

5G-MOBIX Cross Border Corridors & Trial Sites

Technical activities, status & roadmap

Kostas Trichias (Technical Coordinator – WINGS ICT Solutions)

5G-MOBIX 1st Webinar, September 16th, 2019



5GMOBIX



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 825496

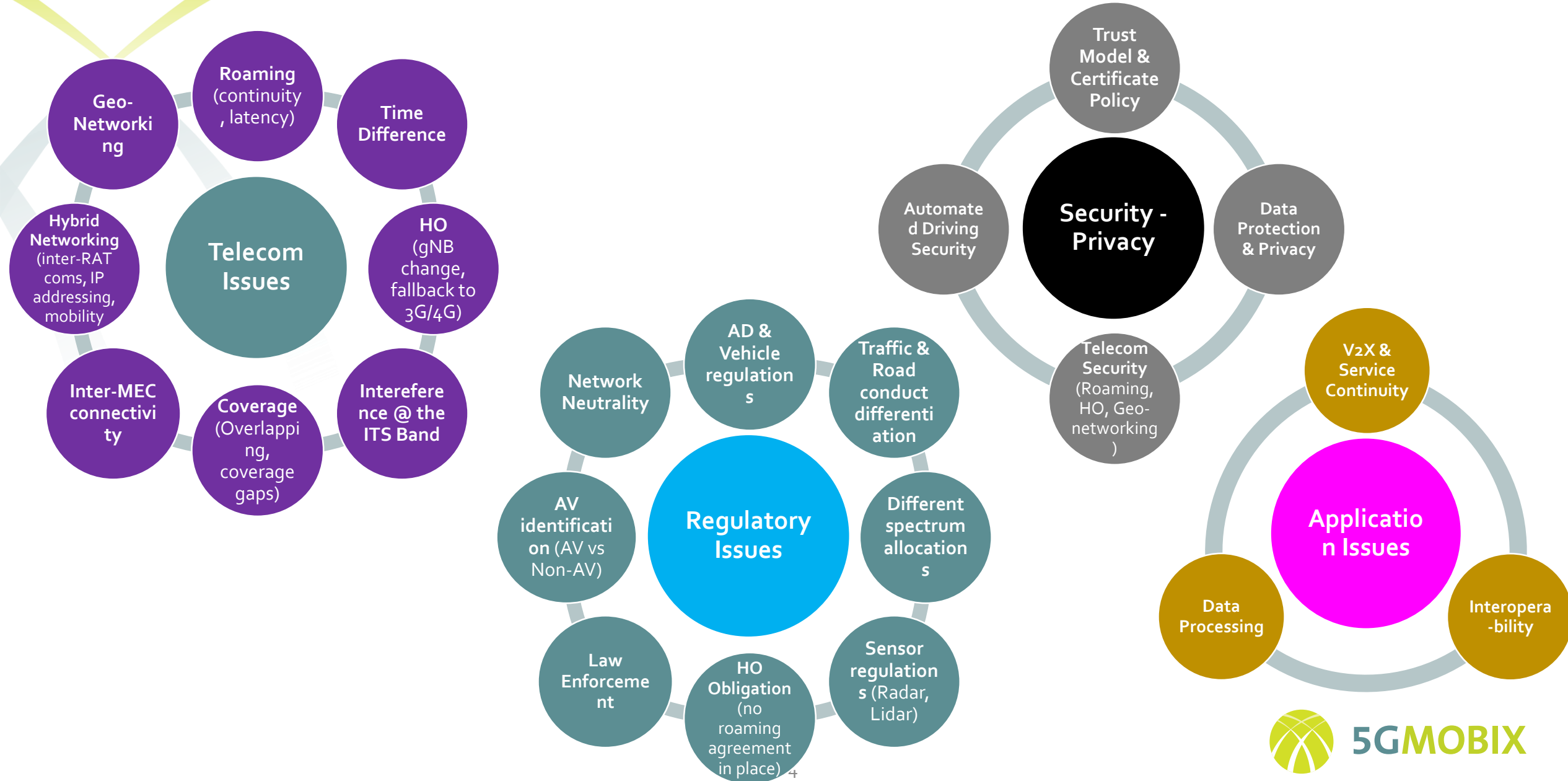
Layout

- X-Border focus of 5G-MOBIX
- 5G-MOBIX CBC/TS overview
- 2 Cross Border Corridors
- 5G-MOBIX CBCs / TSs – 5G Networks
- 5G-MOBIX CBCs / TSs – ITS Infra
- 5G-MOBIX CBCs / TSs – Vehicles
- Roadmap

5G-MOBIX CBCs / TSs – X-Border Issues

- X-border operation is the focus of 5G-MOBIX
- Main X-border issues investigated in order to be tackled properly
- 4 main categories identified
 - Cross Border Telecommunication Issues
 - Service Quality/Continuity
 - Security and data protection
 - Automated driving/regulations
- Distinct solutions to be applied and tested at the different CBCs / TSs

5G-MOBIX CBCs / TSs – X-Border Issues



Overview of 5G-MOBIX CBCs / TSs

- 2 Cross-Border Corridors (CBC)
- 4 complementary European Trial Sites (TS)
- 2 complementary Asian Trial Sites (TS)
- 5 Use case categories based on 3GPP TS 22.186, focusing on x-border operation
- 24 SAE L4 automated vehicles
- 30 5G gNBs
- Starting from **NSA** Architecture and evolving to **SA** during the project



