PNT meets Mobility Mobility Landscape Austria

Martin Böhm, AustriaTech

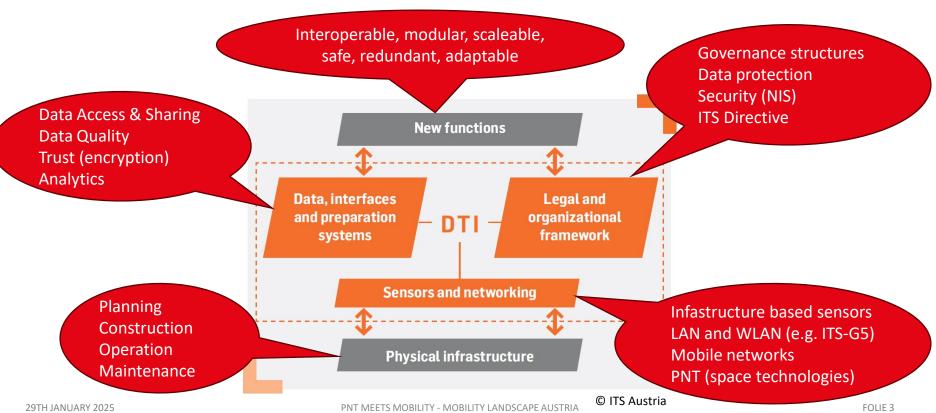
PNT and Mobility

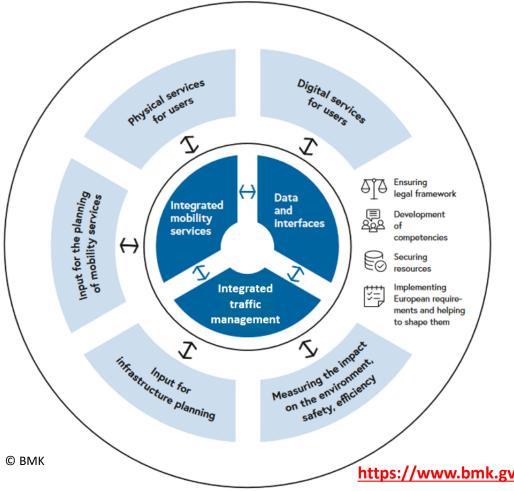
- 1996: the first in-vehicle navigation system approaches the Austrian market (TMC services provide traffic information services)
- 2006: first smartphones are available (location-based services, first multimodal traveller information services)
- 2020: **first connected vehicles** are commercially available and exchange data (starting point is data exchange with the infrastructure operator)
- 202x: **first automated vehicle** is in permanent operation

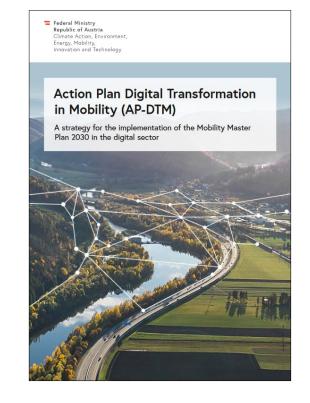
Rising requirements on positioning (accuracy) navigation (lane-accuracy) and timing (sync components)

austriatech

Digital Transport Infrastructure - components





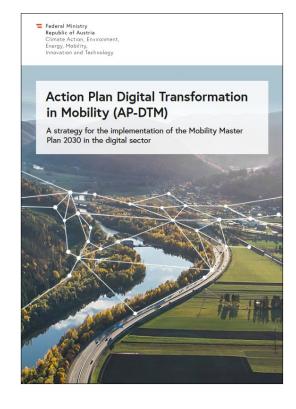


https://www.bmk.gv.at/en/topics/mobility/alternative_transport/its.html

Data and interfaces

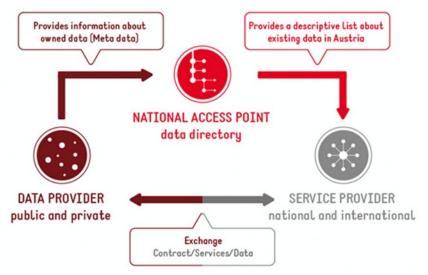
Optimal use of mobility data

- Ensuring the provision of basic data relevant to mobility
- Using data to build evidence
- Designing the National Mobility Data Space
- Cross-sector strategy on digitalisation and data spaces



Data and Interfaces – National Access Point

- Based on the European ITS Directive AustriaTech operates one National Access Point to mobility relevant data (<u>www.mobilitydata.gv.at</u>)
- EU-wide harmonisation within NAPCORE
- Standardised meta-data mobilityDCAT-AP
- 94 datasets
- 36 data holders (public and private)

