


C-ITS

COOPERATIVE INTELLIGENT TRANSPORT SYSTEM



 Co-financed by the Connecting Europe
Facility of the European Union

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C-ITS | MANY TERMS, ONE SYSTEM

V2X V2I V2V C2X I2V WLANP

Communication
Infrastructure \leftrightarrow Vehicle
Vehicle \leftrightarrow Infrastructure



- **Direct Communication**
- Short range radio communication
- No Internet
- No cellular networks

C-ITS CAR2X

COOPERATIVE INTELLIGENT TRANSPORT SYSTEMS

C-ITS stands for "Cooperative Intelligent Transport Systems". It is a technology that allows vehicles to communicate with each other and with the infrastructure to improve traffic flow and safety.

C-ITS is a key technology for the development of the future of transport. It will enable vehicles to share information about their location, speed, and direction, allowing them to coordinate their movements and avoid collisions.



MEIN PAPA ARBEITET
FÜR DICH.



Danke,
dass du
aufpasst.*

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C-ITS | OPERATIVE USE CASES

Road Works Warning

Digital warnings



C-ITS Road Works Warning in Volkswagen ID.3

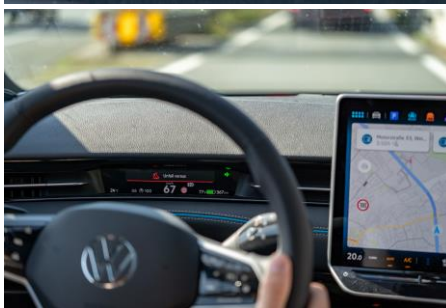


Intelligent equipment for road works localisation



Hazardous Locations

Digital hazard warnings



Hazard Warnings (VW)

	Traffic Jam Ahead
	Accident Zone
	Roadworks
	Slippery Road
	Obstacle on the road
	Animal on the road
	Human presence on the road

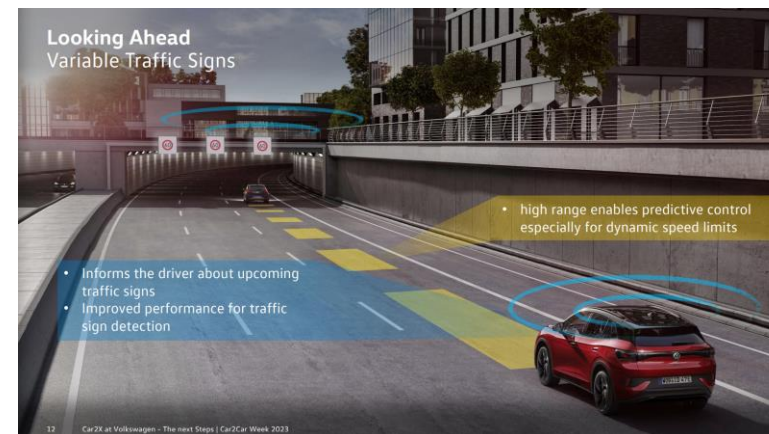
	HLN Wrong Way Driver
	Stationary Emergency Vehicle
	Dynamic Emergency Vehicle
	Strong Wind
	Visual Obstruction
	Slow Vehicle
	Dangerous End of Queue
	Stationary Vehicle
	Broken down Vehicle
	Accident
	Critical Situation ahead

In-Vehicle Information

Digitale traffic signs

~2025/2026

coming soon



Source: „Car2X at Volkswagen – The next Steps“, Car2Car week, 2023

ROLL-OUT IN AUSTRIA



Co-financed by the European Union
Connecting Europe Facility

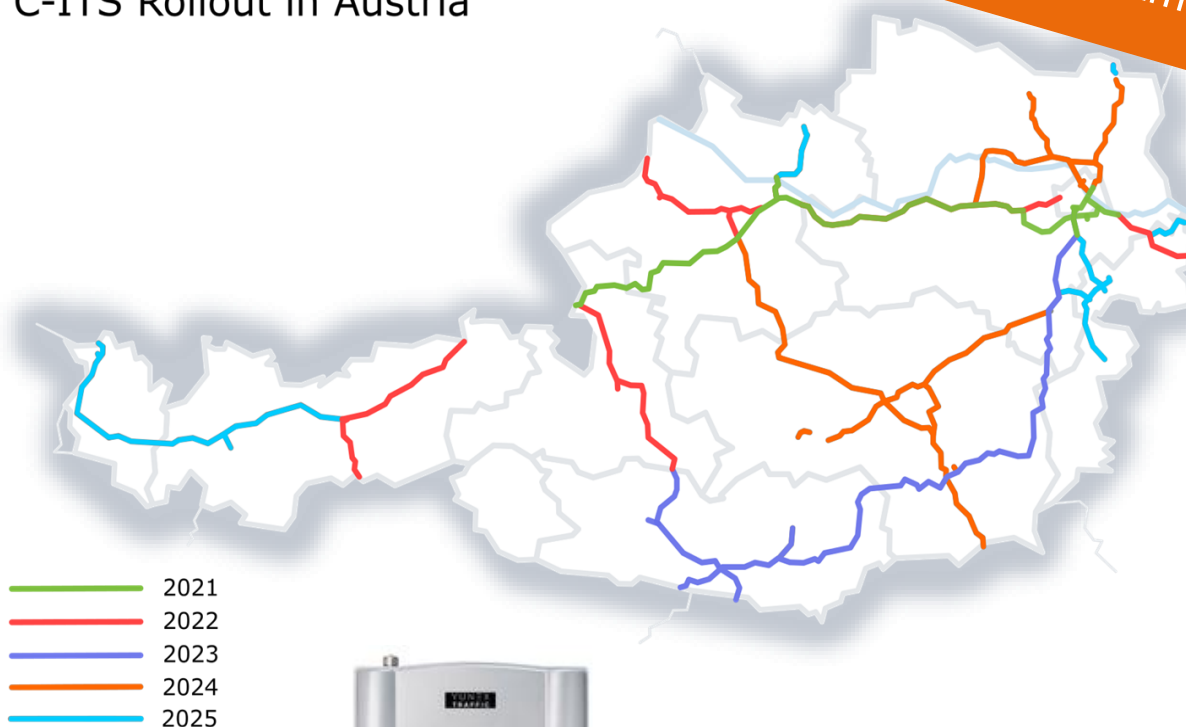
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ASFINAG DEPLOYS C-ITS ON ALL MOTORWAYS



