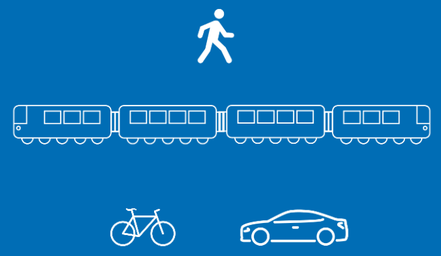
POLIS

CITIES AND REGIONS FOR TRANSPORT INNOVATION

Examples from Europe on tackling high capacity road challenges

Suzanne Hoadley, Polis

Polis – a network of local and regional authorities on transport innovation



73

members,
from small towns to
big regions
Current President:
Manchester

Common network vision - Amsterdam

Improving traffic flow on the A10

Initial fase:

- Started up from Netwerkvision North Holland and nationwide program

Fileproof

- Key element is Ring A10 priority 1: joint filosophy shared with regional partners

How?

- Rampmetering working together with traffic lights urban road and VMS controlling and rerouting the influx from the urban roads
- Operational scenario's via Scenariomanager (automatic system)

Results:

- 15% reduction in vehicle hours lost on national road
- 30% extra waiting time on urban roads

Improving Traffic Flow A10 Part – I (2009-2010)

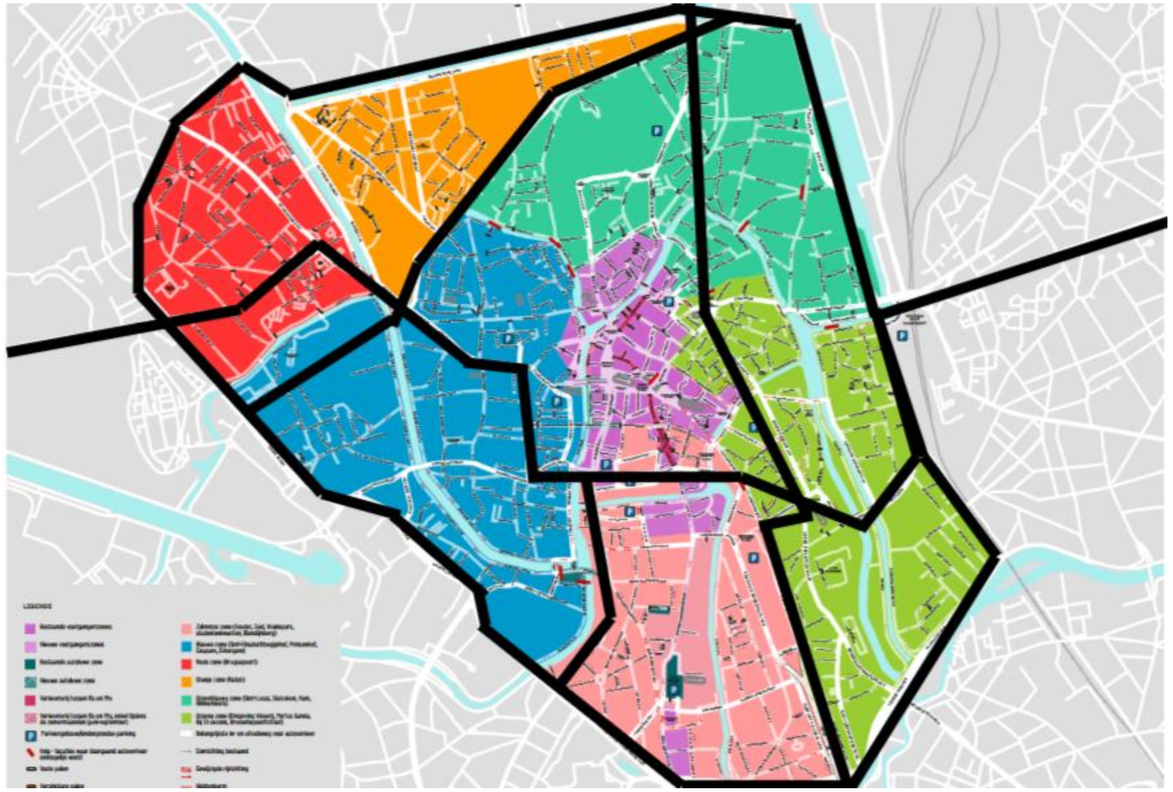
Improving Traffic Flow A10 Part – II (2010-2012)

