

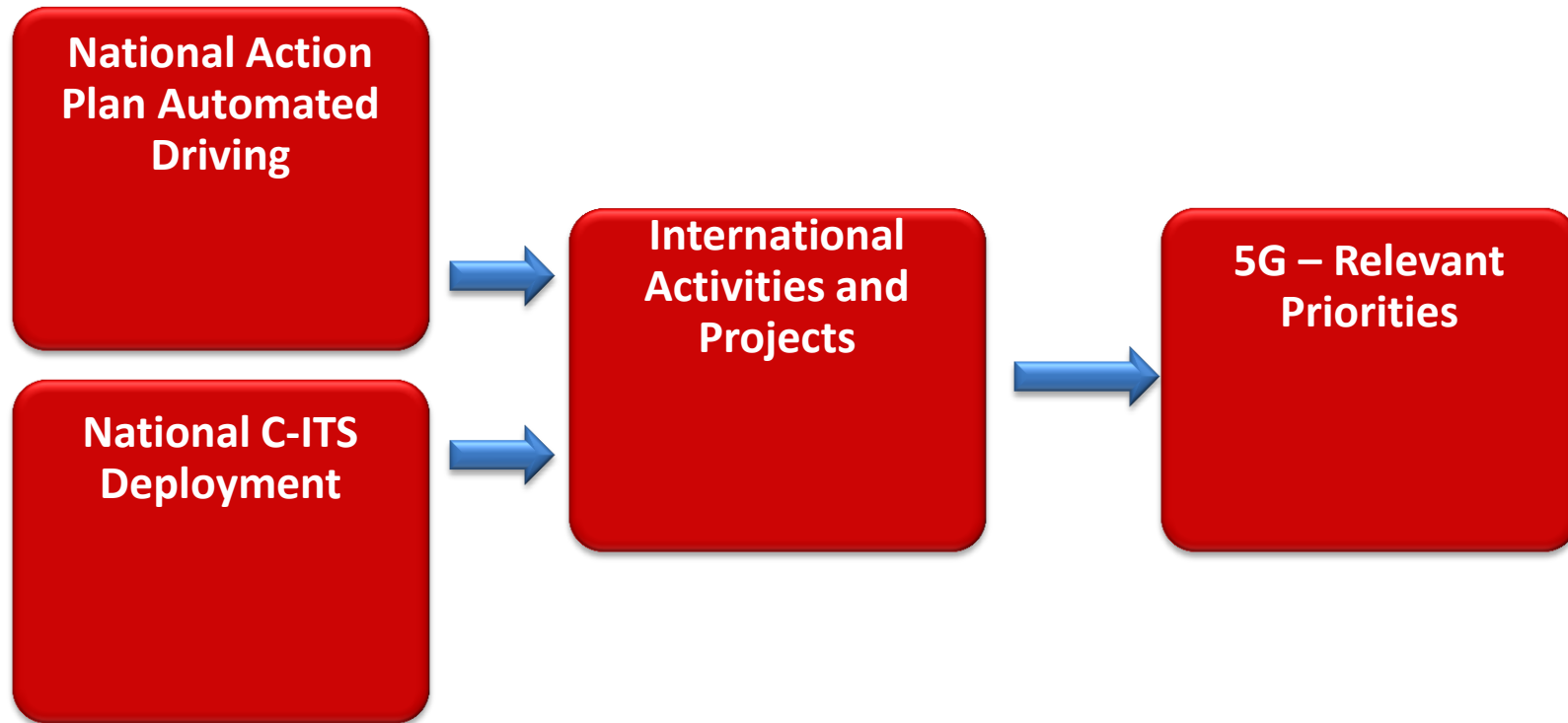
smart mobility
made in austria



Automated – Connected - Mobile

Strategies & Actions towards Automated & Connected Driving in Austria

Outline



Action Plan „Automated Driving“



Framework, Visibility & Evidence

Competences
& Value creation

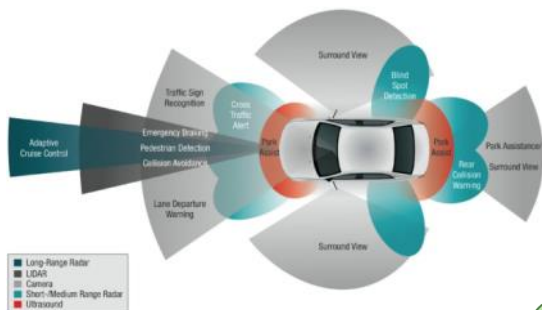


Use Cases
& Impact

USP – Digital Infrastructure

Areas of Action

Vehicle



Infrastructure



Legal / policy framework



- 360° Sensors
- ADAS
- Security and resilience
- Validation & Certification
- HMI of the future



- Dig. infrastructure
- traffic management
- C-ITS (V2x) as enabler
- HD-Maps
- Standards

- Vienna convention
- ECE R-79 steering mechanisms
- ECE R-48 light-signalling
- Type approval