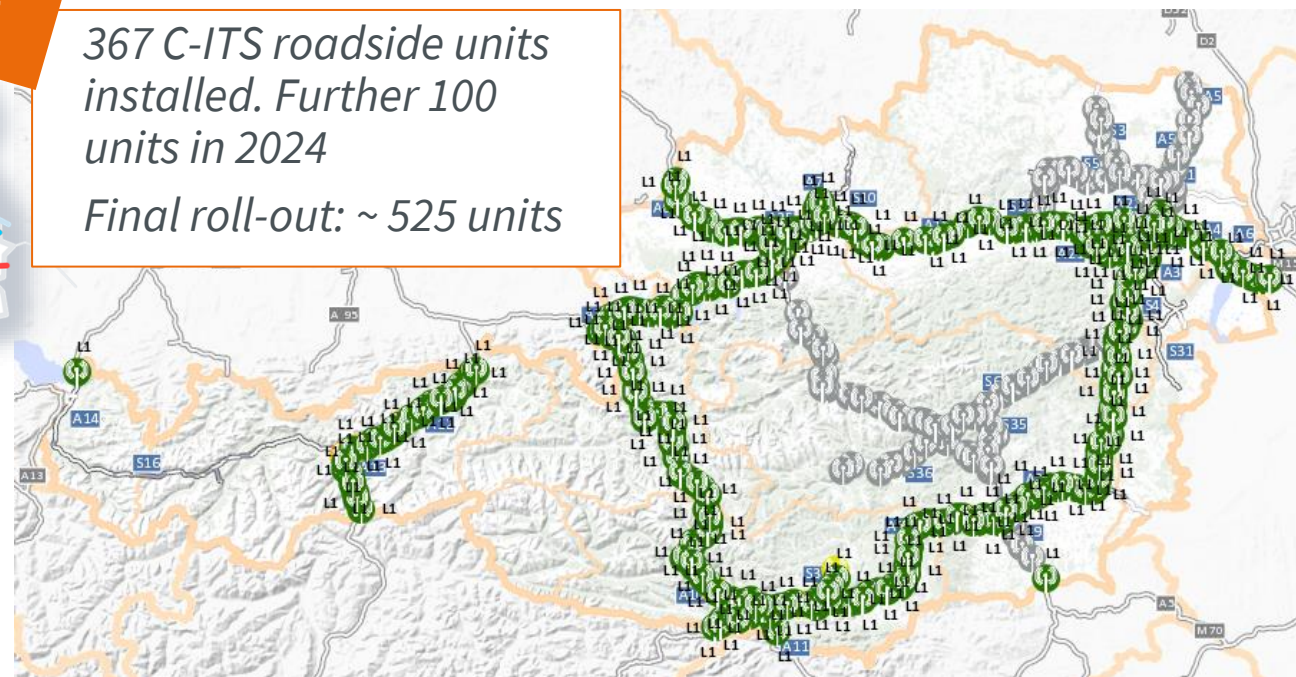
 nis.gv.at

C-ITS Rollout in Austria



One C-ITS roadside unit every ~4 km

367 C-ITS roadside units installed. Further 100 units in 2024
Final roll-out: ~ 525 units



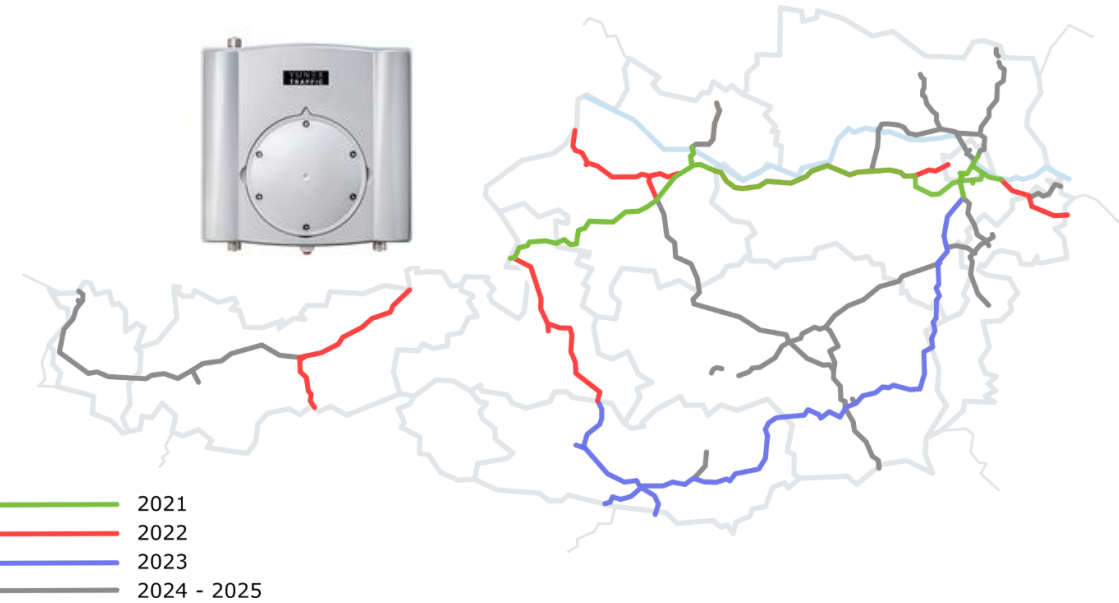
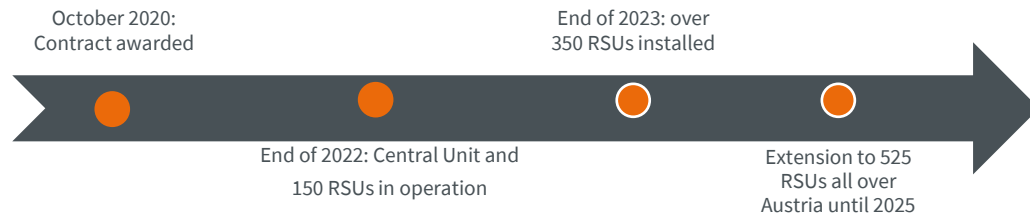
ASFINAG