Pilot Integrated Network Management Amsterdam (2011-2015)

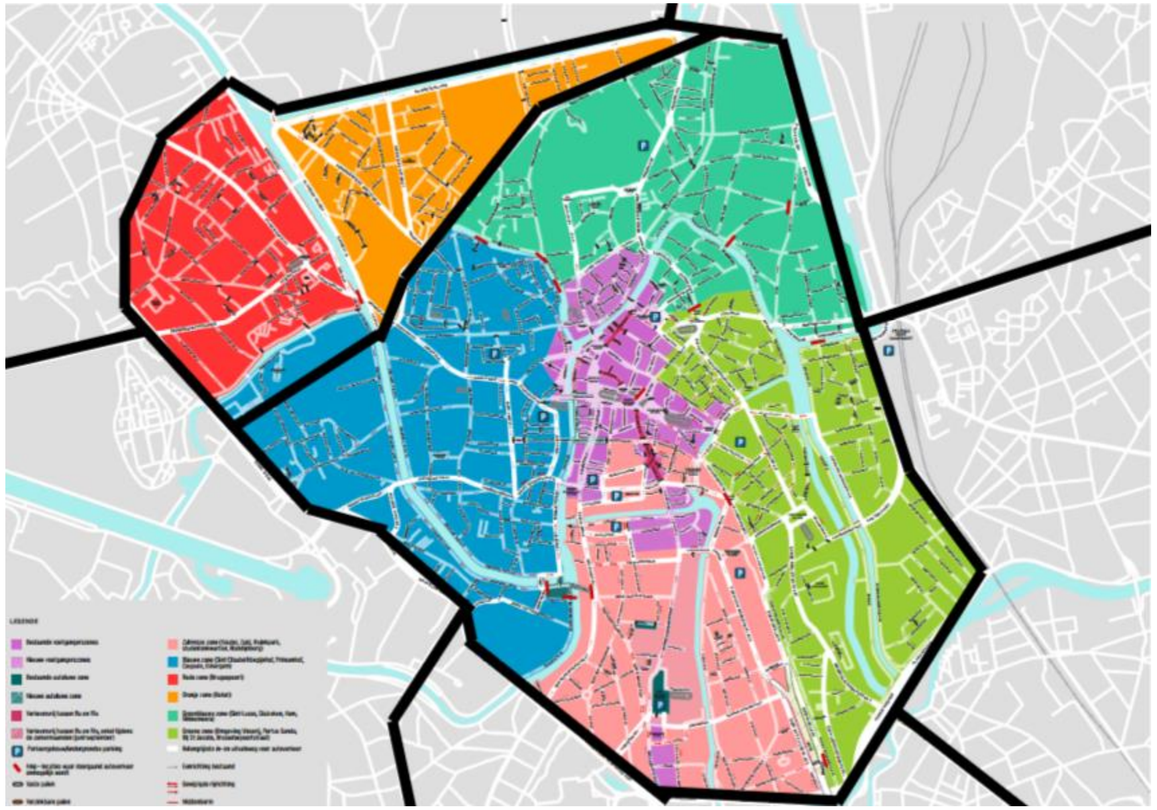
Source: Daniel van Motman, city of Amsterdam, Polis TE WG meeting, Amsterdam, 16/10/12

Traffic circulation plan - Ghent

before



after



Source: Pieter Morlion, city of Ghent
Polis TE WG meeting, Brussels, 19/5/17

Incentives to drive outside rush hour – spitsmijden in Rotterdam

- **Financial incentives to discourage rush hour driving, particularly during road works when capacity is lower**
- **Impact:**
  - Short term: 50-70% change in driver behaviour
  - Long-term: 50% still avoid rush hour one year after project (incentives) ended
- **Enabling technology: ANPR (number plate cameras) & Smartphone app**
- **Privacy is central to initiative**
- **Costs & benefits:**
  - 2000 users x €1000 = €2 million per year
  - ‘Peak shaving’ (spread of traffic over period & peak before rush hour starts)
- **Misuse at 3.5%**
- **Currently: moving away from financial incentives towards mobility offerings**