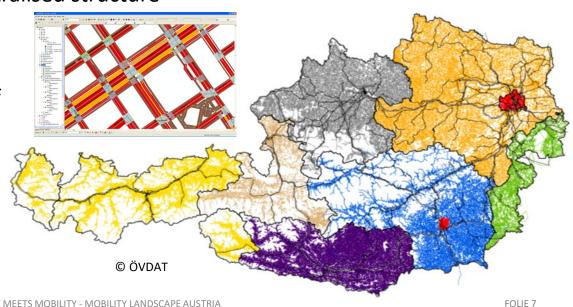




Data and Interfaces – Graph Integration Platform (GIP)

- Already in 2008 Austrian administrations and infrastructure operators started to setup an Austrian-wide multimodal transport graph
- Constantly updated in a decentralised structure
- GIP data is available as Open Government Data (OGD)
- enables a nationwide supply of high-quality transport services
- Forms basis for innovative future services





Data and Interfaces – Echtzeit VerkehrsInformation Straße (EVIS)

- Since 2022 a permanent cooperation (counties, cities, ASFINAG, auto touring club, ministries) operates one Austrian wide real-time traffic situation information system
- EVIS AT provides information on
 - planned events
 - unplanned events
 - actual traffic state
 - prognosis
 - Floating-Car-Data (FCD)
 - traffic regulations





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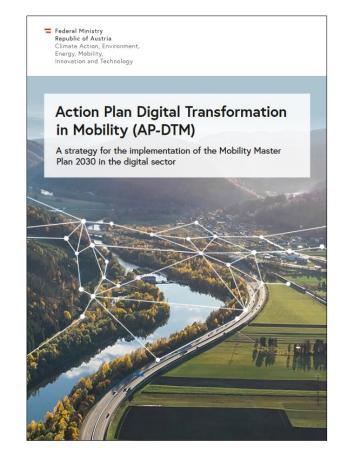
How will satellite services improve data quality as well as completeness (e.g. traffic state)?



Integrated Mobility Services

Making the sustainable mobility services more attractive to use – enabling integrated mobility services

- Simplifying access to sustainable mobility services for users
- Establishing national profiles for data and service interfaces



Integrated Mobility Services

Since 2015 one multimodal traveller information service (white label) as basis for several end-user information services – Travel Information Austria (VAO) – is operative





© Verkehrsauskunft Österreich

FOLIE 11

Übersicht

Konnstraße/Panikengasse Wien

Ankünfte

→ Wien Gersthof, Wallrißstr

→ Wien Westbahnhof S+U → Wien Baumgartner Höhe

→ Wien Gersthof, Wallrißst → Wien Baumgartner Höhe

→ Wien Westbahnhof S+U → Wien Gersthof, Wallrißstr

extern

GIP

Base-

POIs (all

partners)

Monitor

Mo. 22.09.201

Abfahrter

Contract Contract

Message bus

403 m 🔪 🗸

45 +0' +16:50 +0' +16:55 +0' +17:0

traffic messages

0 🗊 🖻

Karte

Ö

Parken & Umsteigen

Integrated Mobility Services

Since 2015 one multimodal traveller information service (white label) as basis for several

0

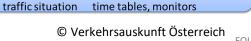
end-user infor Travel Informa is operative



PNT might provide an additional data layer

and in parallel enable new end-user services





Verkehrs-

ARGE ÖVV

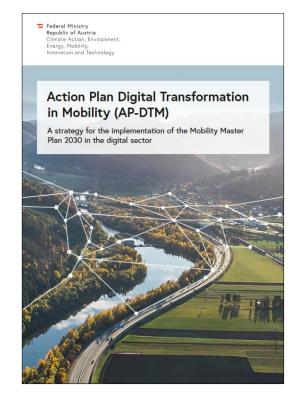
Data

FOLIF 12

Integrated Traffic Management

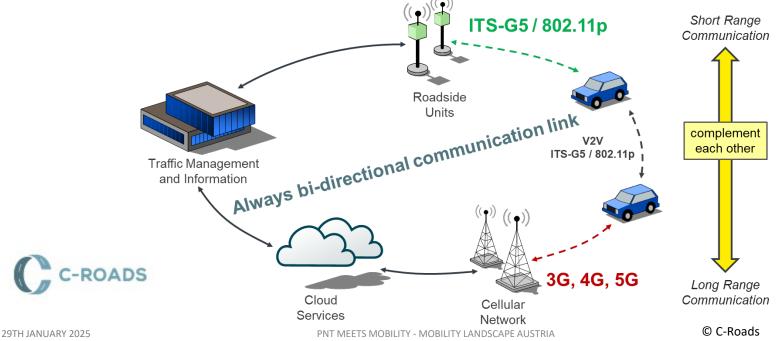
Making transport fit for the future – integrated traffic management