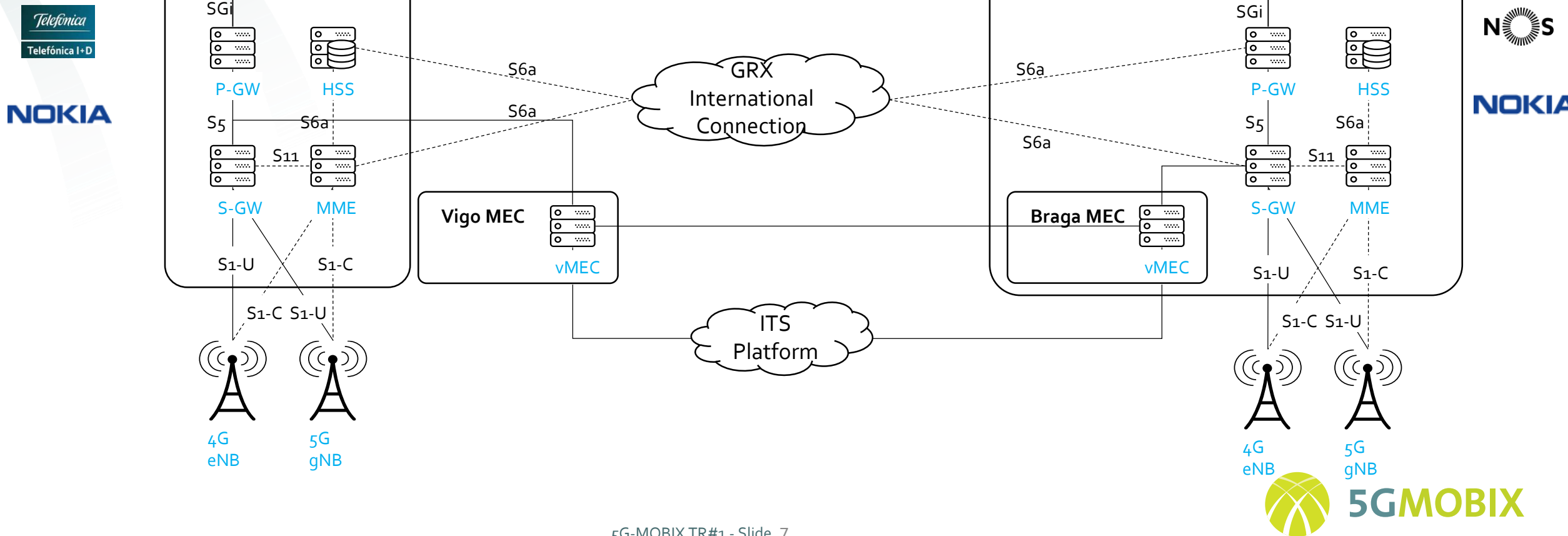
Spain-Portugal Cross-Border Corridor

- The Spain-Portugal corridor includes the following use cases locations:
 - Spain - Vigo bay.
 - Spain - A-55 and AP-9 (near CTAG). **UC cat1**.
 - Border - Old bridge. **UC cat4**
 - Border - New bridge. **UC cat1**
 - Portugal - A-28 (segment near the Porto airport and the Boat Passenger Terminal). **UC cat1**
 - Vigo-Porto highway roads with 5G tests in the new bridge. **UC cat5**