AUSTRIA: ASFINAG LAUNCHED C-ITS AT LARGE SCALE

... with three interconnected deployments

1. Stationary roadside units

- Deployment of 525 C-ITS units on 2.250 km of road network
- One unit every 4km on average



2. Mobile warning trailers

- „Intelligent Mobile Information Systems“ (IMIS), which include Video, Radar, Travel time estimation as well as C-ITS
- Trailers are operational in all regions of Austria



3. Road operator vehicles

- ASFINAG road operator vehicles are equipped with C-ITS vehicle units
- 100 operational vehicles until 2025. Further 100 vehicles planned.



FULLY OPERATIONAL ON ALL THREE DEPLOYMENTS

- All operational C-ITS deployments (roadside, trailers, road operator vehicles) are enrolled on a PKI with bilateral trust with Volkswagen vehicles

The following use cases from the harmonized C-ROADS catalogue have been verified on production vehicles (incl. our own Volkswagen ID.3):

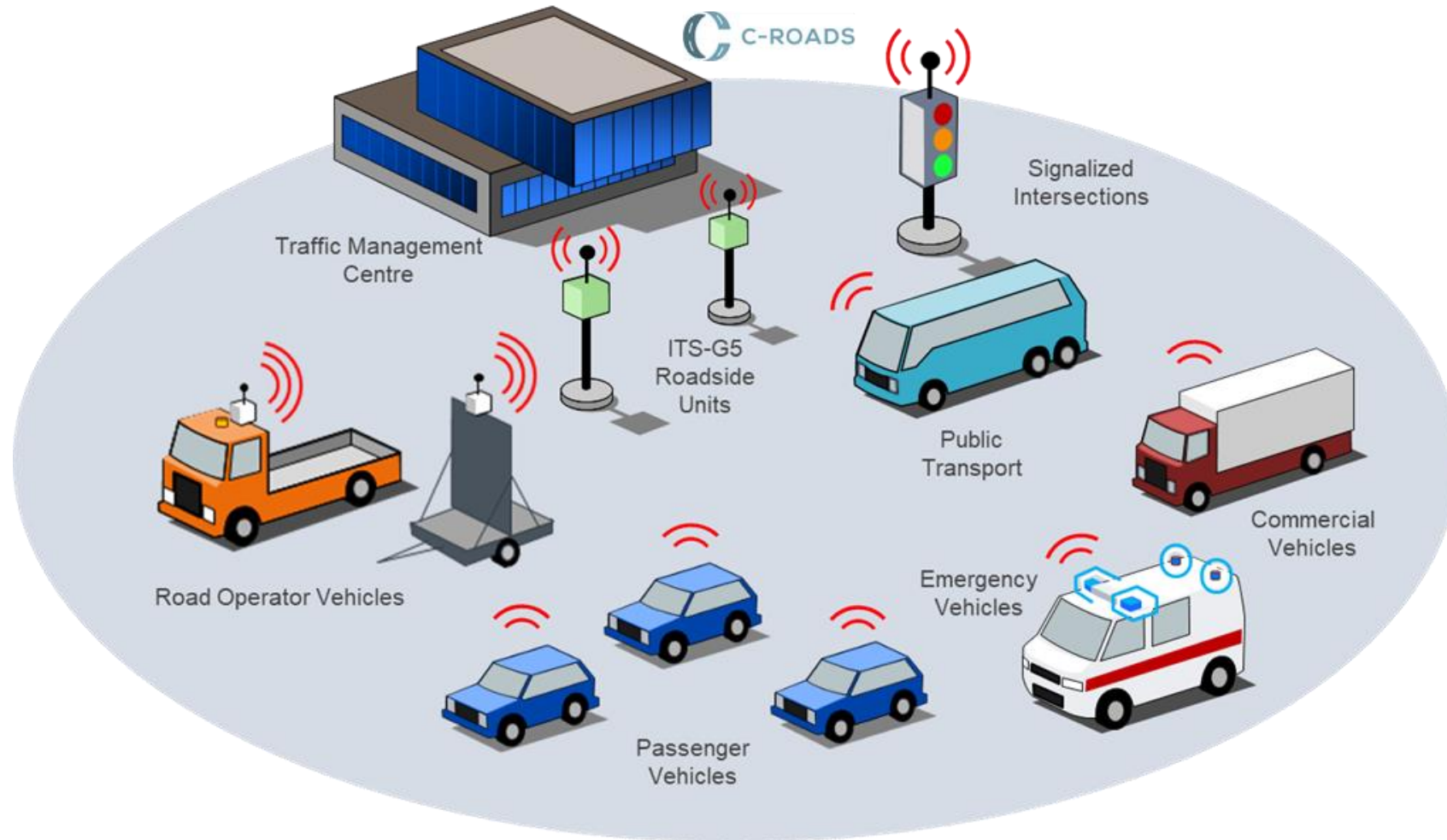
Road Works Warning
Emergency Vehicle approaching
Emergency Vehicle in Intervention
Accident Zone
Stationary Vehicle