- Integrated traffic information and integrated traffic management
- C-ITS implementation as a contribution to a sustainable and safe mobility system
- Using the digital transformation for climate and environmentally friendly traffic management



Integrated Traffic Management – C-ITS

 C-ITS services are operative in Austria (ASFINAG, Graz, Klagenfurt, Salzburg, Vienna) and serving approx. 1.5 M equipped vehicles



Integrated Traffic Management – C-ITS

Road Works Warning (RWW)	2020	2023	2026
Lane closure (and other restrictions) (RWW-LC)			
Road Closure (RWW-RC)			
Winter Maintenance (RWW-WM)			
Hazardous Locations Notification (HLN)	2020	2023	2026
Stationary vehicle (HLN-SV)			
Emergency or Rescue/Recovery Vehicle in Intervention (HLN-ER			
Emergency or Prioritized Vehicle Approaching (HLN-EPVA)			
Accident Zone (HLN-AZ)			
Traffic Jam Ahead (HLN-TJA)			
Weather Condition Warning (HLN-WCW)			
Temporarily slippery road (HLN-TSR)			
Animal or person on the road (HLN-APR)			
Obstacle on the road (HLN-OR)			
Alert Wrong Way Driving (HLN-AWWD)			
Railway Level Crossing (HLN-RLX)			
Unsecured Blockage of a Road (HLN-UBR)			
Public Transport Vehicle Crossing (HLN-PTVC)			
Public Transport Vehicle at a Stop (HLN-PTVS)			

Use case specified

Published in a C-ROADS Profile - Validated and Ready to Market – Infrastructure operation starting Operational on both sides - Trust between Infrastructure and vehicles (OEM vehicles or special fleet)

Signalized Intersections (SI)	2020	2023	2026
Signal Phase and Timing Information (SI-SPTI) Green Light Optimal Speed Advisory (SI-GLOSA) Imminent Signal Violation Warning (SI-ISVW)			
Emergency Vehicle Priority (SI-EVP) * Public Transport – Restricted Access			
In-Vehicle Signage (IVS)	2020	2023	2026
Traffic Signs (IVS-TS) Free Text (IVS-FT) Parking Information Toll Station Approaching / Crossing			
Smart Routing Route Advice Hard Shoulder Running			
Automated Vehicle Guidance (AVG)	2020	2023	2026
SAE Level Guidance (AVG-SAELG) Platoon Support Information (AVG-PSI) Vehicle Distance Information Vehicle Speed Information			
Collective Perception (CP)	2020	2023	2026
Collective Perception on Highways Collective Perception on Urban Intersections			
Probe Vehicle Data (PVD)	2020	2023	2026
Vehicle Data Collection (PVD-VDC)*			

© C-Roads

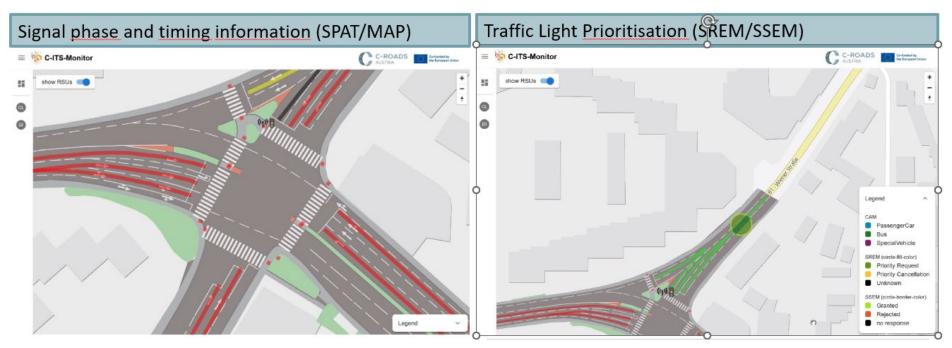
Integrated Traffic Management – C-ITS

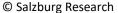
Road Works Warning (RWW)	2020 2023	2026	Signalized Intersections (SI)	2020	2023	2026
Lane closure (and other restrictions) (RWW-LC) Road Closure (RWW-RC) Road Works Mobile (RWW-RM) Winter Maintenance (RWW-WM)			Signal Phase and Timing Information (SI-SPT) Green Light Optimal Speed Advisory (SI-GLOSA Imminent Signal Violation Warning (SI-ISVW)			
Hazardous Locations Notification (HLN) Stationary vehicle (HLN-SV) Emergency or Rescue/Recovery Vehicle in Intervention (HLN-ER	PNT will improvLane specifie		vice quality:		2023	2026
Emergency or Prioritized Vehicle Approaching (HLN-EPVA)	 Need to ope (incl. tunnel 	erate along s, narrow s	the whole infrastru streets) of components	ıcture	2023	2026
Alert Wrong Way Driving (HLN-AWWD) Railway Level Crossing (HLN-RLX) Unsecured Blockage of a Road (HLN-UBR) Public Transport Vehicle Crossing (HLN-PTVC) Public Transport Vehicle at a Stop (HLN-PTVS)			e.g. tunnels, junctio	ons)	2023	
Use case specified	and in parallel	contribute	to trust		2023	2026
	alidated and Ready to Market – Infrastructure		Probe Vehicle Data (PVD)	2020	2023	2026

