

# Concorda

Metropolitan area  
Amsterdam

Ir. Sebe Vogel  
Ministry of Infrastructure and Water Management - Rijkswaterstaat  
Amsterdam Practical Trial

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# 1

## Pilot sites overview and partners

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# HEADING

- Text

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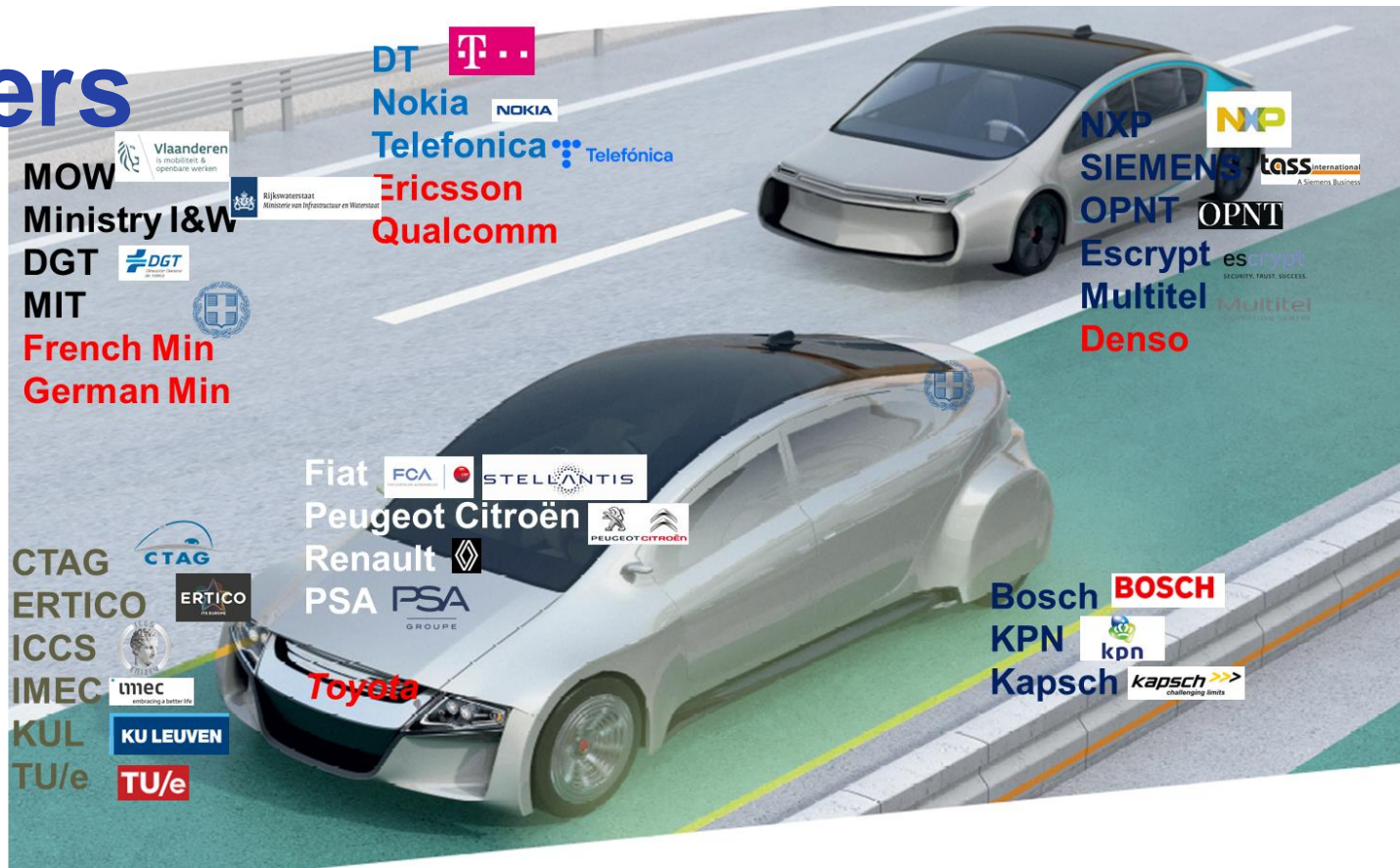
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# Partners



**MOW**  
**Ministry I&W**  
**DGT**  
**MIT**  
**French Min**  
**German Min**

**DT**  
**Nokia**  
**Telefonica**  
**Ericsson**  
**Qualcomm**

**NXP**  
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# Partners

- Specific Partners Amsterdam and Crossite testing
- NL en B: Amsterdam, A16, Italy cross site; Antwerp, Brabant,



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# Pilot sites

- 5 Countries
- NL en B: A'dam, Brabant, A16, Antwerp, cross site, Italy



# 2

## Use cases and Enabling technologies

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Amsterdam  
- Westpoort  
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Haa  
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# Communication Technologies

