

5GLoginnov Truck Platooning

Ralf Willenbrock, T-Systems International GmbH, Program Manager I.T.S.

<https://5g-ppp.eu/5g-loginnov/>

5G LOGINNOV

Connected and Automated Logistics

5G improves logistics and environmental challenges of European ports by connecting 5G devices, data analytics and next generation traffic management

- Development and deployment of innovative ports and logistics hubs operation system integrated in 5G networks
- Optimise ports & logistics hubs operation reducing OPEX
- Reducing ports & logistics emissions (CO₂, NO_x)
- Regulate freight traffic on 5G logistics corridors according to the EU GREEN DEAL program

5G LOGINNOV – Project overview



Deployment of 5G enabled Connected and Automated Logistics

Project goal

Design an innovative framework of 5G enabled Connected and Automated Mobility technologies inside and outside modern ports (Hamburg, Athens, Koper)

- Development of 5G enabled ports and logistics hub operation
- 5G integrated predictive maintenance to anticipate breakdowns
- CAM truck platooning from hinterland to port
- GLOSA for truck platooning and sustainable traffic management

Benefits

- Significant reduction of CO2 and NOx caused by hub logistics
- Boost CCAM based on 5G technology and hub-centric use cases
- Establish new business models and 5G CCAM based Go-to-Market strategies in ports according to the Green Deal policy requirement



Use cases

Hamburg port:

5G Floating truck and emission data for automated truck platoons using GLOSA

Athens port:

Remote automation, 5G communication in ports and predictive maintenance

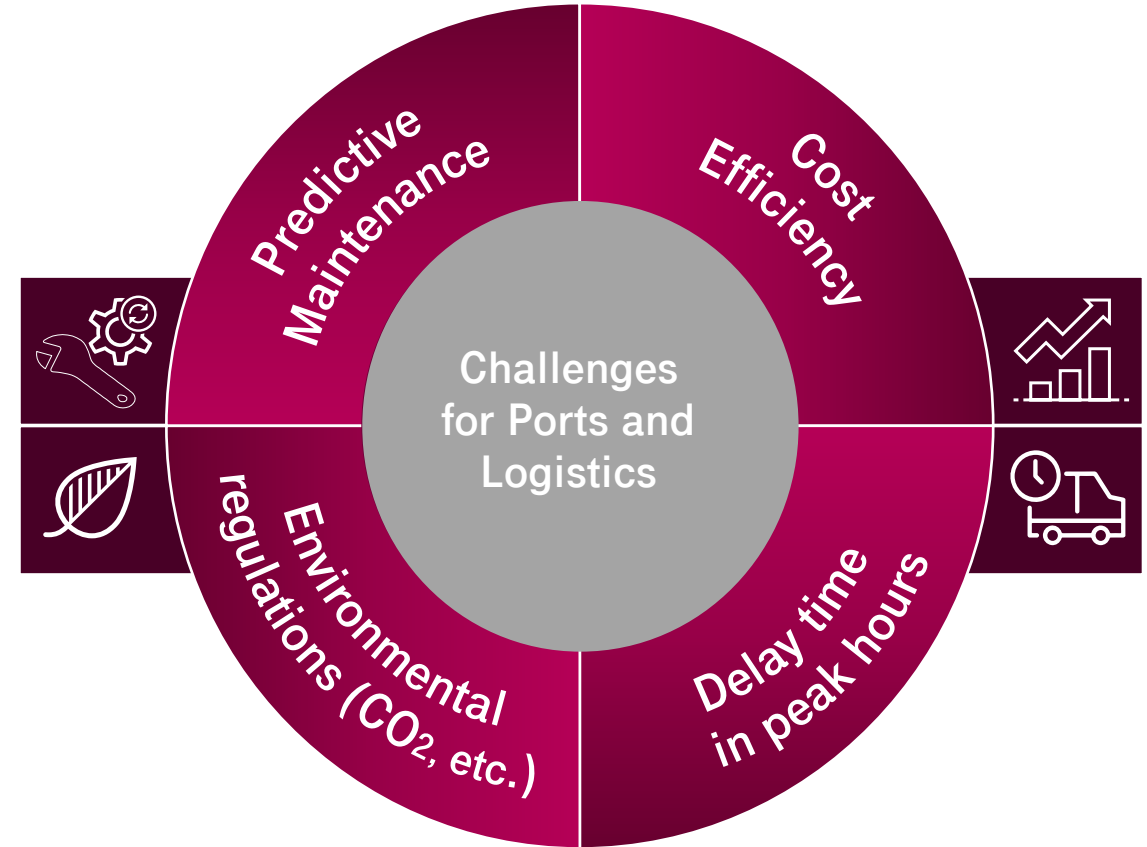
Koper port:

5G based V2X data exchange of surveillance data for yard truck logistics

5G LOGINNOV – Market challenges

- Cargo port operators are under high pressure to **comply with increasingly stricter environmental regulations** and societal views for sustainable operations
- **Managing delay during peak times** due to capacity problems and traffic congestions
- Reducing **operating costs** for infrastructure investment and innovation
- **Improving port operation** to protect infrastructure assets by predictive maintenance
- **Digital Transformation:** make optimum use of 5G capabilities for yard operation and Hinterland connectivity

The solution: Building 5G port and logistics operation systems with connected and automated vehicles and innovative IOT sensor platforms



5G LOGINNOV – Use cases in living labs



Hamburg

UC8/9: 5G-LOGINNOV Floating Truck and Emission Data (FTED)

UC10: 5G-LOGINNOV 5G GLOSA and Automated Truck Platooning (GTP) under 5G-LOGINNOV Green initiative

UC11: 5G-LOGINNOV dynamic control loop for environment sensitive traffic management actions (DCET)



Athens (Piraeus)

UC3: Optimal selection of yard trucks

- Installation of a 5G access point on yard trucks
- 5G latency, precise localization services, etc.

UC4: surveillance cameras / video analytics

- Installation of connected 4K surveillance cameras
- AI/ML solution for container seal presence, human presence detection, social distancing etc.

UC7: Predictive Maintenance

- 5G access point installed on yard vehicles
- AP will collect and forward in real time with low latency telemetry data over the 5G network



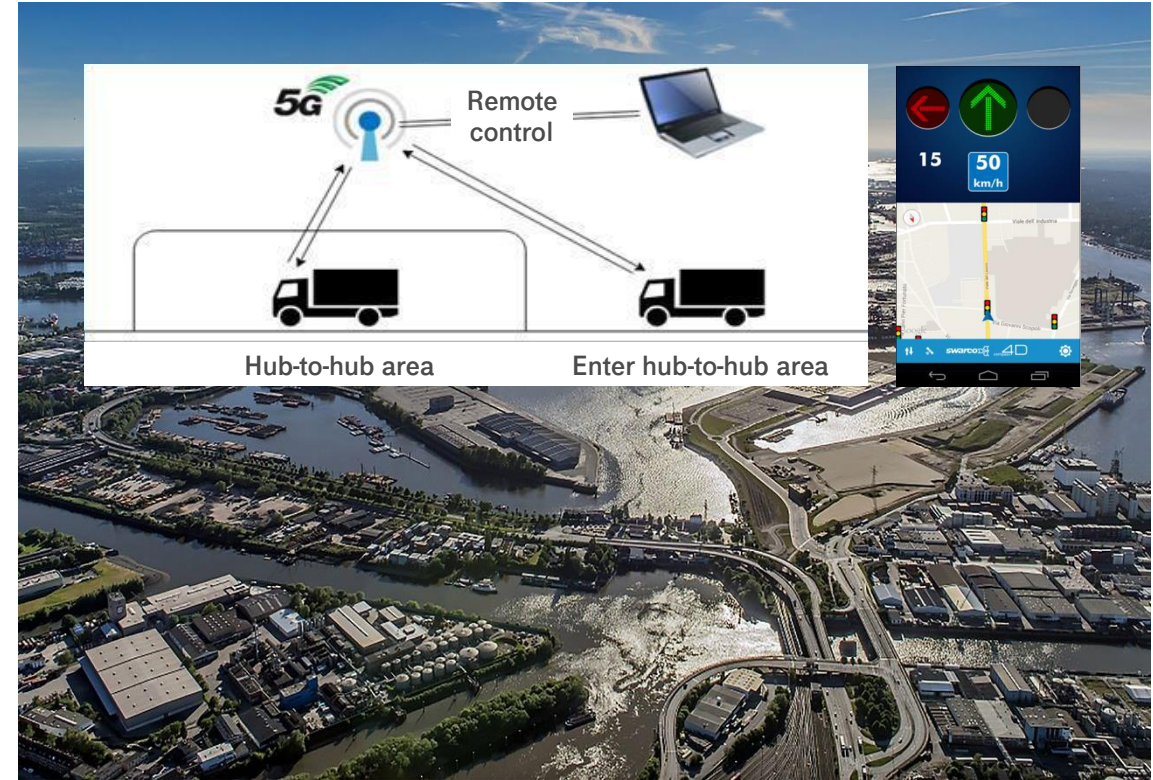
Koper (Luka)