Operational on both sides - Trust between Infrastructure and vehicles (OEM vehicles or special fleet)

Probe Vehicle Data (PVD)	2020
Vehicle Data Collection (PVD-VDC)* Event Data Collection (PVD-EDC)*	

Integrated Traffic Management – C-ITS service examples





Integrated Traffic Management - CCAM

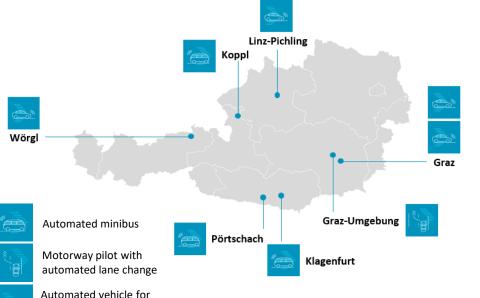
- AustriaTech is the Austrian Contact Point Automated Mobility
- We expect that C-ITS will form one technical basis for enabling CCAM services in Austria





CCAM in Austria

• Active test permits 2024



 Test regions ALP.Lab and Digitrans and test vehicles TORUS & eVAN









passenger transport

CCAM in Austria – recent initiatives and projects

- Strategic Alliance Automated Mobility ("Strategische Allianz Automatisierte Mobilität")
 - Stakeholder network and a cooperation structure with stakeholders from industry, research and the public sector on the topic of automated mobility in Austria
 - Common vision: 1) the **best possible use of automated mobility in Austria** and 2) to achieve **Austria's technological leadership**
 - main pillars: strategic alignment, knowledge transfer and competence building, participation in committees and other platforms, networking and matchmaking

 2023
 2024
 2025

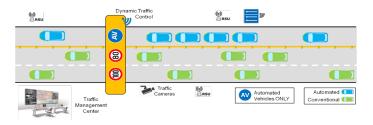
 Start of initiative by BMK and AustriaTech
 Several workshops on use cases, horizonal topics along implementation, international knowledge transfer, research priorities
 Further establishment (managed by consortium led by biz-up)

- auto.Ready
 - centralised support for stakeholders and the public sector in the form of a **Readiness Framework for Automated Mobility in Austria**
 - Coordinated and defined **focus-use cases** for Austria
 - Survey, analysis and evaluation tools + monitoring and evaluation system
 - Identified competencies and technical requirements for the public sector

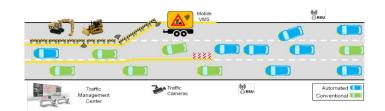


Integrated Traffic Management - CCAM

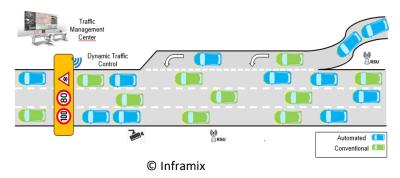
Dynamic Lane Assignment



Roadworks zones



Bottlenecks



Integrated Traffic Management - CCAM

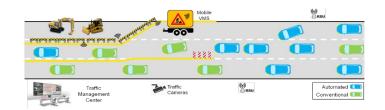
Dynamic Lane Assignment



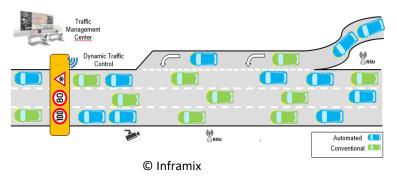
Current scenarios:

- on a specific point/section
- Future scenarios: area wide support?

Roadworks zones



Bottlenecks



Austrian Expertise as part of European Cooperation



Conclusio

- **PNT is an integrative part of the digital transformation** in mobility and becomes even more important in future.
- The combination of satellite navigation systems with various ground-based sensors provides increasingly higher accuracy for navigation.
- These innovations are particularly important for new mobility applications but will improve as well existing mobility applications:
 - Improved data quality (completeness, accuracy)
 - Enlarge service areas (e.g. towards peripheral and rural areas)
 - Time sync (e.g. in the Edge) to support collective perception

Thank you for your attention



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