Access regulations


ACCUEIL | POLITIQUE - SOCIÉTÉ | COLLECTIVITÉS LOCALES | 01 MINUTE

Péage urbain à Paris : les deux conditions d'Anne Hidalgo

MATTHIEU QUIRET | Le 17/10 à 19:04 | Mis à jour le 18/10 à 09:41

Bienvenue ! Pour découvrir nos contenus, nous vous offrons 2 articles.
Pour consulter dès maintenant tous les articles en illimité, abonnez-vous à -50% !

Les Echos.fr

ABONNEZ-VOUS | DÉJÀ ABONNÉ ?

- **City dwellers travelling more sustainably. Big problem is commuters from outside city**
- **Paris preconditions for road user charging:**
  - Metropolitan approach
  - Avoid penalising people living in Paris (high charge at rush hour combined with incentives)

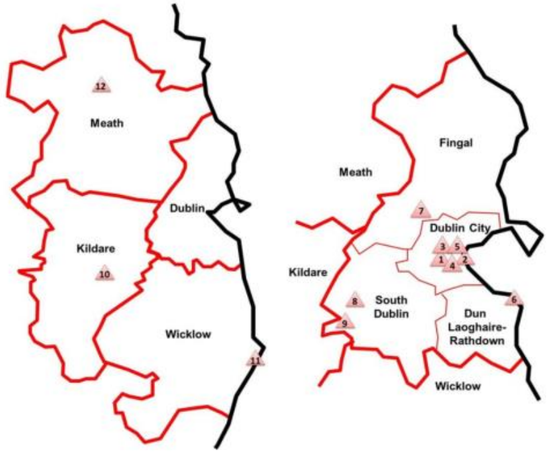
ITS inventory - Dublin

Greater Dublin Area (GDA)

7 Council Areas

11 Primary Transport Centres
- 3 Urban Traffic Control Centres
- 1 Strategic Traffic Centre
- 4 Traffic Departments
- 3 Public Transport Controls

Emergency Control Centres
- Gardaí
- Fire Service



Inventory of GDA Data

Source Data Systems
- Urban Traffic Control (faults, cycle, flow, saturation, journey time, speed)
- ANPR Journey Time (average link journey time)
- Automatic Vehicle Location (public transport journey times, headway)
- Fault / Asset Management System (asset locations, downtime)
- Count / Classification Loops (flow)
- Speed Actuated Signs (speed, flow)
- Noise and Air Quality Monitoring