Automated & connected mobility in Austria

National Action Plan „Automated – connected –mobile“

Short- and medium-term measures

WGs: Legal framework, Test Environments, System-Competences,
Use Cases, Digital Infrastructure

ECSEL Austria

Industry/
Technology
Roadmap

(Micro-Electronics;
Sensors & Networks)

A3PS

Roadmap
Eco-Driving &
Automation
(Propulsion Systems &
Lightweight
Materials)

ITS Austria

FTI Roadmap
„MaaS“
Integrated
Door2Door
Mobility &
Automation

C-ITS Deployment Strategy

Focus on
Connectivity (ITS-
G5, 4G/5G) Roll-
Out and Services

National Action Plan - Outline

- Legalize Tests & future legal frameworks (data protection, liability, ...)
- Build & Run Test-Environments
- Prioritize Use Cases & Applications (Impact, acceptance, ethics, ...)
- Secure & strengthen USPs
 - Technology Competences
 - Digital Infrastructures
 - Scientific Competences – Emerging Research!
- Monitoring & Evaluation

WG2 Systems expertise

Fields of technology

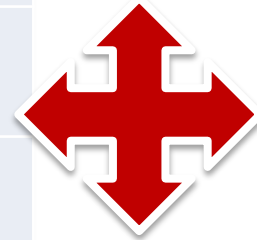
TF 1: System architectures

TF 2: HW, Sensors, Connectivity

TF 3: Embedded SW & CPS

TF 4: Integration V&V, Field Tests

TF 5: ADAS Applications



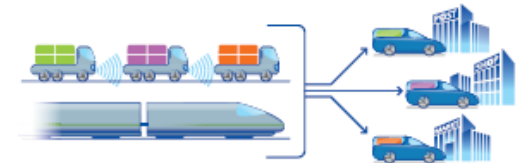
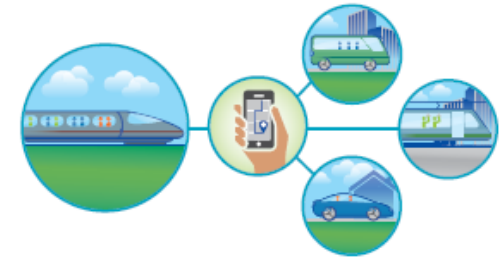
USE CASES

Map & Match

**National
COMPETENCES**

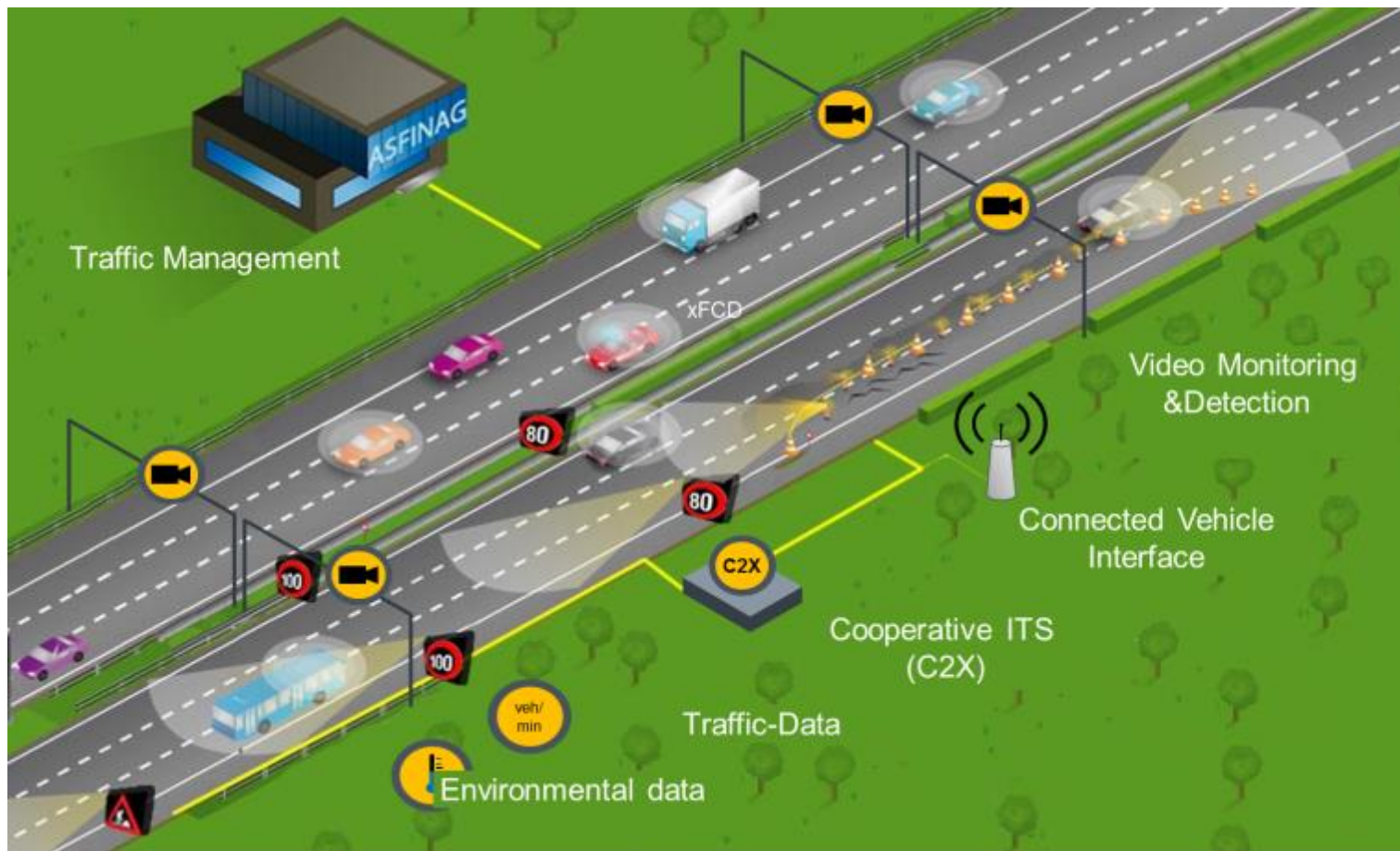
WG3 – Use Cases & Application Scenarios *austriatech*

