

# 5G-MOBIX French Trial Site's results and lessons learnt on 5G for CAM

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**5GMOBIX**



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## ABOUT

- EU funded Innovation action (H2020-ICT-18-2018)
- November 2018 – September 2022
- 59 partners from 11 countries in Europe (incl. Linked Third parties)
- 9 non-EU funded partners from China and South Korea

## OBJECTIVES

### Accelerate deployment of 5G at cross-border areas

- Carry out trials along X-border corridors to assess 5G capabilities for CAM
- Qualify the 5G-infrastructure and evaluate the benefits of 5G within the CAM context
- Identify spectrum allocation gaps, contribute to standardisation and 5G CEF preparation



Technical

Business



### Define deployment scenarios & recommendations including x-border context

- Perform cost/benefit analysis and impact assessment
- Identify new business opportunities for 5G-enabled CAM
- Investigate legal, regulatory and security issues

# 5G-MOBIX Trials



## LOCATIONS

- 2 Cross-Border Corridors (CBC)
- 4 complementary European Trial Sites (TS)
- 2 complementary Asian Trial Sites (TS)



## NETWORK

- 29 5G gNBs
- NSA Architecture (potential for evolving to SA)



## VEHICLES

- 20 SAE L4 automated vehicles



## USE CASES

- 5 use case categories based on 3GPP TS 22.186, focusing on x-border operation

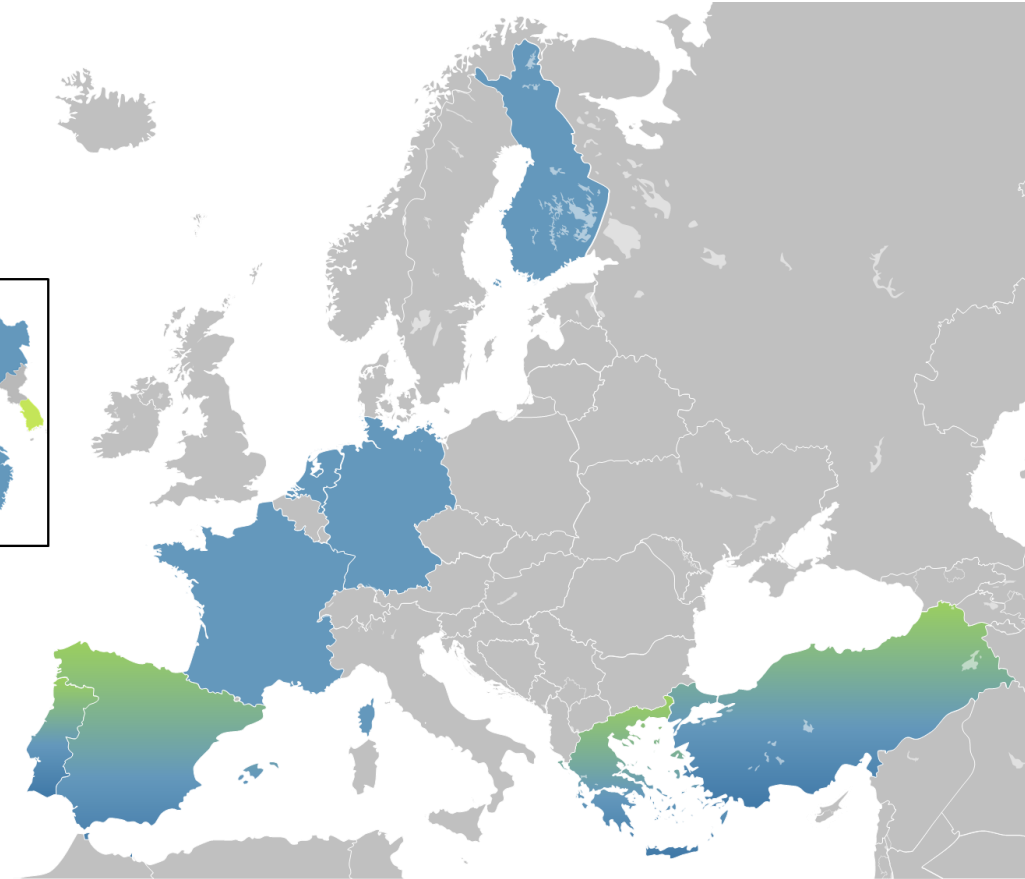
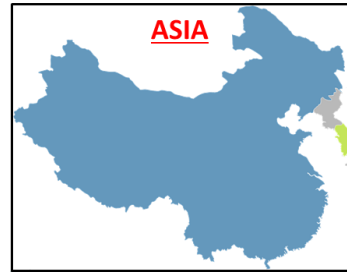
Advanced  
Driving