UC1: port control, logistics and remote automation

UC2: business critical and mission critical communications

- 1) **Truck & Emission Data for Sustainable Traffic Management** based on 5G V2X in Hamburg
- 2) **Automated Truck Platooning using 5G based GLOSA** in the logistics corridor of Hamburg to **achieve low emission targets** for ports and hub-logistics
- 3) **Data exchange with SWARCO traffic management center.** Dynamic control loop for the reduction of CO₂/NO_x emissions from trucks by **avoiding Start-Stop events** by using GLOSA technology

With 5G-LOGINNOV, ports will **minimize their environmental footprint to the city**. They will decrease disturbance to the local population through a **significant reduction in the congestion** around the port.



Contribution of project lead partners



- **SWARCO** is Traffic Light and **Traffic Systems Provider**
- **SWARCO** is Traffic Management System (TMS) **Provider** in Hamburg
- T1.3 Lead (**LL infrastructure requirements**) and **GLOSA**



- **Continental** is **Automotive Systems and Engineering Supplier**
- **Supplier** of 5G and IoT based sensors **for Truck Telematics**
- **Sensor data supplier** for **Automated Truck Platooning** and **GLOSA**





- **Tec4u** is a **Fleet and Engineering SME** for **Truck Telematics**
- **Tec4u** develops **logistics application** for Living Lab Hamburg
- **Support** and involvement **for SME's, Start-Ups and Market Deployment**




- **Deutsche Telekom** is national **mobile network operator** providing 5G-based services
- **T-Systems** is **Service provider** LCMM (Carbon Footprint Monitoring) and GLOSA
- **T-Systems** is **LL Hamburg coordinator**, WP3 lead beneficiary

5G LOGINNOV – Facts & Figures

 Start 10 oct 2020,
duration 36 months

 7,9 million €

 Consortium with
15 members from
7 countries
(BE, FR, IT, RO, GR,
SL, DE)

 Members represent
stakeholders from
Logistics, Automotive and
Telecom Industry working
closely with Infrastructure
operators and Research
Institutes.
SMEs and Start-Ups will
be integrated for future 5G
market uptake across Europe