- **#Flex'n Easy (Automated Last Mile)**
- **#Safety+ (Connected ADAS)**
- **#Transport Works (Connected Freight & City Logistics)**
- **#Create Time (Highway Chauffeur +)**
- **#Stay mobile (Aging and inclusion)**
- **#Create Space (urban mobility concepts)**
- **#Special Helpers (Off-Road, Airport, Terminals, ...)**



WG4 – Digital Transport Infrastructure

- C-ITS (C2X via ITS-G5 & 4G/5G)
- communication networks and protocols
- information management processes and procedures
- traffic management and information centres
- positioning infrastructures
- high definition digital maps
- identification infrastructures and systems
- sensors, sensor networks and monitoring systems
- system architecture (operating systems, IT HW/SW)



Austrian C-ITS Deployment Strategy:

Definition of C-ITS applications

- Focus on EU wide day one list,
- + day 1,5 and day 2 C-ITS application list's

Cooperation of stakeholders

- Engage Cities!
- Special Focus on Freight

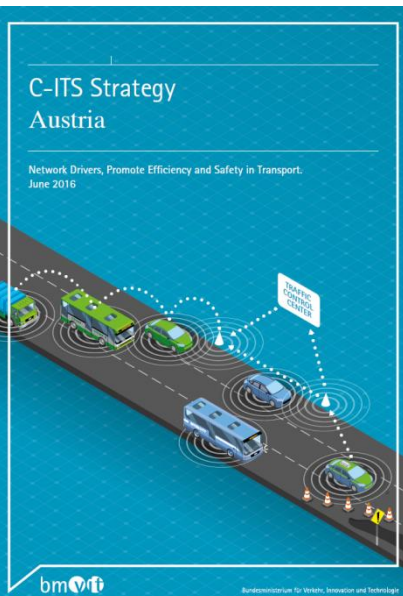
R&D areas

- Priorities for Nat. Research Programme

Clear Vision and Goals 2020

C-ITS Introduction timeline in Austria

- organisational, technical and legal todo's for stakeholders



Policy objectives for C-ITS (Target 2020)

Connect mobile travellers to transport infrastructure management and inform them in the best way

- enhance road safety
- save energy and reduce greenhouse gas emissions
- enable informed and comfortable travelling
- Improve capacity management

by 800 km „connected roads“

by targeted warnings and reduced speeds at all roadworks sites

by an accepted C-ITS Service list

1st things 1st - C-ITS message formats

EC_o-AT

Cooperative awareness message
periodical triggered

CAM

vehicle information:
location, speed, heading, station
type, exterior lights, ...



In-vehicle information
information triggered

IVI

road information:
fixed road signs, dynamic
message signs, text, ...



Decentralized environmental notification message
event triggered

DENM

event information:
type (e.g. RW, accident, adverse
weather), location, duration, ...



Signal phase and timing / map
periodical triggered

SPaT / MAP

traffic light information:
signal phase, timing, road
topology, ...