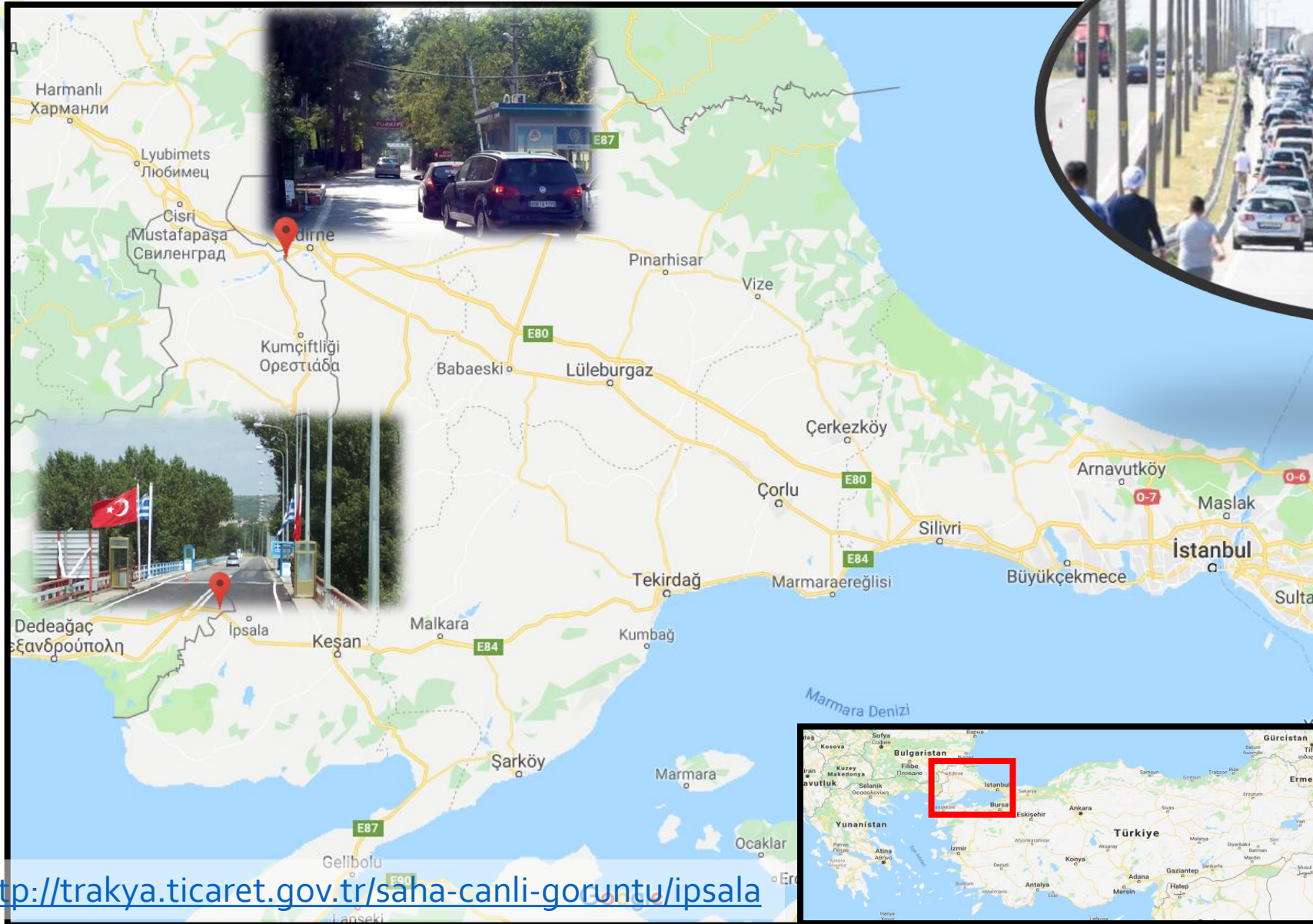


ES-PT CBC Architecture

5G NSA Roaming with local break out