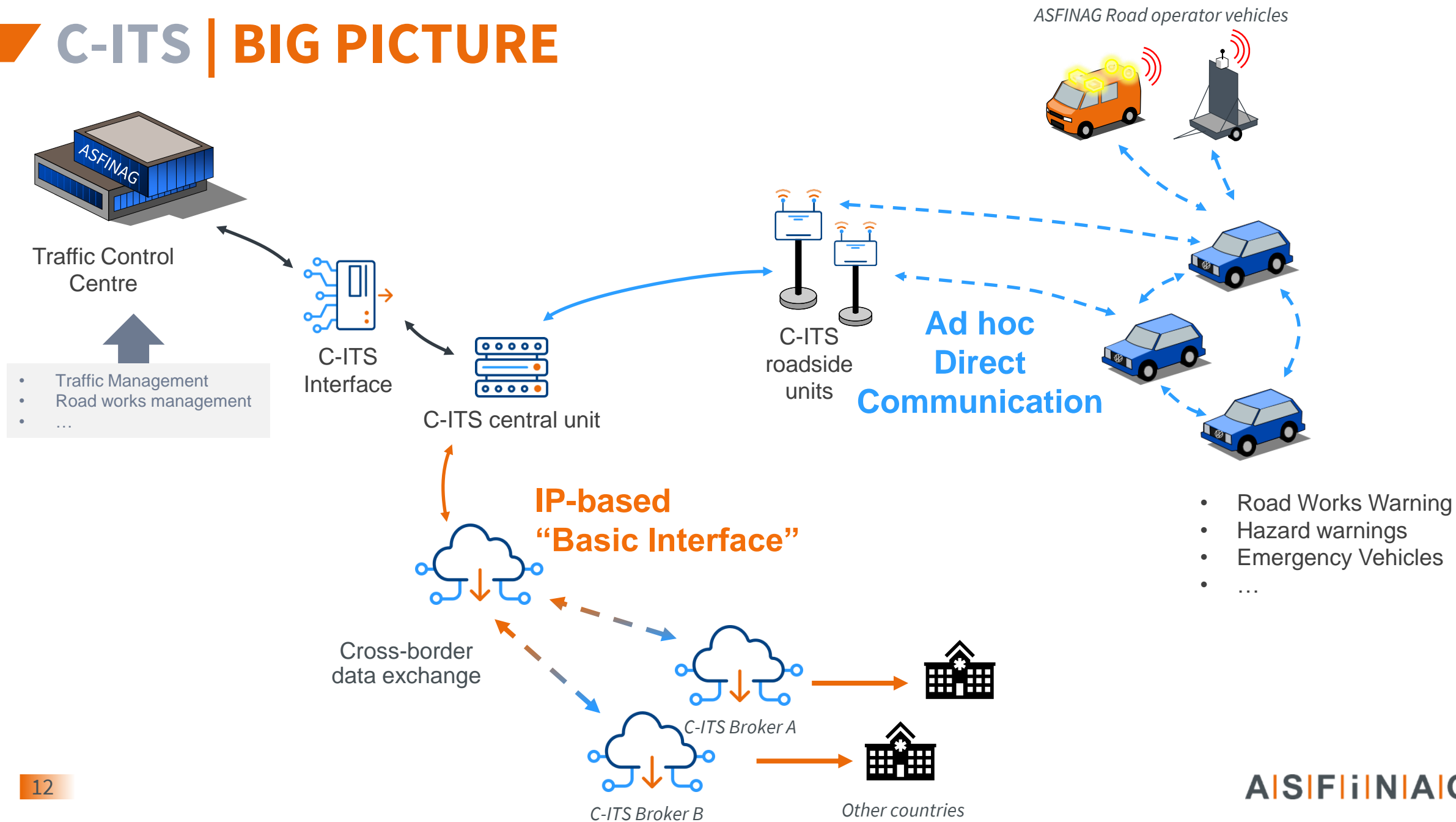
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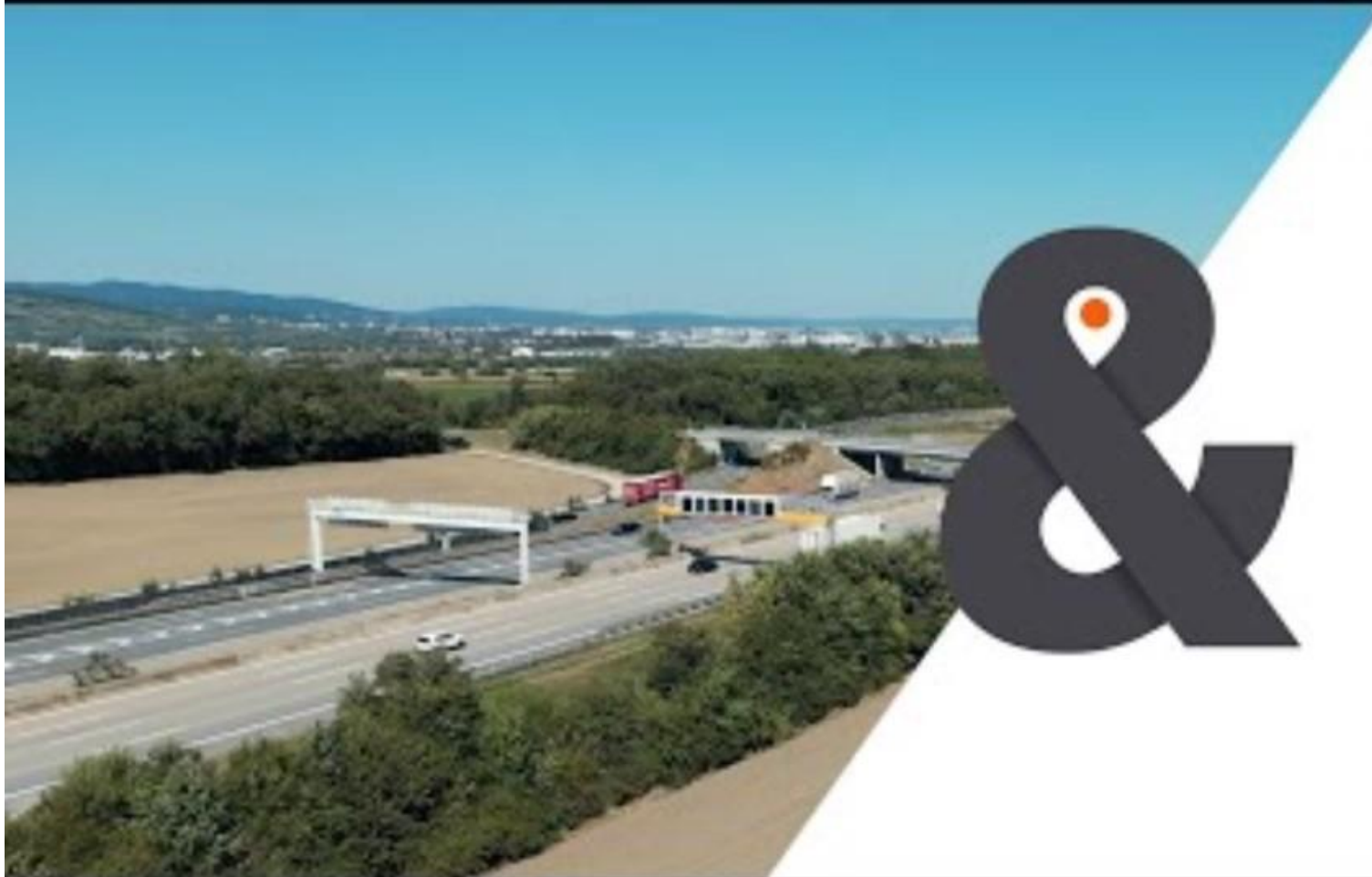
WHAT IS „COOPERATIVE“ IN C-ITS?