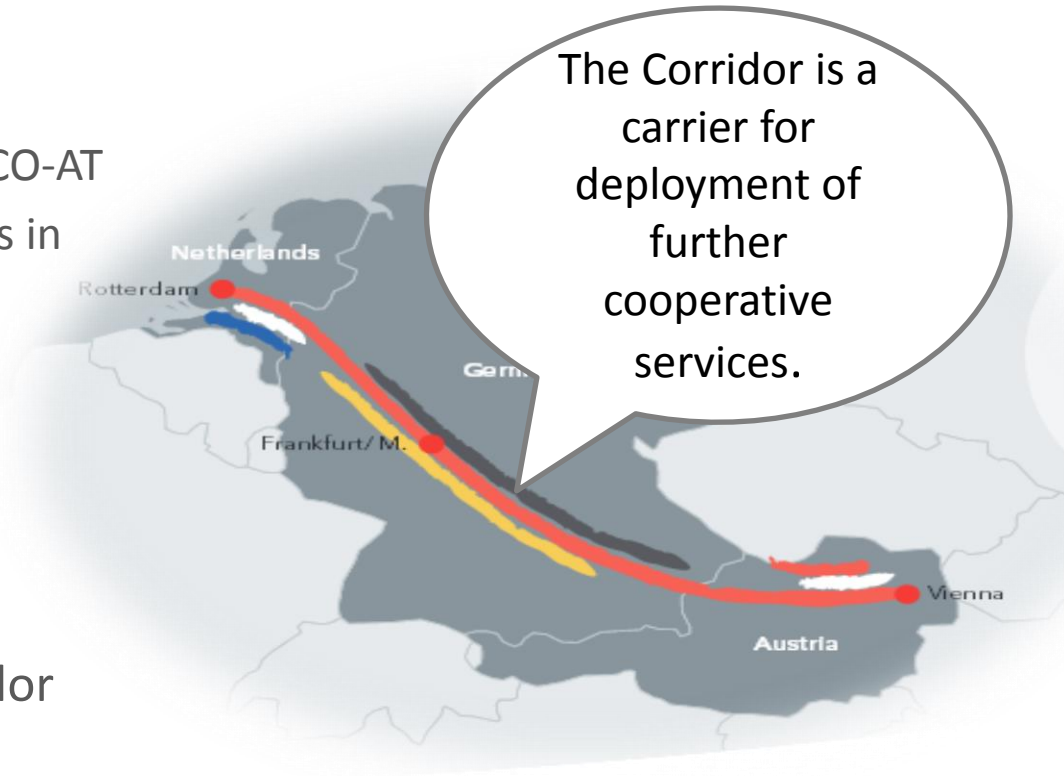
C-ITS STRATEGY – Day1 Services:

Application / service	C-ITS Message Basis	Required & committed key stake holders	Supported by deployment and specification activity	Further key technology building blocks	V2V / V2I
Signage applications:					I
In-vehicle signage	IVI / IVS	OEMs; road operators	C-ITS Corridor, ECo-AT SCOOP@F Car2Car-CC MoU		I
In-vehicle speed limits	IVI	OEMs; road operators	C-ITS Corridor, ECo-AT SCOOP@F Car2Car-CC MoU		I
Signal violation / Intersection Safety	SPAT/ MAP	Cities /road operators OEMs	C-ITS Corridor Car2Car-CC MoU		I
Traffic signal priority request by designated vehicles	SPAT/ MAP	road operators, prio. Veh. Operators: Public transport organisations Emergency service operators / Police	Infrastructure Industry; Cities; PT organisations		I
Green Light Optimal Speed Advisory (GLOSA)	SPAT/ MAP	Cities /road operators OEMs	Car2Car-CC MoU	Forecast required	I
Probe vehicle data: CAM aggregation	CAM		C-ITS Corridor (ECo-AT) SCOOP@F	CAM evaluation logic at infrastructure for detection of traffic related events	I

Application / service	C-ITS Message Basis	Required & committed key stake holders	Supported by deployment and specification activity	Further key technology building blocks	V2V / V2I
Hazardous location notifications:					
Slow or stationary vehicle(s) Traffic jam ahead warning	DENM	OEMs	SCOOP@F Car2Car-CC MoU		V V
Road works warning	DENM	OEMs; road operators	C-ITS Corridor, ECo-AT SCOOP@F Car2Car-CC MoU	Interfaces on infrastructure to trailer / Centre	I
Weather conditions	DENM	OEMs; road operators	SCOOP@F	Interfaces on infrastructure to Centre; evtl. roadside weather station	I
Emergency brake light	DENM	OEMs	SCOOP@F Car2Car-CC MoU		V
Emergency vehicle approaching	DENM	OEMs, Emergency Service Operators / Police	Car2Car-CC MoU		V

Implementation - Pilot

1. Pre-development and proof-of-concept
 - within the Austrian project ECO-AT
 - with road works safety trailers in Hessen around Frankfurt/M.
 - by extension of Dutch Test-site DITCM
2. Nationwide Deployment of Road Works Warning and Probe Vehicle Data in the Cooperative ITS Corridor (NL – DE – AT)
 - within the Austrian project ECO-AT