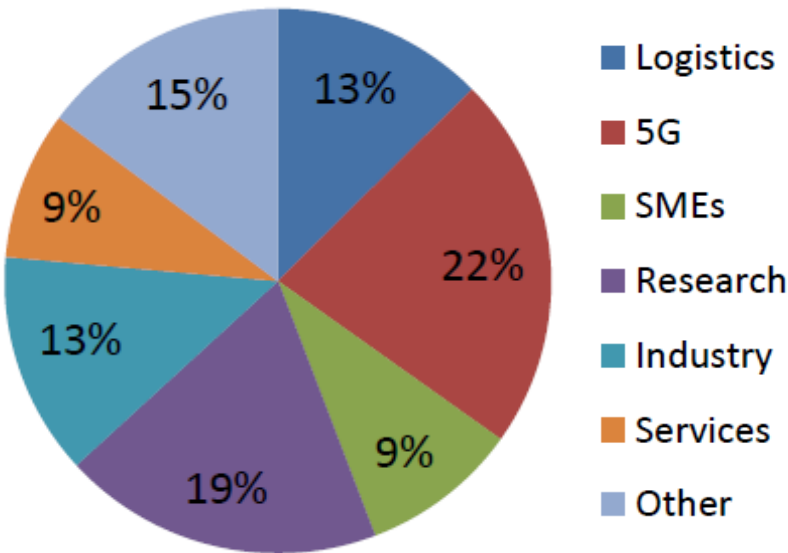
T-Systems contribution

Project lead with partners Continental, Swarco and TEC4U

Project members

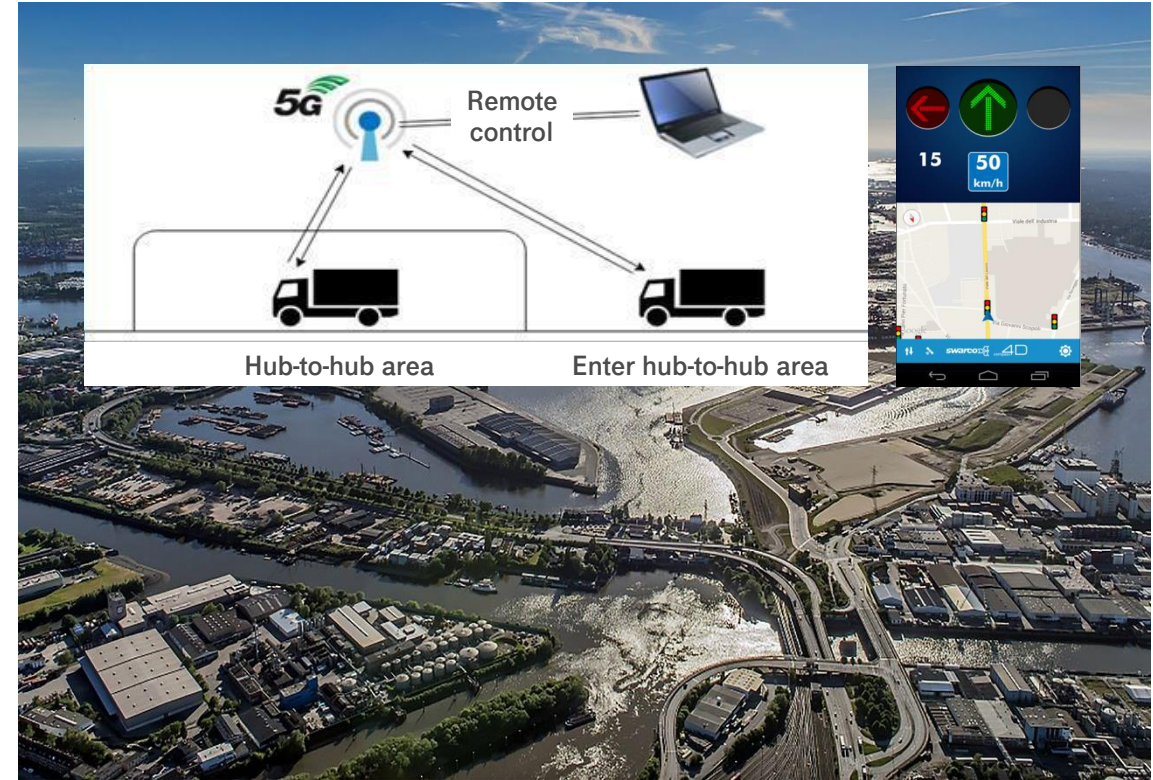
- ERTICO
- AKKA
- CIRCLE
- Continental
- ICCS
- ICOOR
- ININ
- Luka Koper
- PCT
- SWARCO
- tec4U
- Telekom Slovenije
- T-Systems
- VICOM
- VODAFONE

Per type of partner:

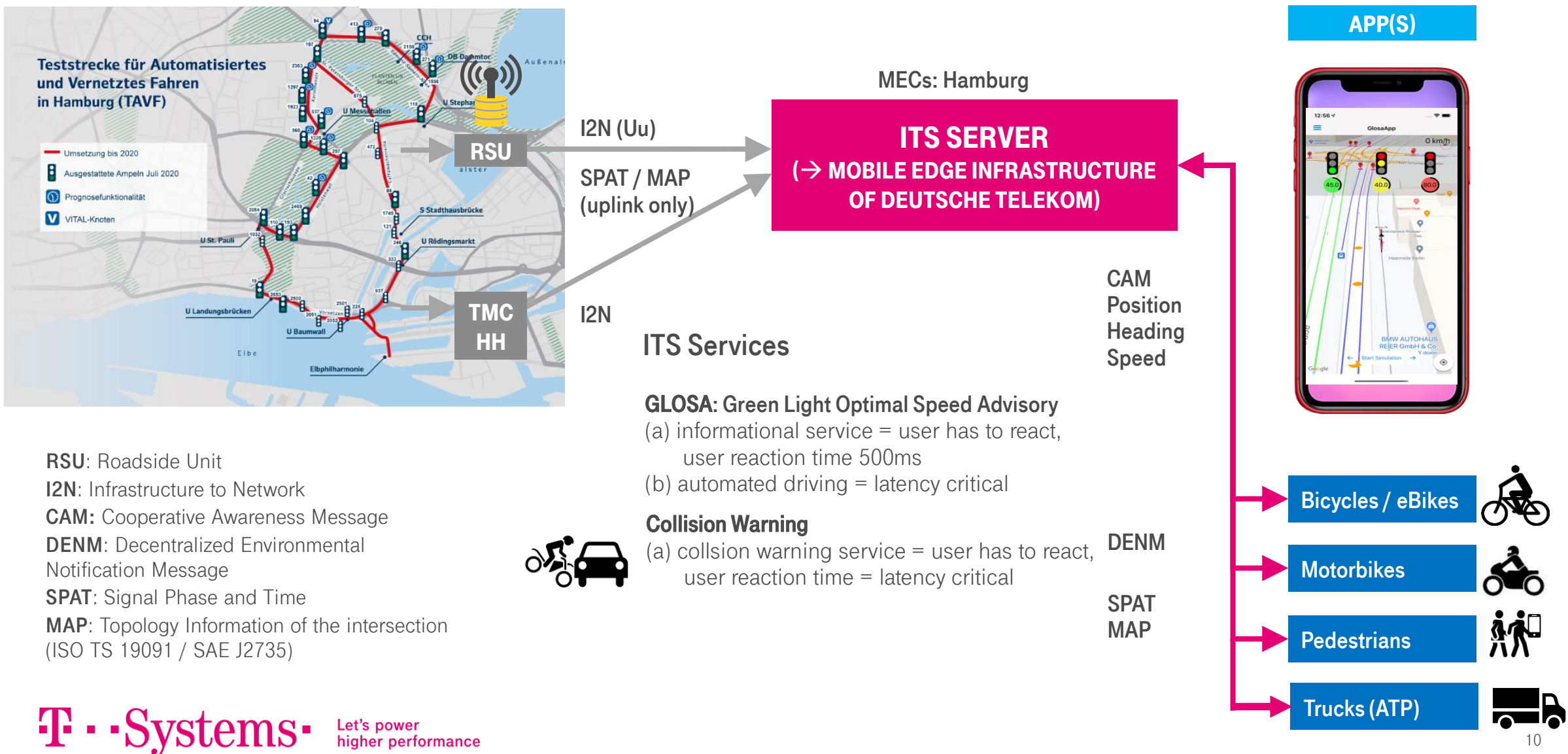


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How does it work?



Apps: GLOSA, EnTruck, et. al



vehicle pos / speed data (CAM)

5G



environmental data
aggregated movement data

Traffic Light Forecast
(SPAT/MAP)



Service Centre



Virtual
Traffic Management Centre

Traffic Signal
State [forecast]

Traffic Management
Strategy measures,
vehicle trajectories for
traffic control

other
environmental
data



City Traffic Management
Centre(s)

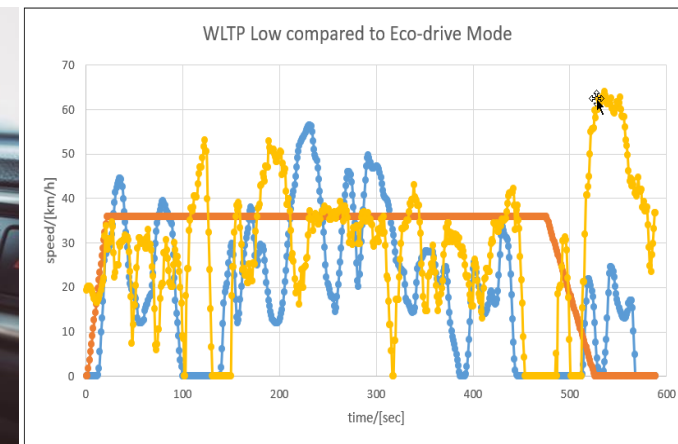


City access point
(e.g Urban Data Platform)

5G enabled FTED for Sustainable Traffic Management



**Low Carbon
Mobility Management
(LCMM)**
World-wide first
ISO-23795-DIS
compliant





SHOW

Connecting automated vehicle fleets with the main axes of local public transport, making urban mobility more sustainable and environmentally friendly.

- More than 70 automated and networked vehicles to be rolled out
- 20 European cities over a period of 24 months
- First/last-mile gaps with automated and connected vehicles Mobility Service Provider can offer additional products feeding them into public transport trunk lines.
- Automated vehicles become the missing link for an integrated public transport network.

SHOW – Project overview

SHared automation Operating models for Worldwide adoption



Project goal

SHOW aims to support the deployment of shared, connected and electrified automation in urban transport, to advance sustainable urban mobility.