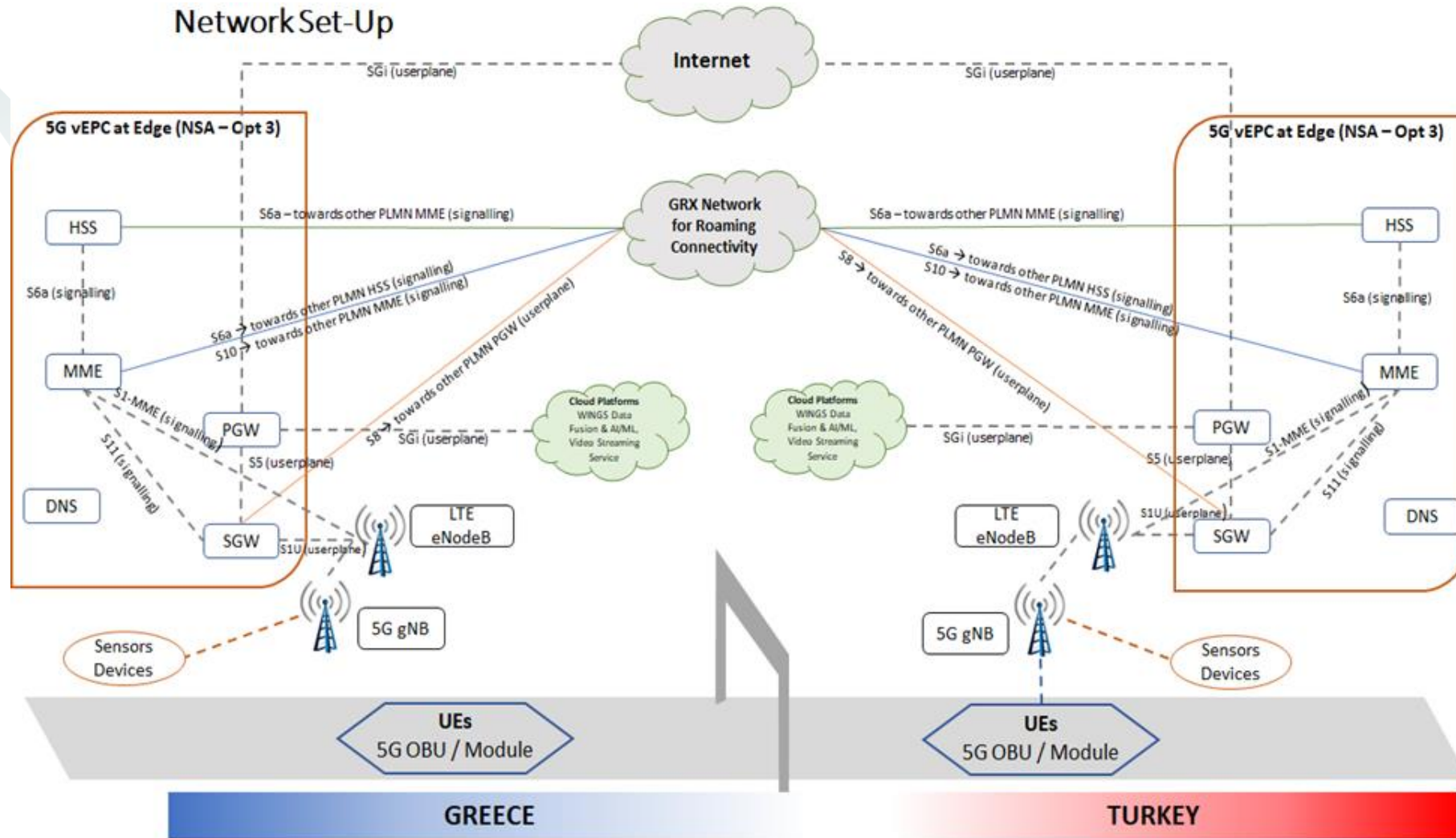
Greece-Turkey Cross Border Corridor



LIVE

<http://trakya.ticaret.gov.tr/saha-canli-goruntu/ipsala>