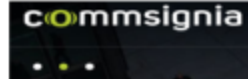


Harmonisation at EU level

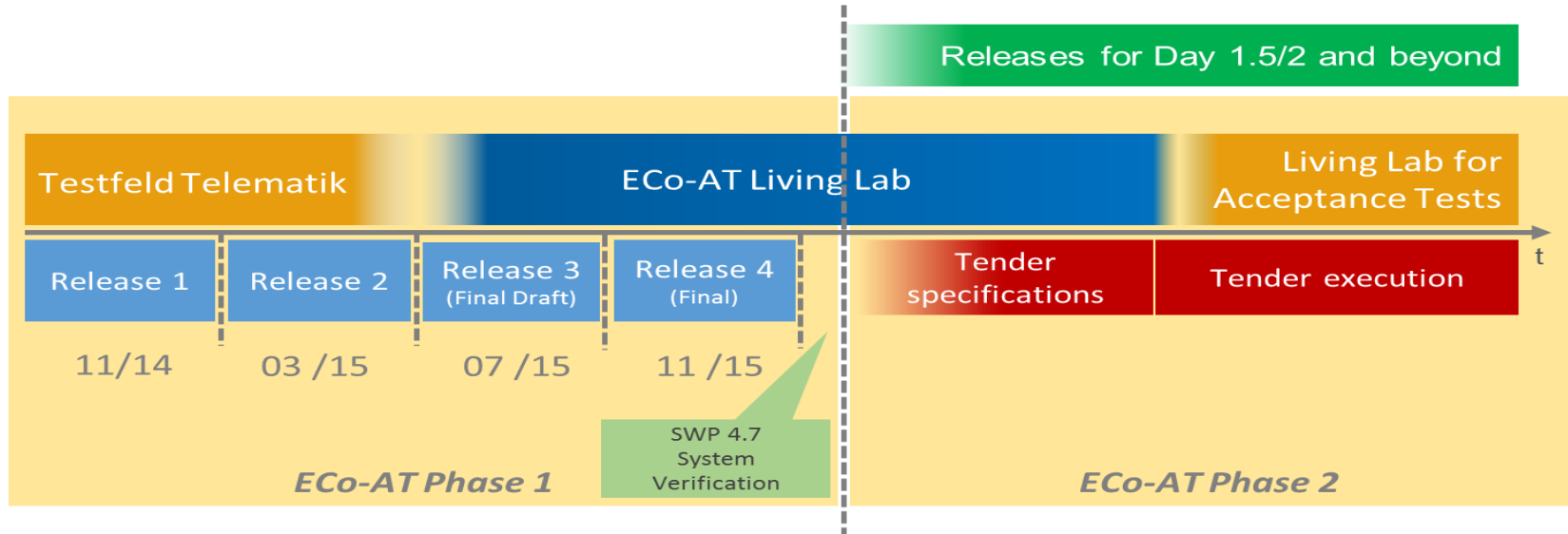
ECo-AT

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- C-ITS standards ((ISO/ETSI – M453 ; CAM, DENM, ..)
- Implementation specs.=> **EU C-ITS Corridor** / companies +3rd parties
- Testing and validation **Living Lab** of components with **open access**



