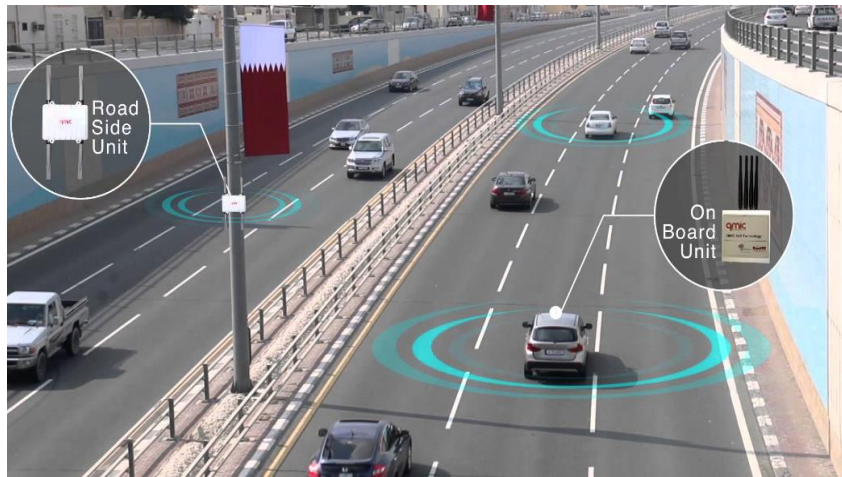
Strengthen the role of
C-ITS as its catalysts

Data collection for the AUTOCITS Consortium and BRISA research project

What happened



What happened...



12V

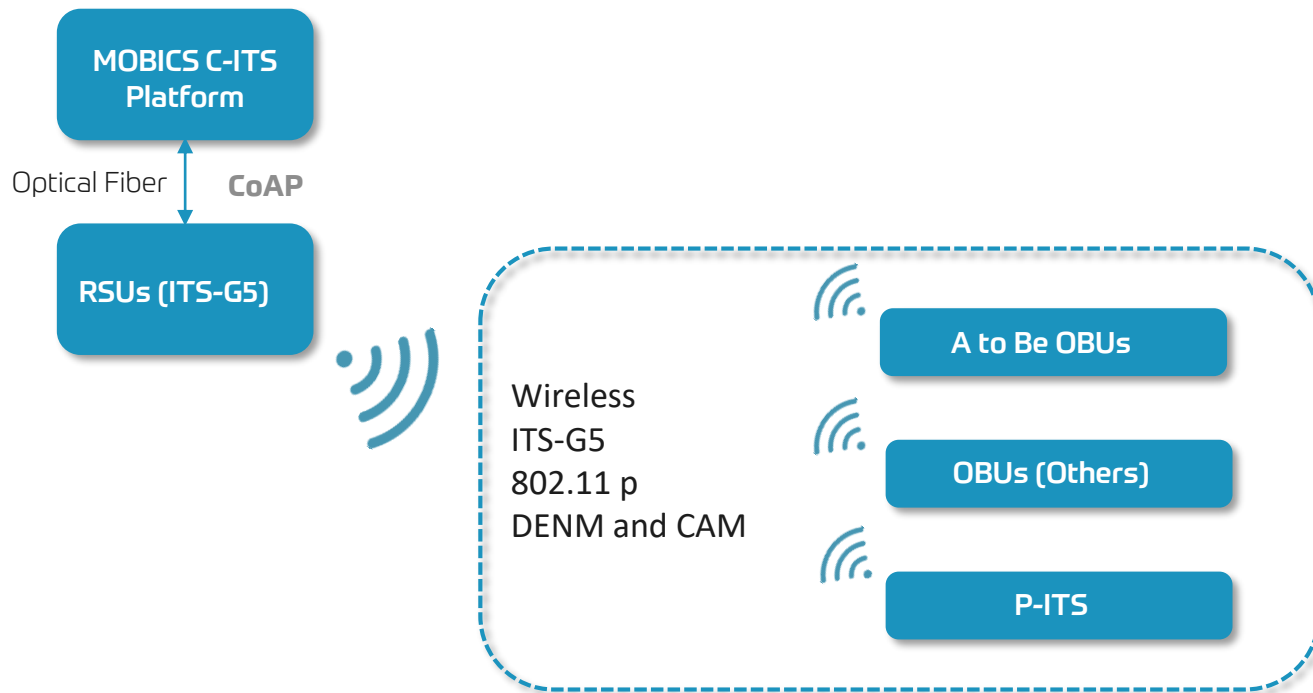
6 Roadside Units (RSUs)

Day1
Services

3 C-ITS Services

Infrastructure with **A-to-Be** equipment

What happened...



We guarantee the interoperability of C-ITS

Where?



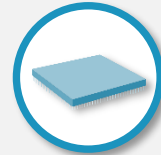
A9 CREL

start somewhere

RSUs constitution



1 Radio module



1 Processing board



2 Antennas (radio and GPS)

All from **A-to-Be**

C-ITS infrastructure assessment



C-ITS infrastructure assessment

Interoperability assessment



Beginning and end
of DENMs' issuance



Percentage of DENMs'
received



Start of DENMs
reception



Mean time between
received messages



DENMs' adequate
reception time



Standard deviation of time
between received messages

Assessing the communication tests between OBUs and RSUs

Conclusions

Conclusions

BRISA's point of view

C-ITS infrastructure

- The interoperability between different C-ITS stations, from Portuguese and Spanish manufacturers, was tested and verified
- The initially planned C-ITS Platform Day 1 Services' were all tested
- The Lisbon Pilot constituted a further step in ensuring cross border interoperability at European level

Need for more large-scale trials in real environment

BRISA's benefits achieved



BRISA's benefits achieved



DATA TO
RESEARCH PROJECT

C-ITS
PLATFORM
IMPROVEMENT

BUGS
CORRECTION

**PIONEERS
IN
PORTUGAL**

IMAGE

EXPERIENCE

CREL
FOR
FUTURE TESTS

”Automated driving future is not just about vehicles technology. It is about a broad and integrated system that allows cars to communicate with each other and with the driving ecosystem to keep drivers and other roadway users safe.”

Stephen Joseph OBE, CEO of the Campaign for Better Transportation

Thank You!

Contact number:

96 203 85 10



Email address:

conceicao.magalhaes@brisa.pt



Linkedin:

[linkedin.com/in/conceição-magalhães-59199269](https://www.linkedin.com/in/conceição-magalhães-59199269)