Manual survey databases also maintained by centres

Inventory of Staffing and Procedures

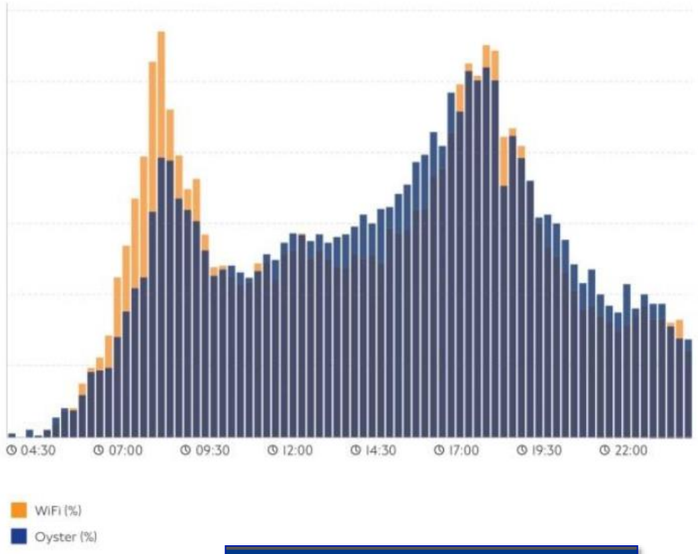
Examples of Good and Bad practice

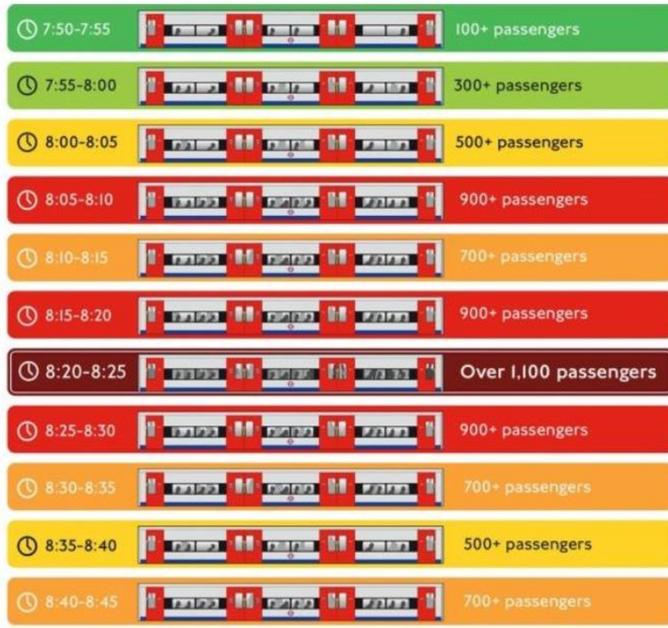
Key Issues
- Lack of network targets and monitoring
- Lack of formal agreements
- Limited documentation of procedures
- Staffing resilience and experience levels
- Competency levels unproven
- Use of generic staff development plans

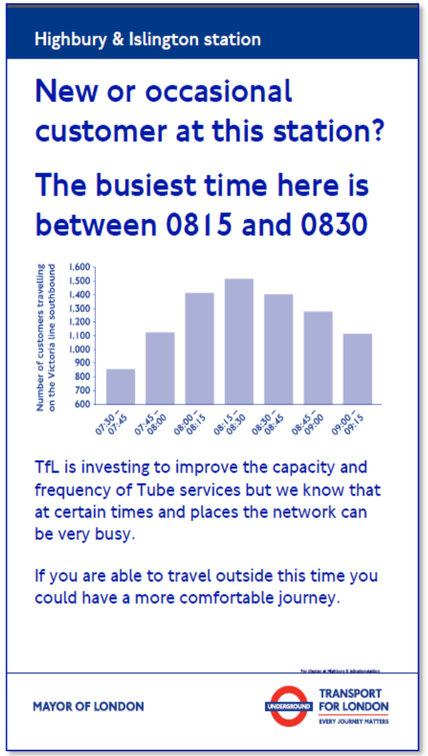
(Big) Data

- **Data for better governance:**
  - What decisions do I need to take? *eg, how can I provide better information to drivers to avoid congestion?*
  - Which insights can big data bring in relation to this decision?
  - What data do I need to do this? What's missing?
- **How can I use data to influence road user/ travel behaviour?**