Everyone can communicate with everyone



C-ITS | BIG PICTURE





C-ITS

*in Operational
Vehicles*

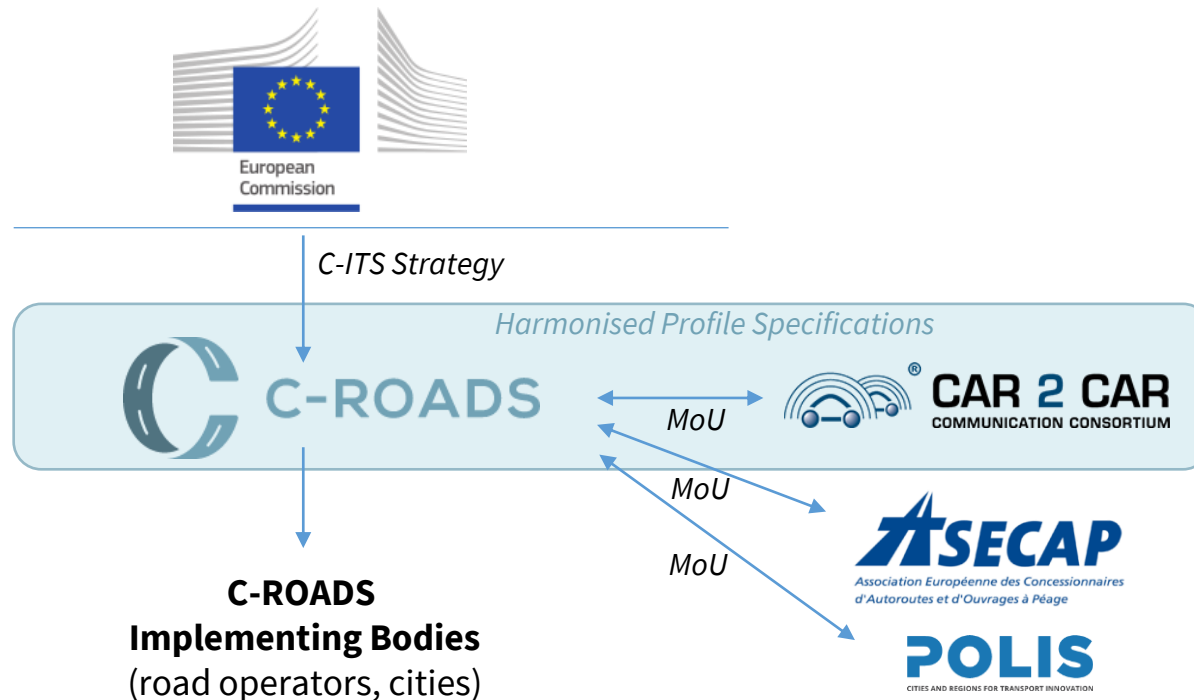
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GUTE FAHRT, ÖSTERREICH!