Project phases



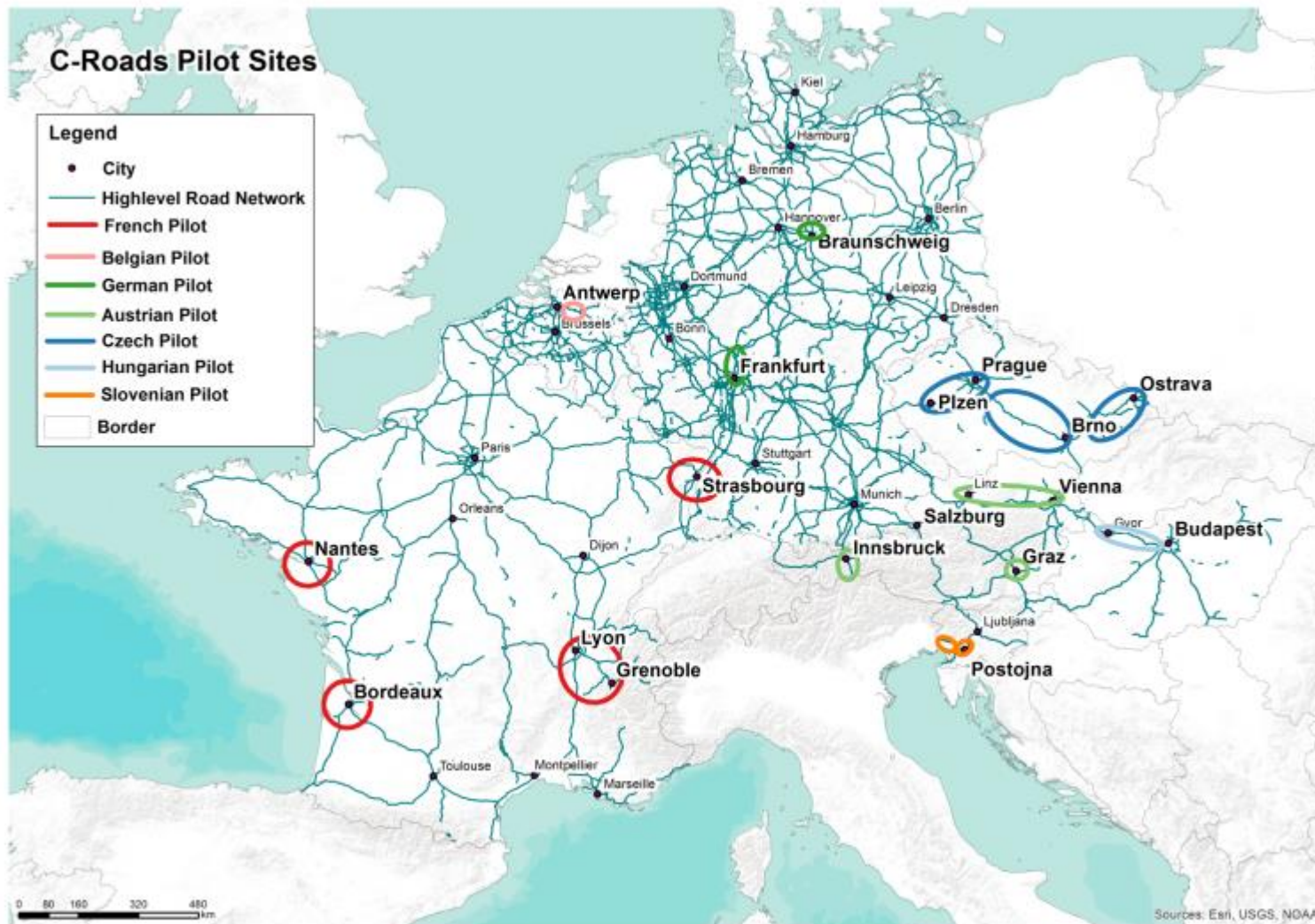
Next: C-Roads (CEF) goal & vision

- *Member States across Europe will install C-ITS pilot sites needed for the testing and later operation of “Day-1-Use-Cases”.*
- *OEMs and the industry will be able to use infrastructure to test systems and services.*
- *All C-Roads pilot site installations will be done in a harmonised way by ensuring interoperability based on international cooperation.*

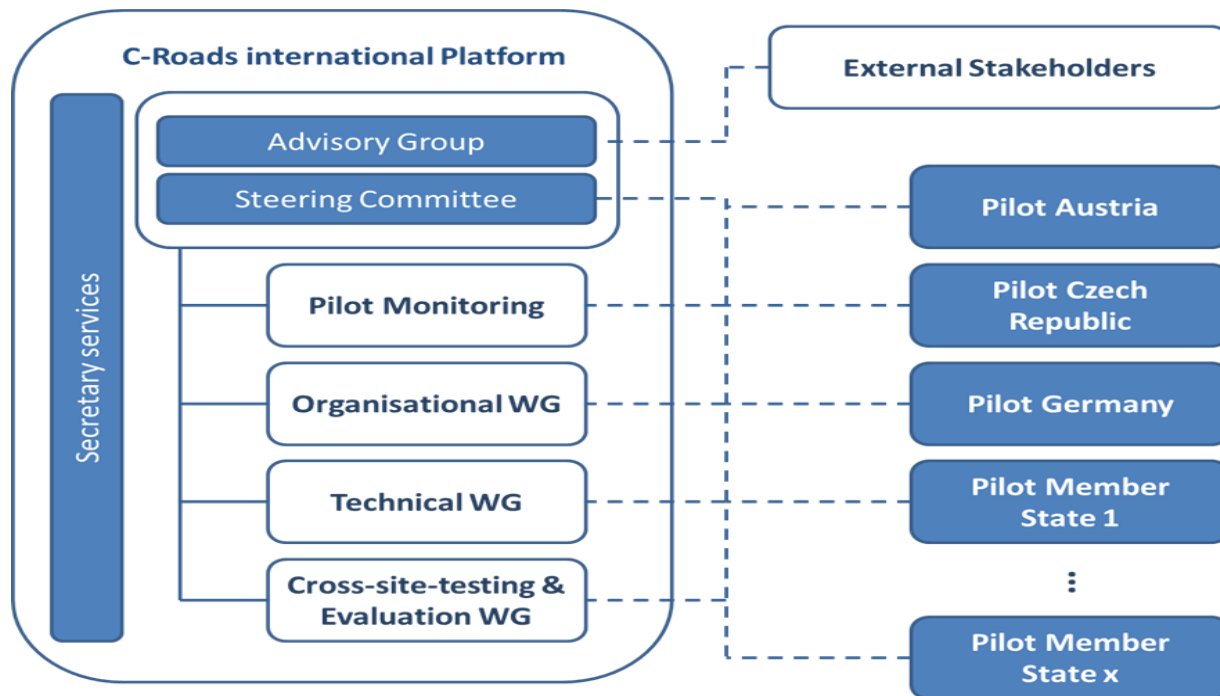
C-Roads Pilot Sites

Legend

- City
- Highlevel Road Network
- French Pilot
- Belgian Pilot
- German Pilot
- Austrian Pilot
- Czech Pilot
- Hungarian Pilot
- Slovenian Pilot
- Border



Concept of C-Roads – working group(s)