To identify busy stations and trains

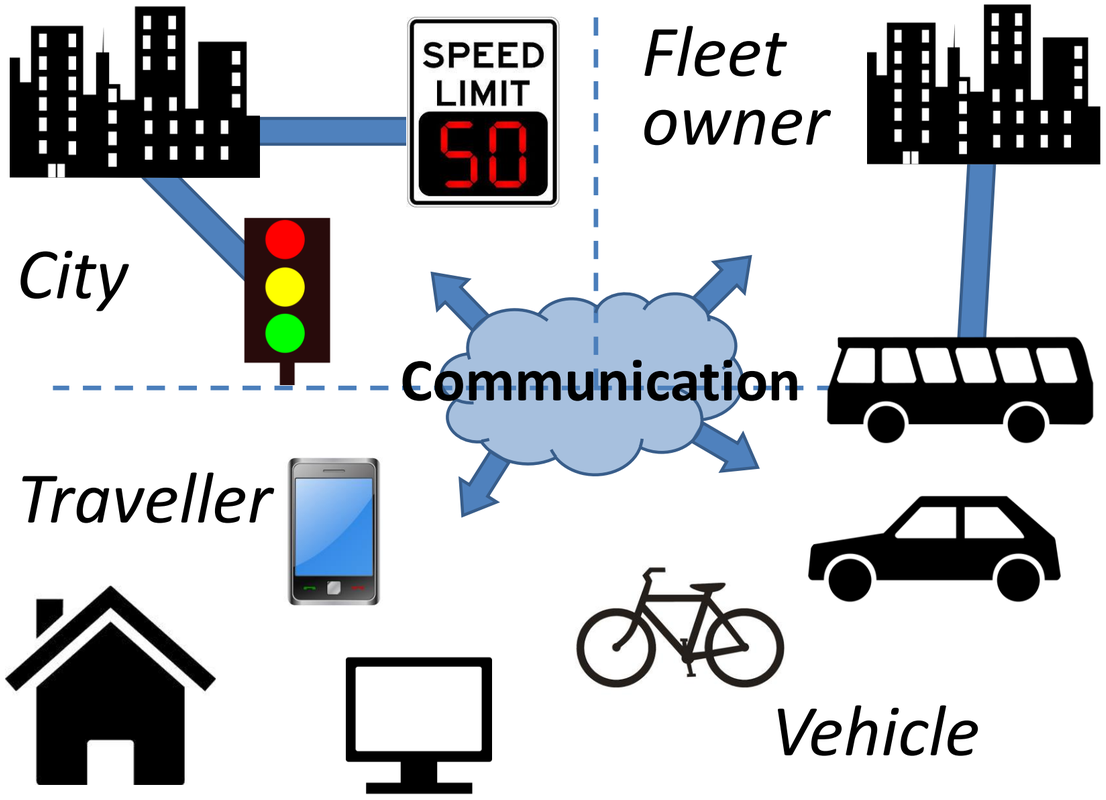






Sources: Dale Campbell & Simon Reed, Transport for London

C-ITS – what is it?



- **Standardised platform** for **communication between vehicles, vehicle to infrastructure and potentially infrastructure to infrastructure**
- **Standards adopted by vehicle manufacturers and system suppliers**
- **Which standards?**
  - Standardised message sets
  - New standardised short-range communication technology ITS G5 (to complement existing long-range cellular comms)
- **Why is this relevant to cities and regions?**
  - Offers direct communication to/from all equipped vehicles (not just cars) for traffic management and information purposes
  - C-ITS applications may offer a more (cost) effective way of delivering certain traffic management functions than ITS does today, eg, traffic data to support adaptive traffic management

C-ITS & cities – findings from CIMEC

RECOMMENDATIONS FOR CITIES

As soon as realistic C-ITS products become available:

Start working on a strategy for optimizing C-ITS potential by means of:

- shared technology platforms
- shared approach for business models

- Communication channels
- Roadside units
- Central data bases
- Open data feeds

Role of suppliers of:
- technology
- data
- services

cimec

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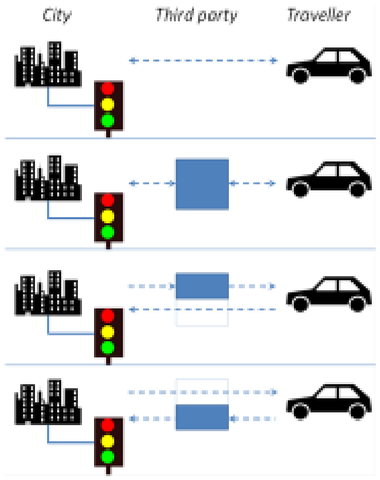
BUSINESS MODELS



City collect data and provide service directly to the road user, using its own technology - No third party involved

Third party collect data and provide service - No direct city involvement

Third party provide service on behalf of city - *city collect data* for own use

Third party collect and provide data to the city - *city provide service* to the road user

- Feasibility; political, technical and commercial
- Utility; to road users and city managers
- Social and legal issues - privacy

cimec

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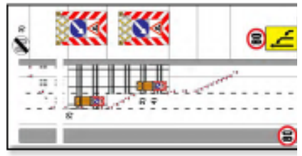
C-ITS activities in Austria

What is our definition of C-ITS?