C-ITS IN EUROPE



C-ITS INFRASTRUCTURE DEPLOYMENT BY C-ROADS

- C-ROADS is a platform of 18 European states and 6 associated members
- C-ROADS develops harmonised profiles for C-ITS infrastructure deployment
- C-ROADS profiles are aligned with the CAR 2 CAR profile
- **Achievement: ~ 30 use cases are harmonized, tested and validated**
→ [C-ROADS Roadmap](#)
- 20 000 km of European roads has been equipped with ITS-G5 in early 2022



18 core members
6 associated members
50+ cities involved

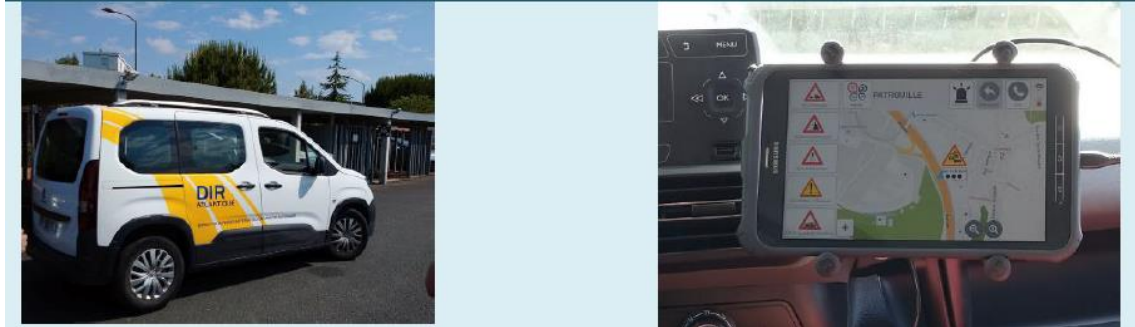


C-ITS DEPLOYMENTS IN EUROPE

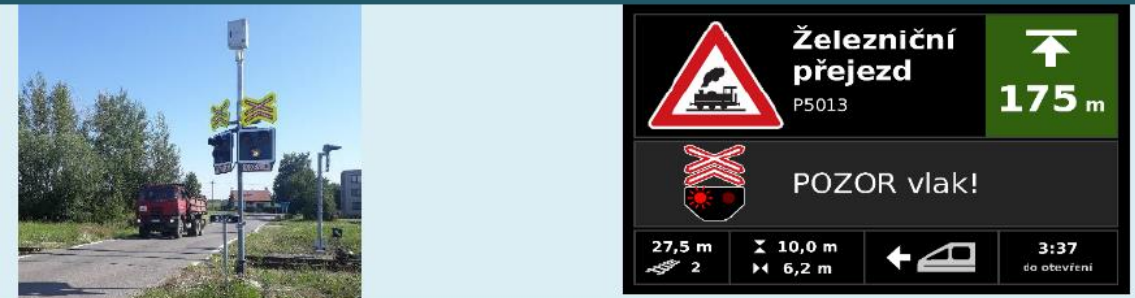
ITS-G5 Roadside units in France



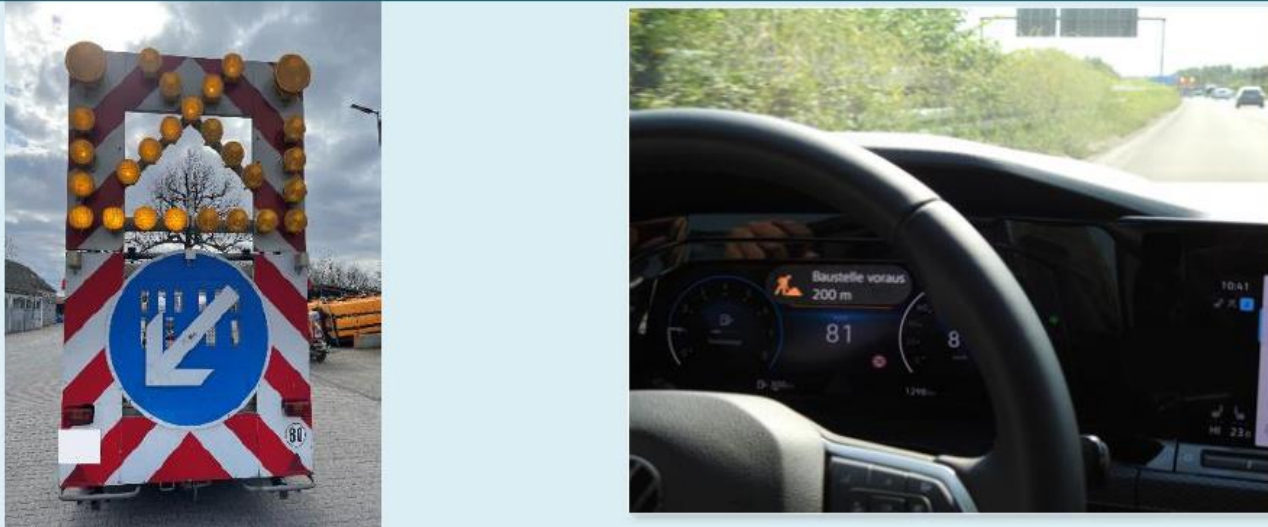
Road operator vehicles with ITS-G5 in France