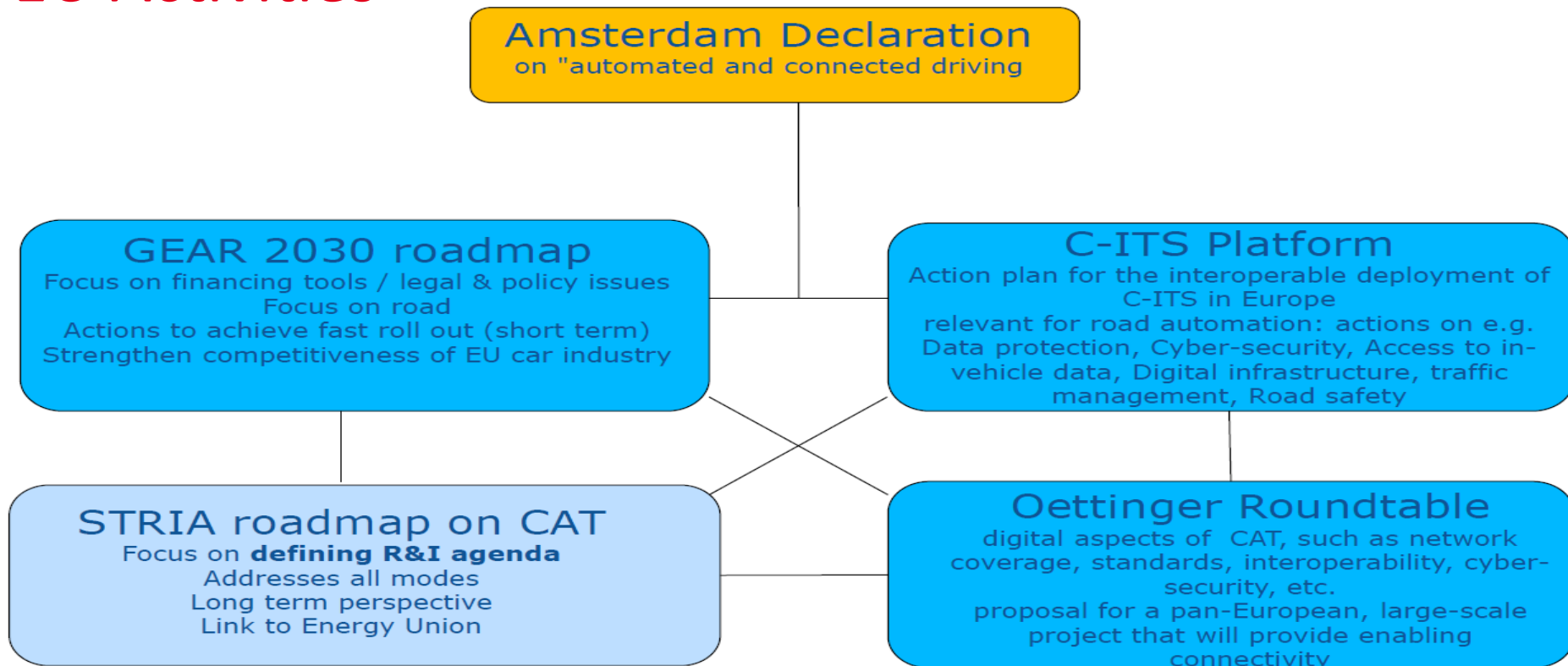
Concept of C-Roads – WG Pilot Tracking

- Scope:
 - Service harmonisation
 - Monitoring of deployment activities within the single Member States (equipment used, road stretches equipped, etc.)
 - Clear description of services piloted
 - Documentation of procurement/piloting/evaluation
 - Implementation of Test-gantries: each pilot site has to set up at least two test-gantries for submission of all pilot-site relevant services
 - Attract equipped vehicles

EU C-ITS Platform, WG1 List of Services	V2I	V2V	Communication via cellular networks	Communication via ITS G5 networks	Road networks were deployed
Day 1 services					
<u>Hazardous location notifications:</u>					
Road works warning	x	x	x	x	
Weather conditions	x		x	x	
Emergency brake light		x		x	
Emergency vehicle approaching		x		x	
Slow or stationary vehicle(s)	x	x	x	x	
Other hazardous location notifications	x		x	x	
<u>Signage applications:</u>					
Traffic jam ahead warning	x	x	x	x	
In-vehicle signage	x	x	x	x	
In-vehicle speed limits	x		x	x	
Probe vehicle data	x	x	x	x	
Shockwave Damping					
Green Light Optimal Speed Advisory (GLOSA)	x	x	x	x	URBAN
Signal violation		x		x	URBAN
Intersection Safety (SPAT/MAP)	x	x	x	x	URBAN

	V2I	V2V	Communication via cellular networks	Communication via ITS G5 networks	Road networks were deployed
Day 1.5 services:					
Off street parking information	x	x	x	x	URBAN
On street parking management and information	x	x	x	x	URBAN
Park & Ride information	x		x	x	URBAN
Information on alternative fuel vehicles & charging stations	x		x	x	
Traffic information & Smart routing	x	x	x	x	
Vulnerable Road user protection		x		x	URBAN
Cooperative Collision Risk Warning		x		x	