Use Cases for first deployments

- **Use Case „Roadworks Warning“**
  - Information about several types of short-term and moving roadworks
  - Several scenarios supported, using roadworks trailer and roadside stations
  - Several modes (stand-alone, stand-alone with augmentation, from TCC)
  - I2V use case
- **Use Case „In-Vehicle Signage“**
  - Transmission of electronic signage directly into the vehicle
  - Variable message signs and free-text signs
  - I2V use case
- **Use Case “Hazardous Locations / Events”**
  - Notification about hazardous locations and events
  - I2V and V2I use case
  - I2V uses the road operators event management system
  - V2I sends vehicle events back to the event management system

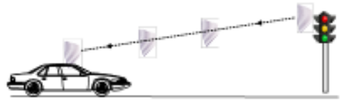


What is our definition of C-ITS?

Use cases for first deployments (II)

- **Use Case „Probe Vehicle Data“**
  - Status and awareness data from vehicles
  - V2I use case
  - Aggregation for usage in traffic management (like traffic sensors)
  - Also enables calculation of travel times (after adequate privacy management)

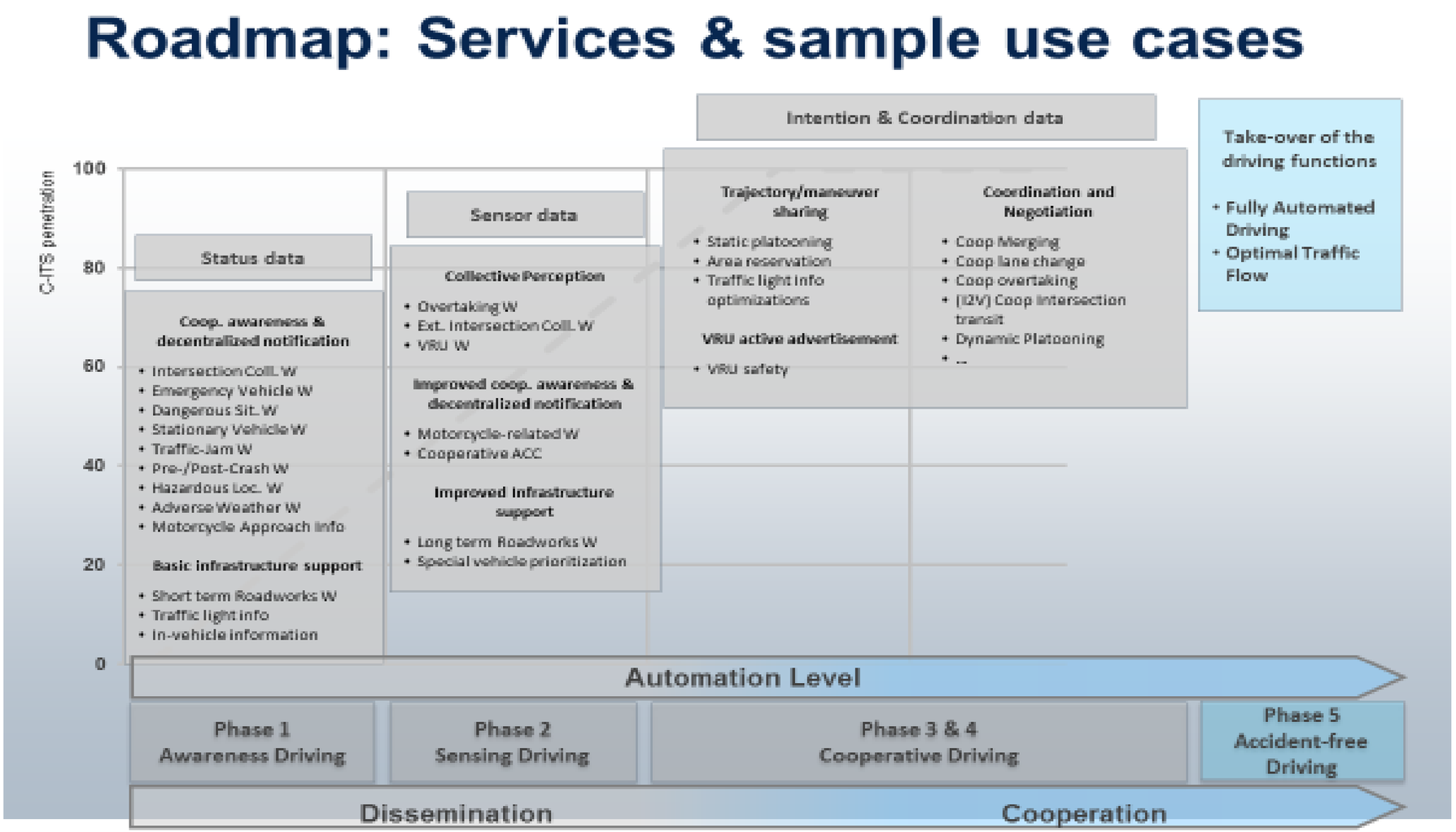
- **Use Case „Intersection Safety“**
  - Transmit signal state, timing and road topology at intersections
  - I2V use case
  - Enables multiple use cases (GLOSA, Time to Green/Red, …)