Railway crossing with ITS-G5 in Czech Republic



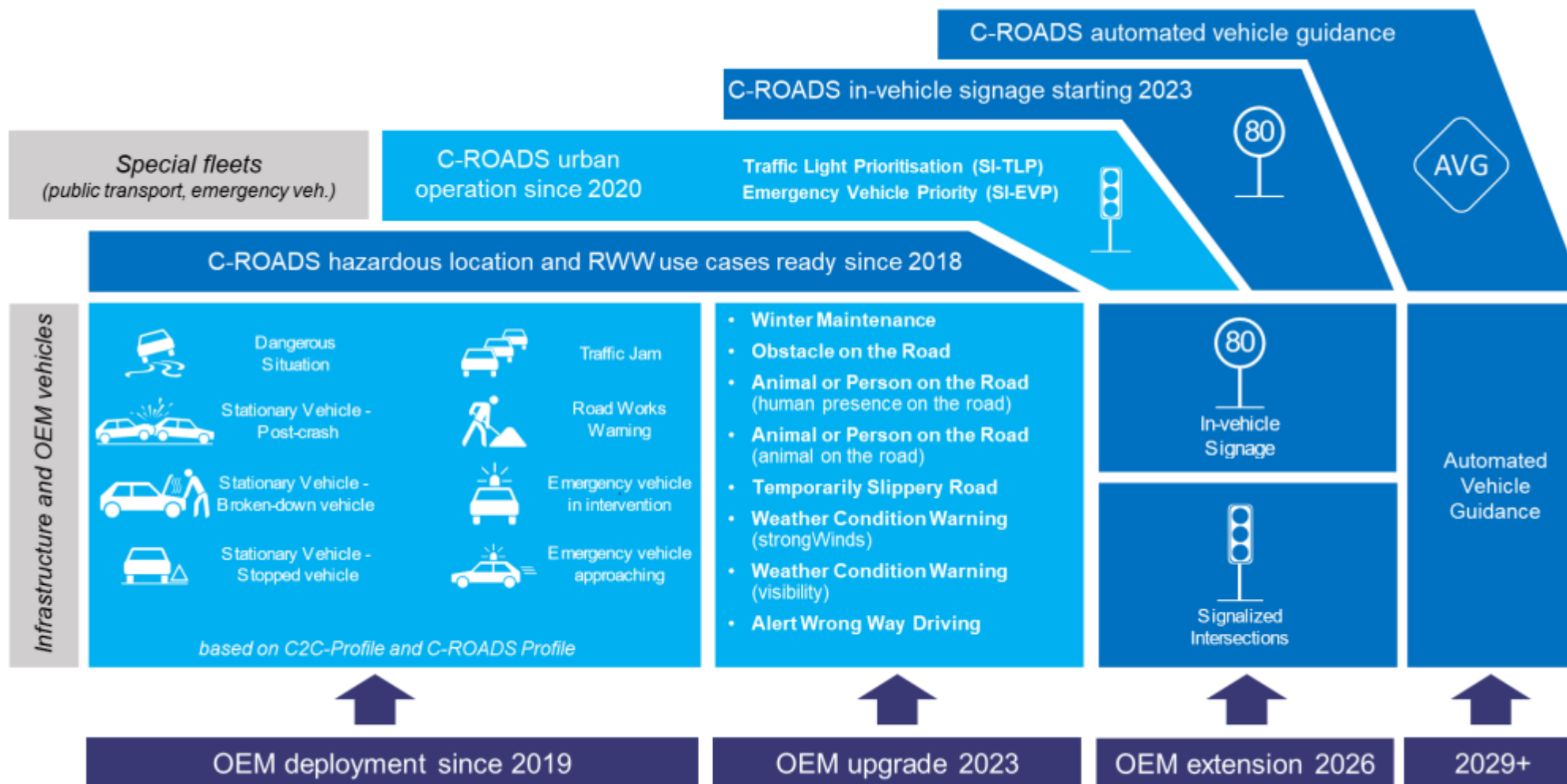
Road works warning based on ITS-G5 on German Autobahn



Public Transport Vehicles with ITS-G5 in Czech Republic



C-ROADS ROADMAP



VEHICLE DEPLOYMENT: C-ITS IN 1.5 MIO VEHICLES

- 📍 Volkswagen introduced "Local Hazard Warning 1.0" in the Golf 8 in 2019
- 📍 Awarded by EURO NCAP
- 📍 In the meantime several other models, also from Seat and VW Commercial Vehicles.