- Demonstrations in 20 cities across Europe
- Integration of automated fleets in Public Transport
- Including 69 partners from 13 EU-countries
- International cooperation with organizations from the US, South Korea, Australia and China

Benefits

- Reduction of 20% energy consumption and 10% emissions
- Reduction of overall number of private vehicles through intelligent combination of smart Public Transport solutions
- Improved traffic flow
- Establish new business models and improve virtual validation



Use cases

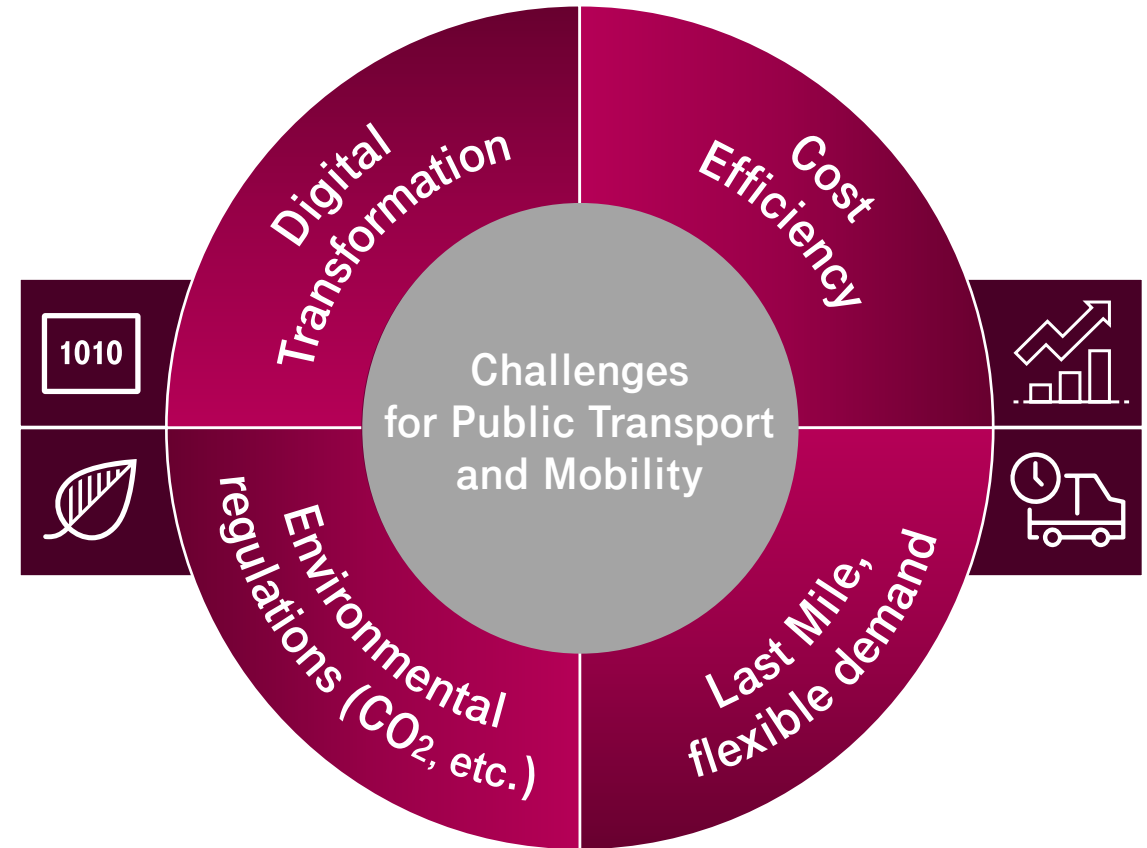
- Automation of Public Transport
- Demand Responsive Transportation
- Car Sharing
- Logistics as a Service
- Mobility as a Service

SHOW – Market challenges



- **High pressure** for cost efficiency through high vehicle deprivation rates and personnel costs
- **Managing flexible demand of passengers and goods**, e.g. modal shift for last mile gaps
- Reducing **operating costs** for mobility services
- Operating **zero-emission vehicles** to comply with complex EU environmental regulations
- **Digital Transformation**: manage competitive price and service quality against digital competitors (e.g. UBER)

The solution: Building Integrated Public Transport Networks by operating **Connected and Automated Vehicles** for last mile mobility service operation



SHOW – Partner ecosystem (excerpt)



Project Management Team



ADVANCING
PUBLIC
TRANSPORT



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS



Automated Public Transportation (OEM)