GR-TR CBC Architecture



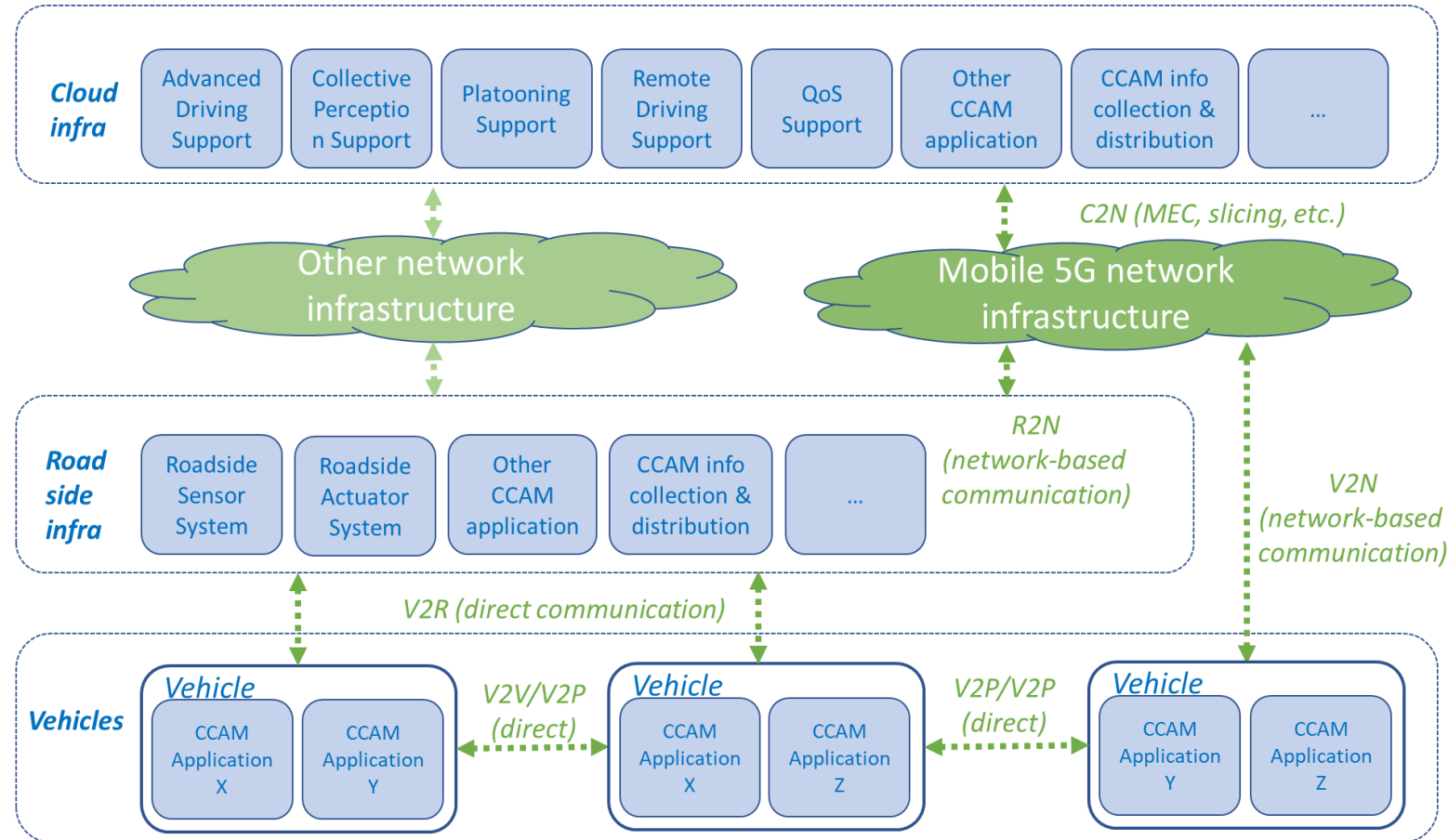
Overview of 5G-MOBIX CBCs / TSs – 5G Networks