- **Use Case „Protected Zones“**
  - Protects DSRC based tolling applications
  - I2V use case
  - DSRC tolling (5.8Ghz) and WLAN based C-ITS (5.9Ghz) can interfere with each other
  - Co-Existence standard available, C-ITS needs to lower transmission levels and duty cycles
  - Messages informing C-ITS vehicles about location and radius of DSRC tolling stations

Source: Peter Meckel, Asfinag,
CODECS workshop, Dublin, 22/3/18

C-ITS/automation: the OEMs roadmap



Source: Michele Rondinone, Hyundai
CODECS workshop, Dublin, 22/3/18

CAR 2 CAR COMMUNICATION CONSORTIUM

POLIS

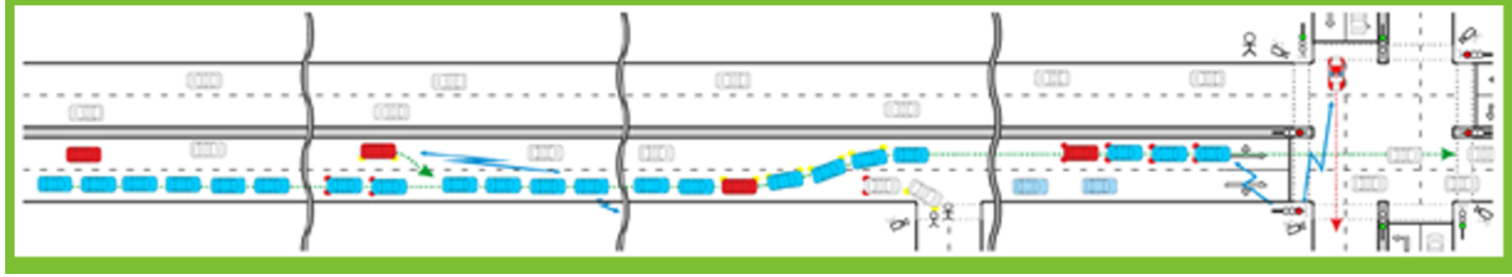
C-ITS, automation & traffic management

MAVEN aims

- to develop management regimes for highly automated driving in urban areas enabling..
- ..road infrastructure to monitor, support and orchestrate vehicle and VRU movements to guide vehicles at signalised intersections and corridors in urban areas..
- ..going beyond the ADAS and C-ITS applications such as GLOSA by adding cooperative platoon organisation and signal plan negotiation to adaptive traffic light control algorithms.