Public Transportation Operators



EMT MADRID



Infrastructure



ERICSSON



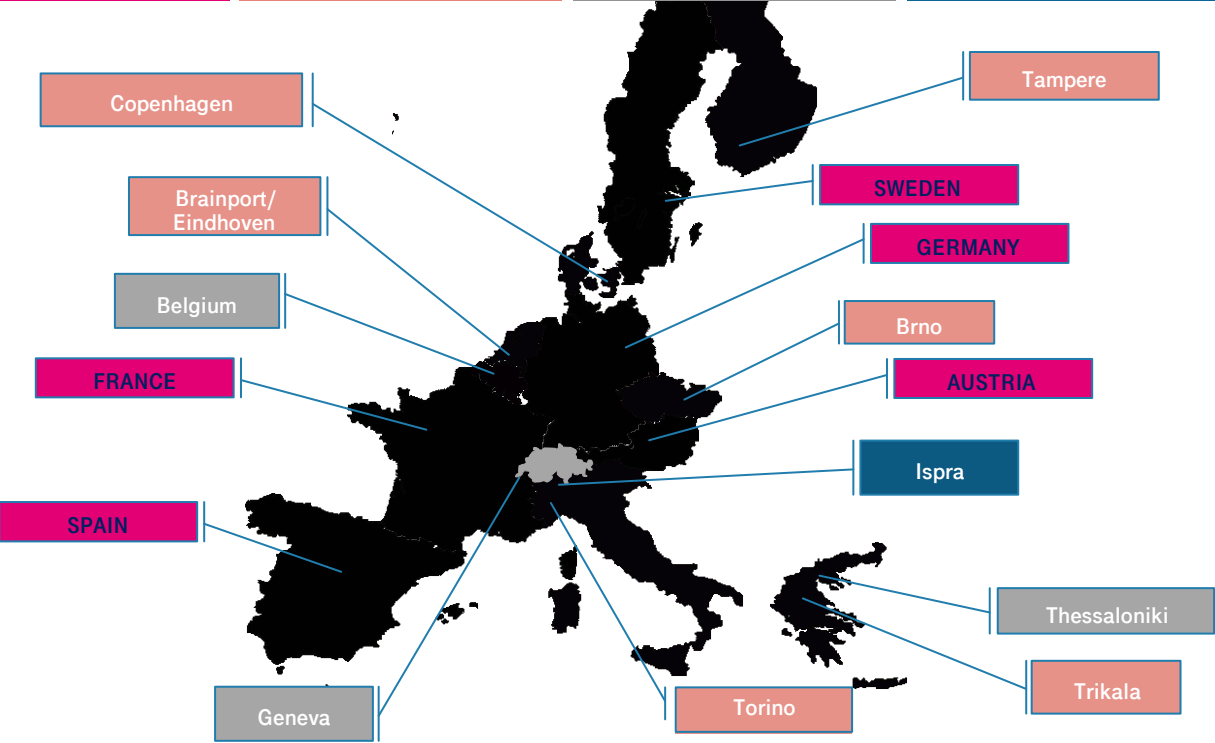
BOSCH



SHOW – Demo sites and vehicles



Mega Sites	Satellite Sites	Follower Sites	Technical verification and commissioning Site
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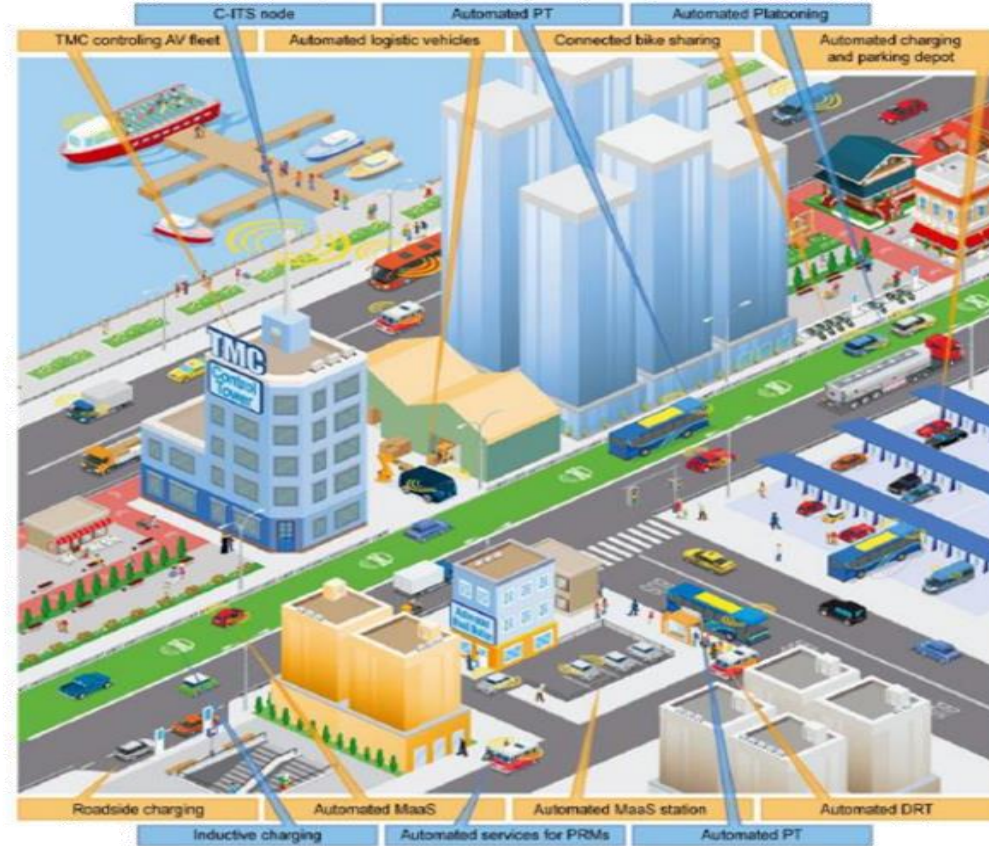
SHOW – Use cases