Source: Car2X in the Golf 8, Volkswagen AG, March 2020



Source: Euro NCAP
<https://cdn.euroncap.com/media/58058/volkswagen-local-hazard-warning.pdf>

- 📍 „Local Hazard Warning 2.0“ was launched 2024 with new infrastructure-based use cases

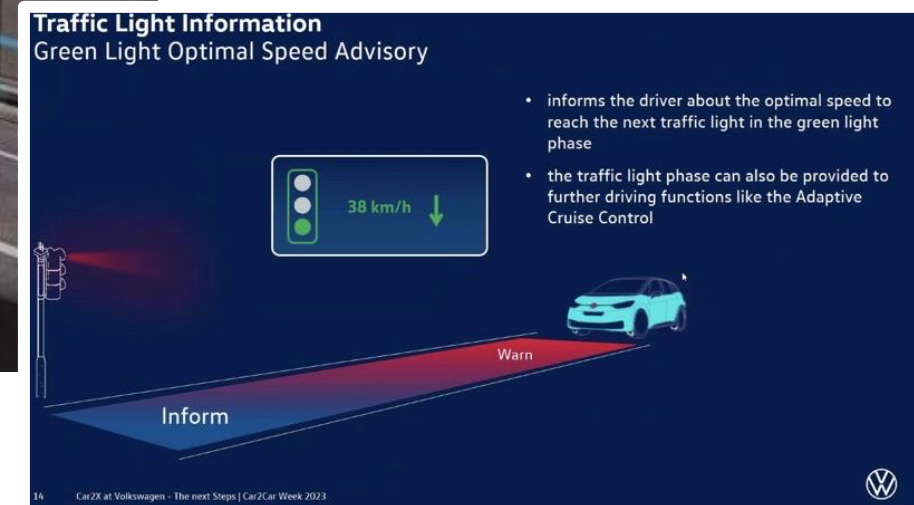


DIRECT COMMUNICATION MOVES ON

With new use cases, new messages, and in more vehicle models...



Source: Car2X at Volkswagen – The next Steps, Car2Car Week, March 2023



TOLLING AND ITS

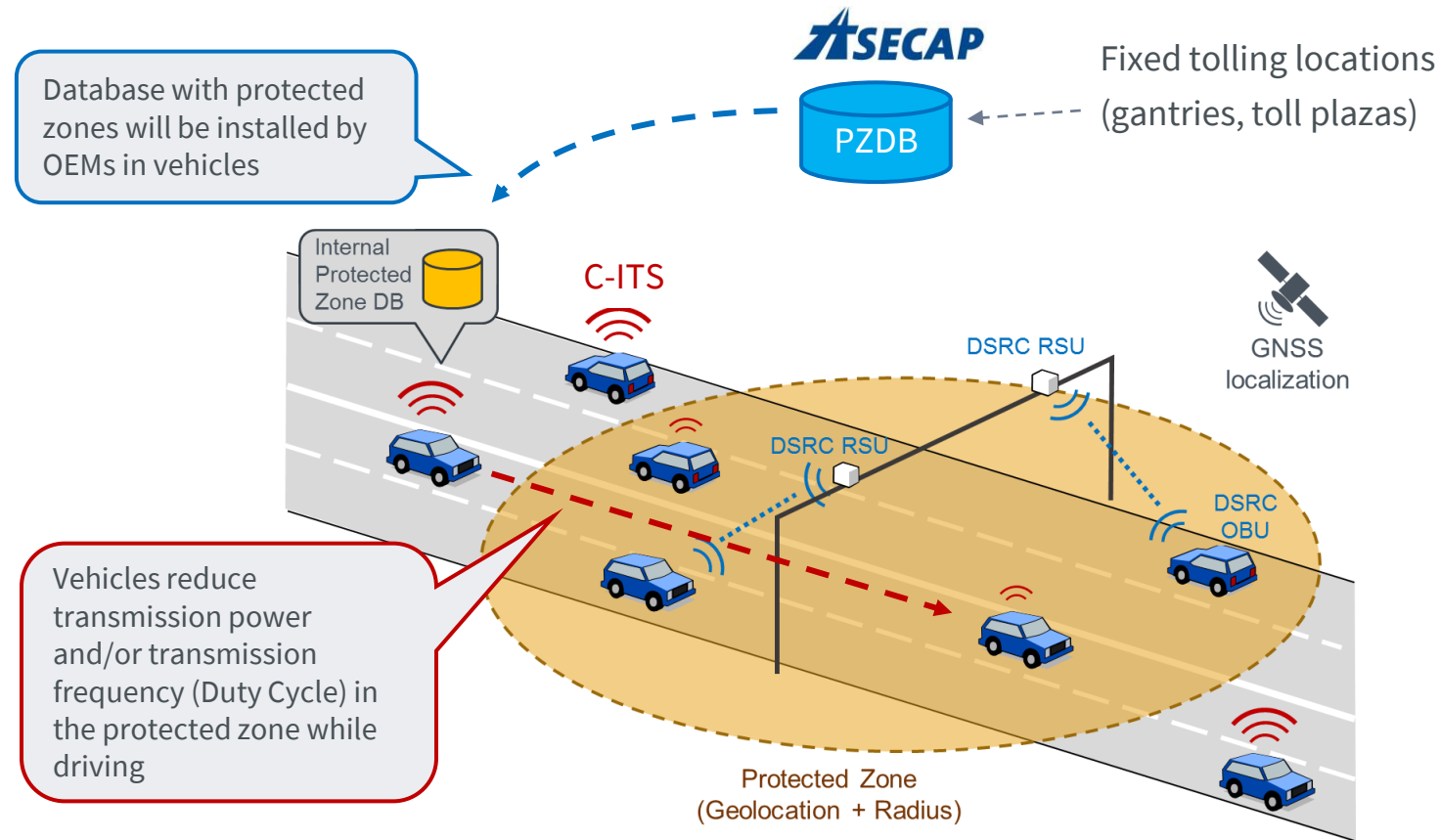


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COEXISTENCE WITH ROAD TOLLING

- 📍 CEN DSRC Road Tolling and ITS operate on neighboring frequencies.
- 📍 To avoid interference and protect road tolling, **protected zones** have been defined.
- 📍 ASECAP maintains the European database of protected zones

Tolling operators can register their CEN DSRC tolling locations in the ASECAP protected zone database



QUESTIONS?

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