H2020 project: 09/2016 - 08/2019
www.maven-its.eu

INFRA-ASSISTED & INFRA-INITIATED USE CASES	
Traffic control optimization ➢ Signal optimization ➢ Priority management ➢ Queue estimation ➢ Green wave	**Platoon management** ➢ Forming a platoon ➢ Joining a platoon ➢ Platoon progression ➢ Leaving a platoon ➢ Breaking a platoon
I2V interactions ➢ Negotiation (signal timing vs. vehicle arrival pattern) ➢ Speed change advisory ➢ Lane change advisory	**Conventional traffic and VRUs** ➢ Detection of non-cooperative vehicles ➢ Vulnerable road users ➢ Emergency situations



Transition roadmap from city perspective

Infrastructure requirements

- Traffic control requirements
- Sensor requirements
- Communications requirements, incl. road-side units
- Physical infrastructure requirements
- Digital map requirements

Traffic manangement requirements

- Organisational aspects: the role of the traffic manager in the future
- Operational aspects: the impacts of different mixes of vehicles on traffic patterns
- The effect of the MAVEN system in different traffic scenarios

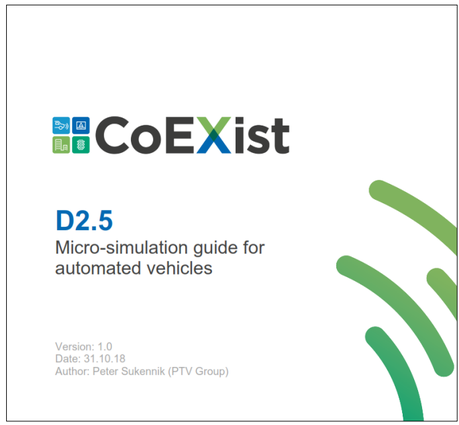
Automation-ready cities

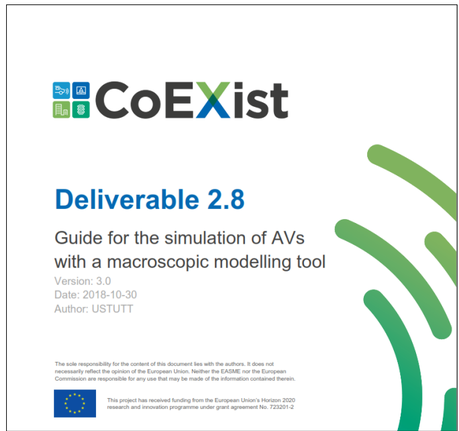
Automation-ready transport modelling
Develop a validated extension of existing microscopic and macroscopic transport models to include different types of CAVs (passenger cars and light freight vehicles with different automation levels).

Automation-ready road infrastructure
Create a tool to assess the impact of CAVs on safety, traffic efficiency and space demand, and develop design guidance for hybrid infrastructure (for both conventional and CAVs) to mitigate the potential negative impacts.

Automation-ready road authorities
Use the CoEXist tools to evalute the impacts of CAVs on safety, traffic efficiency and road space requirements and making detailed hybrid infrastructure design recommendations.

Mobility Aspect	Automation Awareness	Planning for Automation Readiness	Implementation of Automation Ready Measures
Policy	**Policy screening:** Liveability as top priority – how can CAVs contribute to it?	**Reassessment** of strategic mobility plans; incorporating new mobility forms	**Mobility pricing** for "SPAM" roaming cars
Infrastructure	Is there a conflict between **people friendly** vs. automation friendly?	Preparation of **physical and digital** infrastructure	**Modifications** to infrastructure and accompanying traffic code
Planning	**Engagement** with citizens & support **testing activities** and research	Update travel demand **models** and evaluate road **capacity needs**	Assessment of required land use changes based on integrated **land use** and transport modelling tools
Capacity Building	**Try out** level 1 & 2 functionalities	Identify **new skill requirements** – 'less concrete more bytes'	**Organisational restructuring** for traffic management and public transport operations
Traffic Management	Road **authorities** need to engage with OEMs	**Back office for data exchange** in traffic management	**Defining data management responsibility** with new management schemes





Thank you!

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