- Most sites will initially deploy 5G-NR over a 4G core (vEPC) – **3GPP NSA Option 3x**
- NL and KR will deploy 3GPP SA Option 2 based on 5G core open source solutions and later upgrade
- Home Routing (HR) and Local Break-Out (LBO) solutions will be investigated for inter-PLMN roaming in both CBCs.
- Heterogeneous MEC implementations will be deployed and various experimentations frequencies will be utilized
- Thorough description of 5G Architecture, ITS infra & Applications and Vehicles / OBUs in upcoming Deliverables D2.2, D2.3 and D2.4, respectively

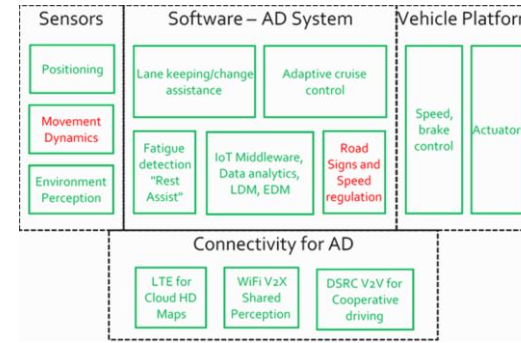
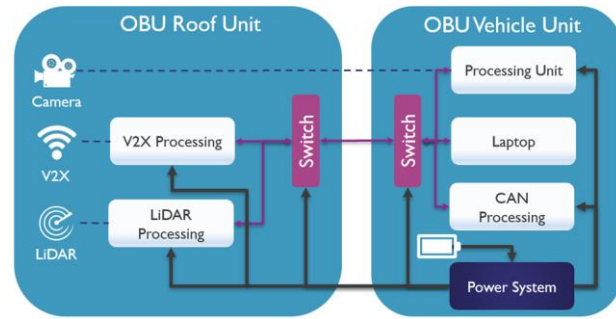
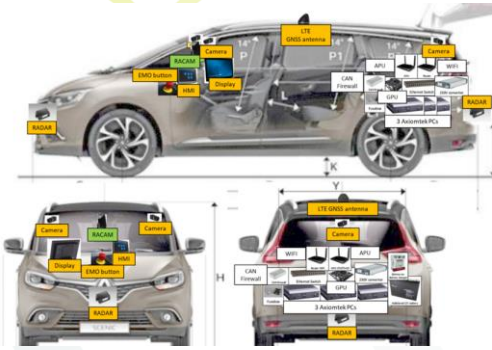
CBC / TS	3GPP Deployment Option	Number of gNBs	Experimentation Frequency	MEC	Roaming	Additional info
ES-PT	3X / (2)	7	2100 MHz (B1), 2600 MHz (B7), 3.5 GHz (n78)	Distributed (Far edge & central)	HR/LBO	
GR-TR	3X / (2)	4	2600 MHz (B7), 3.5 GHz (n78)	Edge computing (SGi to PGW)	HR/LBO	Coexistence with NB-IoT
DE	3X / (2)	2	2100 MHz (B1), 3.5 GHz (n78) 700 MHz (n12)	eRSUs with TUB MEC, DT MEC	Emulated PLMN, Multi-Core	2x Core, DE RAN & TUB RAN
FI	3X / (2)	2	3.5 GHz (n78)	Commercial + SDN based	Multi-PLMN	Multi-PLMN testing
FR	3X / (2)	2	700 MHz (4G), 800 MHz (4G), 1800 MHz (4G), 2100 MHz (3G/4G), 2600 MHz (4G), 3700-3800 MHz (n77)	Yes	Satellite as infill for cellular coverage gap	MEC optimization during inter-PLMN HO
NL	3X / 2	8	800 MHz (LTE B20), 1800 MHz (LTE B3), 700 MHz (5G NR n28), 3.5 – 3.7 GHz (5G NR n78) 26.65 GHz (5G NR n258)	Multiple (Kubernetes based)	HR/LBO	Multi-PLMN testing with peering
CH	3X / (2)	2	3.5GHz(n78) 4.9 GHz(n79) 2.6GHz(n41)	Yes	TBD	
KR	2	3	22-23.6 GHz	TBD	N/A	