Showcasing the automated city of tomorrow



Automated mobility in cities

- Under normal / complex traffic and environmental conditions
- Interfaces with road users incl. VRU
- Connection to operation center for tele-operation and remote supervision
- Platooning
- Seamless autonomous transport chains (incl. MaaS and LaaS)



Added-value services

- Big data/AI based services for passengers & cargo
- Automated parking
- Depot management

SHOW – Facts & Figures



01/2020 – 01/2024
(48 months)



Twinning actions with
11 global organisations



69 partners from
13 EU-countries



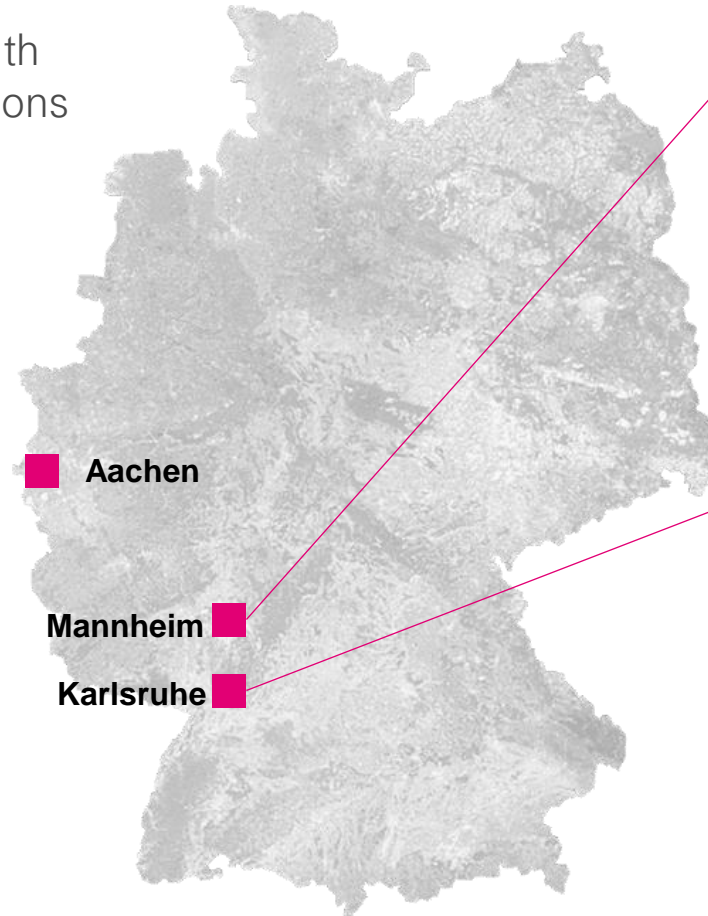
30 million €

T-Systems contribution

Technical project lead for the Mega Site Germany

- V2X integration
- 5G implementation
- Demonstration of modular vehicle for mixed passenger-cargo transport services (Karlsruhe)
- Tele-operated PT services and maneuvers (Mannheim)

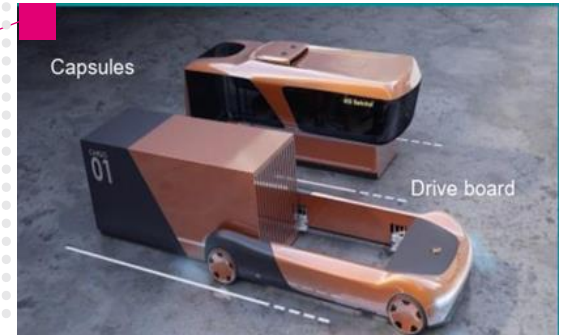
Consulting for Business Models and Exploitation



Aachen

Mannheim

Karlsruhe



Thank you

ralf.willenbrock@t-systems.com

T · Systems · Let's power
higher performance