Vehicles  
Platooning

Extended  
Sensors

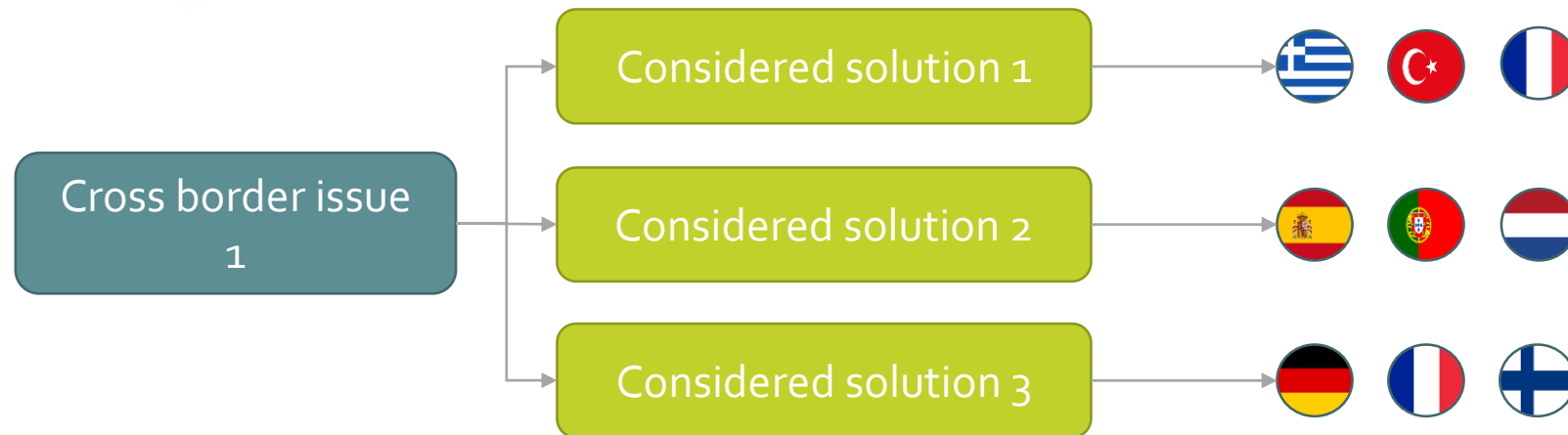
Remote  
Driving

Vehicle QoS  
Support



# Cross border issues identification

- Identification of the main cross border issues (XBIs) of 5G for CAM → 11 XBIs identified
- Identification of solutions considered (CSs) to solved those XBIs → 26 CSs
- Each site worked on XBIs and tested 5G solutions locally and at the borders.



# Cross borders issues and Considered solutions

XBI	Title
XBI_1	NSA Roaming interruption
XBI_2	SA Roaming interruption
XBI_3	Inter-PLMN interconnection latency
XBI_4	Low coverage Areas
XBI_5	Session & Service Continuity
XBI_6	Data routing
XBI_7	Insufficient Accuracy of GPS Positioning
XBI_8	Dynamic QoS Continuity
XBI_9	Geo-Constrained Information Dissemination
XBI_10	mmWave applicability
XBI_11	Network slicing applicability

CS	Definition
CS_1	S1 handover with S10 interface using an NSA network
CS_2	Release and redirect using an NSA network
CS_3	Release and redirect with S10 interface using an NSA network
CS_4	Multi-modem / multi-SIM connectivity - Passive Mode
CS_5	Multi-modem / multi-SIM connectivity - Link Aggregation
CS_6	Release and redirect using an SA network
CS_7	Internet-based Interconnection
CS_8	Direct Interconnection.
CS_9	Satellite connectivity
CS_10	MEC service discovery and migration using enhanced DNS support
CS_11	Imminent HO detection & Proactive IP change alert
CS_12	Inter-PLMN HO, AF make-before-break, SA
CS_13	Double MQTT client

CS	Definition
CS_14	Inter-MEC exchange of data
CS_15	Inter-server exchange of data
CS_16	LBO NSA
CS_17	HR NSA
CS_18	LBO SA
CS_19	HR SA
CS_20	Compressed sensing positioning
CS_21	Adaptive Video Streaming.
CS_22	Predictive QoS
CS_23	Uu geobroadcast
CS_24	PC5 geobroadcast
CS_25	mmWave 5G.
CS_26	Network slicing

# French Trial Site Description

Key Role	Partner	Contribution
Consortium partners	VEDECOM	TS leader, Satory site provider, applications/MEC/OBU provider, vehicle/roadside sensor provider, SW/HW integrator, experimentation/trialling
	CATAPULT	Far-MEC provider Seamless handover solution provider Satcom solution provider
	AKKA	MEC provider
	VALEO	OBU provider
Operators	Bouygues, Orange TDF	5G cmWave NSA commercial network 5G cmWave NSA experimental network 5G mmWave NSA experimental network
Site provider	Satory, TEQMO Open roads	Closed test tracks : SATORY, TEQMO Open roads: Yvelines, ES-PT CBC
Test cases	French partners	- Use-case: Infrastructure assisted advanced driving - Multi-SIM and Satellite communication - QoS prediction
Trials	French partners	French trials started with pre testing in September 2020. Final trials sessions were in early June 2022. ES-PT CBC trials in march 2022.





# Contribution of the FR Trial site to ES-PT CBC

- Connected vehicle transferred to ES-PT CBC: The "French" vehicle is equipped with a double stack OBU and a safety mechanism developed by the FR TS.
- Objectives:
  - Test the interoperability between the FR vehicle and 5G and the infrastructure of the ES-PT corridor
  - Test multi-SIM solution where FR vehicle connects to MEC (ES) and MEC (PT) using multi-SIM in overlapping coverage area.



# French trial site demo video

<https://www.youtube.com/watch?v=l1p2RrZhDoQ>

## 5G for Connected and Automated Mobility

Towards greater safety and efficiency

5G-Mobix French Trial Site Results





# Thank you !



[www.5g-mobix.com](http://www.5g-mobix.com)



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