Overview of 5G-MOBIX CBCs / TSs – ITS Infra

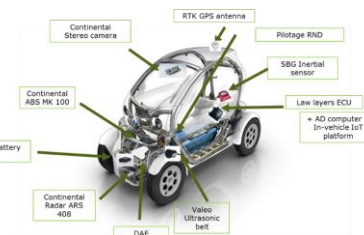
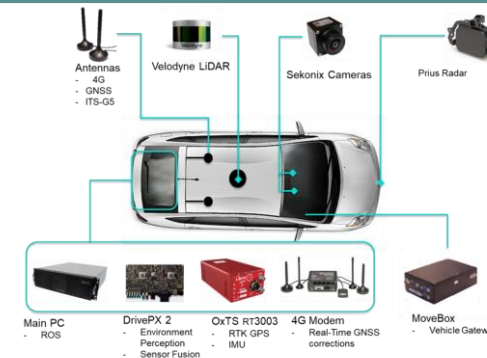
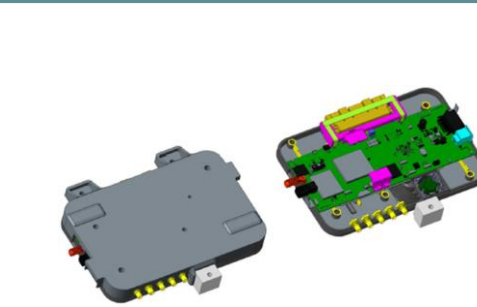
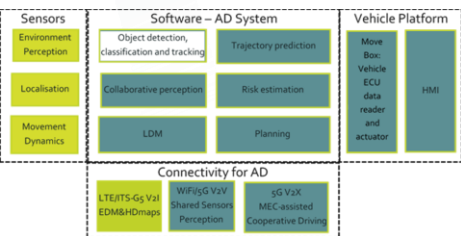
- Road side infrastructure comprises RSUs, MEC, road sensors, edge / cloud platforms, CCAM applications, data collection tools, etc.
- Focus on integration of road side infrastructure with the 5G network and CCAM enabled vehicles
- Guarantee service / application continuity
- High-level architecture describing the Physical, **Functional** and **Communication** view of the 5G-MOBIX deployment
- Thorough description of all ITS infrastructure in D2.3