EU Activities





EU MASTER PLAN

NordicWay



**C- ITS
PLATFORM**

C-ITS Platform Phase II

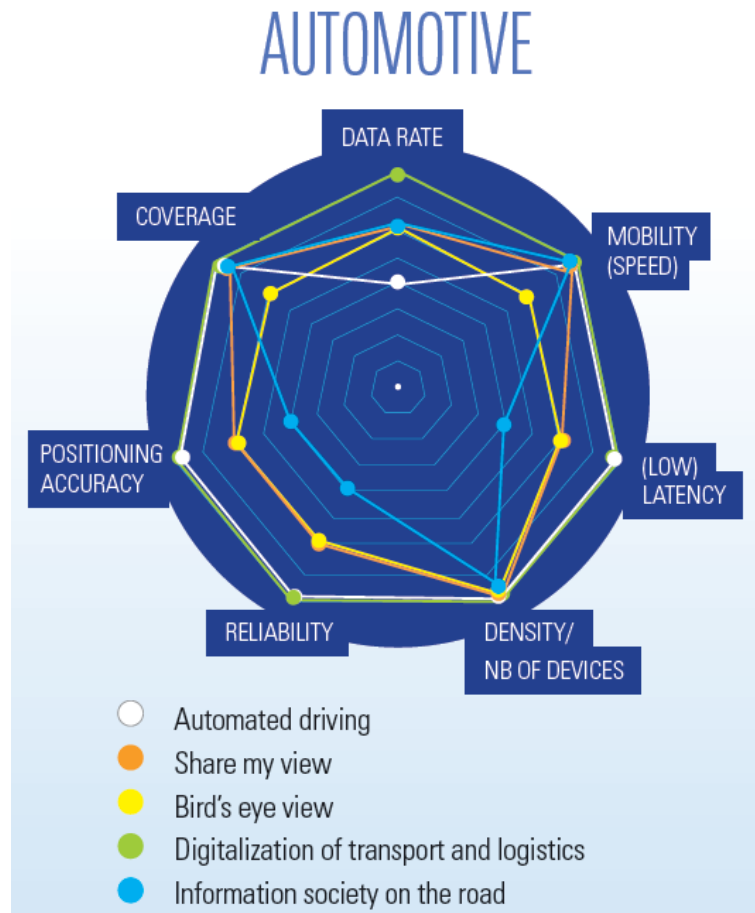


- *C-ITS Security*
- *C-ITS Compliance*
- *Data Protection & Privacy*
- *C-ITS & Automation*
- *C-ITS & Public Transport*

Core 5G

EU 5G Action Plan

- Promote early deployment in major urban areas and along major transport paths.
- Promote pan-European multi-stakeholder trials as catalysts to turn technological innovation into full business solutions.
- Motorways and national roads, and railways, in line with the definition of Trans-European Transport Networks.
- 5G in co-existence with technologies already being deployed, in particular short-range communication for vehicle-to-vehicle and vehicle-to-infrastructure (ITS-G5)



5G for CAV - Challenges

- **Change of service platforms**
 - (smart phone based – integrated to the vehicle or open ones from e.g navigation service providers)
- **Data integration (Vehicle & Infra)**
 - At the same time platforms become integrators of multitude of data sources – and the challenge is to define formats and agree on them
- **High vertical market requirements for CAV**
 - in terms of dynamic service configuration of single network cells
 - In terms of “parallel network links” for automated vehicles, independently of the technical quality of one link, because of failure recovery

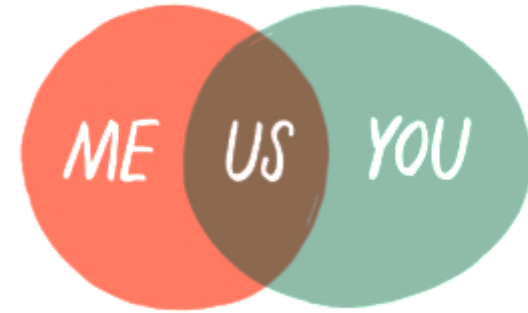
5G for CAV – Challenges (2)

- **More than technology**
- e.g. by 1ms or 3ms transmission time latency
- **“Integrate” actual “infra & service landscape”**
 - ITS –G5, TMC/DAB, 3G/4G
- **“Robust” organisational settings**
 - cooperation's of networked business to be analysed and verified in demonstrations and large scale test sites or better “open labs”

5G - Next Steps & Priorities

■ Pilots & Projects

- AT : Automation Test-Environments (including Digital Infrastructure Perspective)
- C-ITS Deployment – Urban Areas/Applications
- Next: CEF & H2020 & Oettinger RT & IPCEI... → Coordinate



■ Strategies & Frameworks

- AT: Roadmap DTI
Int. Cooperation (NL, FIN, ...)
- C-ITS Platform & Masterplan („lead“ for transport sector)
- „Fair and balanced“ participation of sectors
- Collaboration of DGs!





A digital era for transport

solutions for society, economy and environment

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