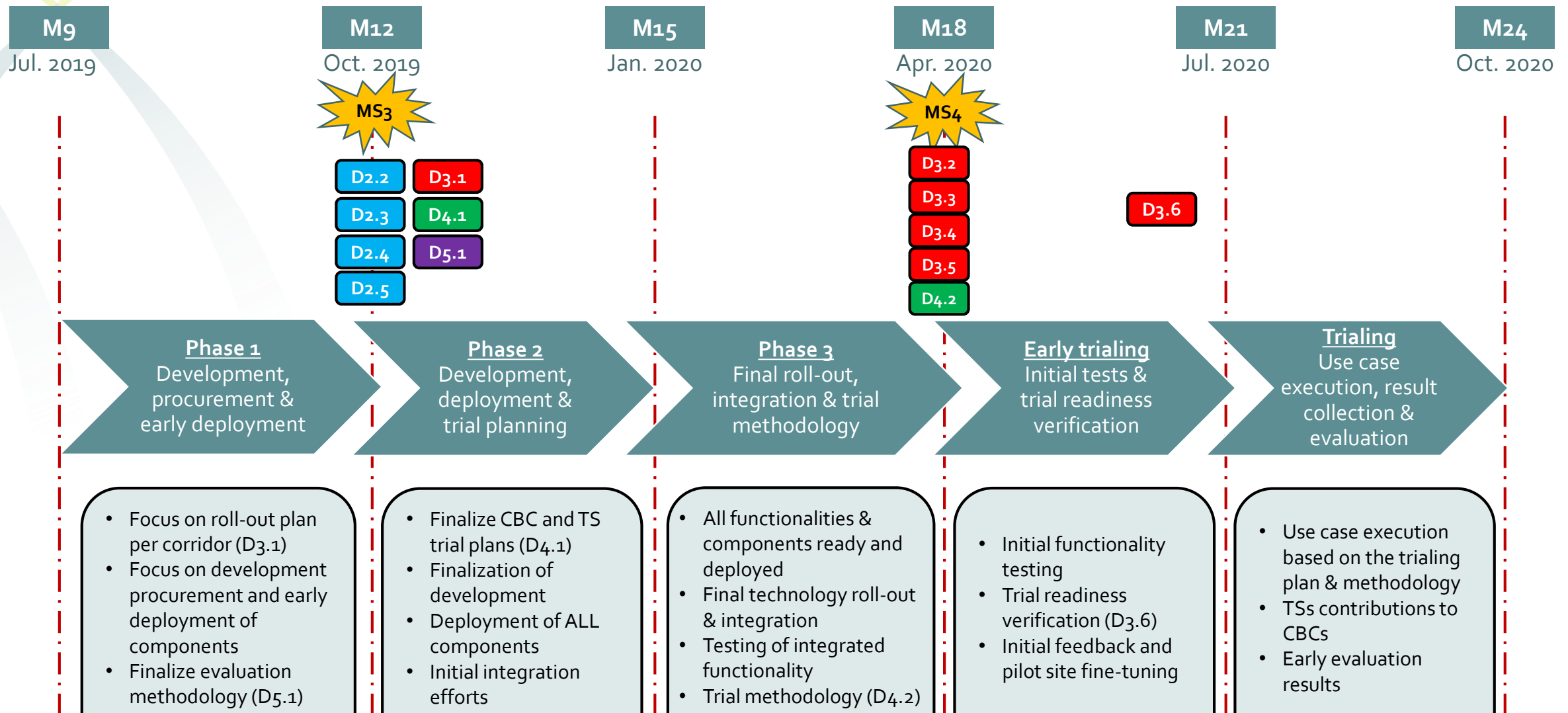
Overview of 5G-MOBIX CBCs / TSs – Vehicles



- Large variety of SAE L4 vehicles with a multitude of on-board sensors
- Different functional architecture utilized
- Various OBU versions and functionalities
 - Starting from Rel.14 support and migrating to Rel.15 during the project lifetime
- Supporting different Augmented Automated Driving Functions



5G-MOBIX Technical Roadmap until M24



Thank you

Questions?



5GMOBIX

www.5g-mobix.com



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 825496