Long range

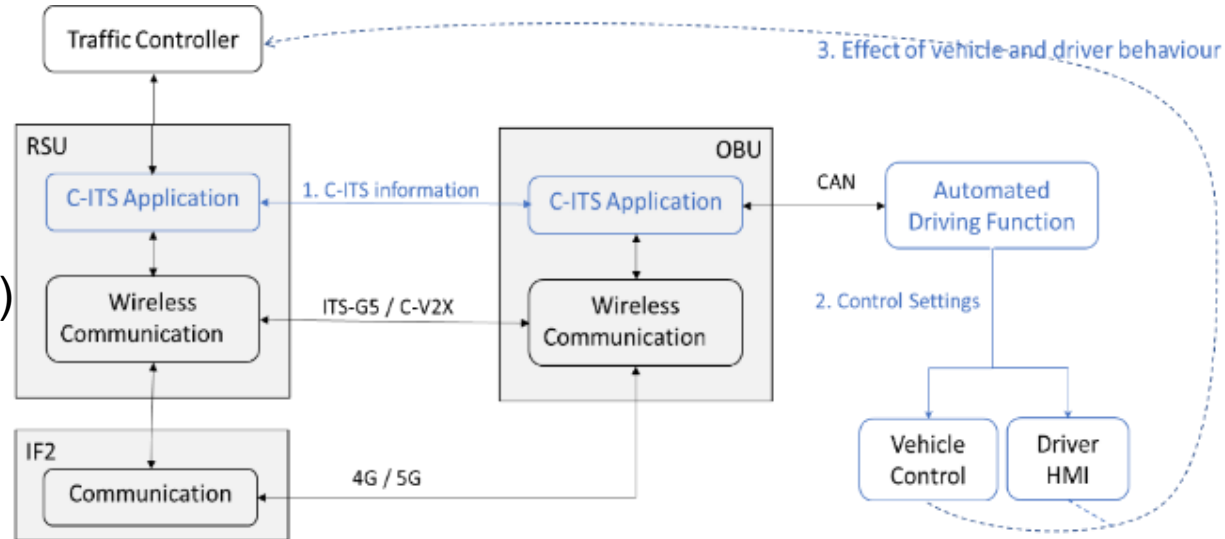
- LTE (4g)
- Enhanced mobile networks (only Brabant)

Short Range

- ITS-G5
- C-V2X

(also called LTE-V2X, PC 5 or sidelink)

Hybrid, long and short range



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# Site



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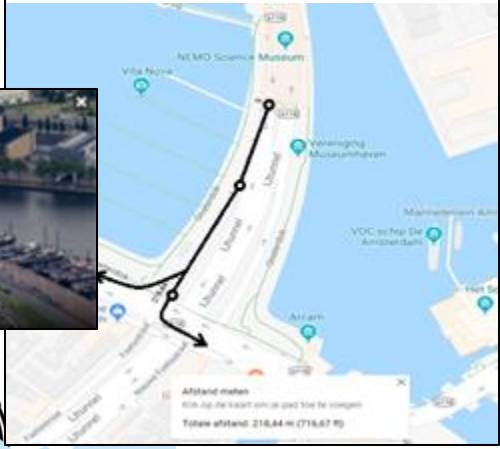


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# Vehicles



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## Testing, results and lessons

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# Evaluation & Lessons Learned

## Technologies

- ITS-G5 ready for V2X;
- LTE V2X still in its “infancy”
- Concorda had early access to technology, requires more development
- PKI security has negative effect on reliability and latency
- LTE networks not specifically optimized for AD;  
Time critical events currently need direct communication
- 4G LTE Uu added value; advanced warnings and maneuver control to  
Highway Chauffeur services.

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# Evaluation & Lessons Learned

## .Services for Automated Driving

- Automated driving requires higher quality example on latency, reliability, accuracy, security and authorization of the sender
- Data exchange from RSUs is valuable for AD
- C-ITS Improves driving assist time and safety
- Challenges with time synchronization
- Adaptive TLC's pose a particular challenge for safe speed control In AD
- GLOSA (1) extends the ODD of Interurban Chauffeur (2) sensibly reduces stop-and-go
- showed traffic flow improvements to be further investigated.
- SSV impacts on driving comfort and safety, reducing the number of sudden decelerations.
  - time travelled in AD mode is extended of 76% by means of V2X-equipped traffic lights
  - AD & Connected vehicles are 5.7% faster than regular vehicles at crossing C-ITS traffic lights.
  - Human driven vehicles stay at zero speed 2.08 times the amount that AD & Connected vehicles do.

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# Evaluation & Lessons Learned

## Road Exemption

- Acquiring exemption is a complex process, differences between countries
- *alignment across countries*

## Pilot Test Organisation

- usefulness and necessity to verify and validate systems before piloting in iterations
- *Cross-pilot tests are an efficient approach*
- *Importance of multi-stakeholder cooperation*

## Deployment

- *First to develop knowledge on real situations and the usage of the use case information in*
- *Deployment of use cases implemented on test sites in the CONCORDA project is a good starting point for development of this experience*

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## Discussion; what's next

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# Discussion

## Road operator

- An automated vehicle cannot obtain the necessary information and information quality  
Gaining practical experience with automated driving in event zones is considered essential for further development of automated driving functions, road side services and the impact on driver behaviour, traffic effectiveness and safety.
- Since the motorway services in the MRA are assessed as ready for testing with automated vehicles, the logical next step would be to organize automated driving tests to collect the evidence for infrastructure supported automated driving in real traffic conditions on public roads in the MRA
- Multi-stakeholder cooperation

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# Discussion & Remarks

- Performance to the actual weight of V2I in the AV data fusion system and how this affects the driving behavior of the vehicle
- Road exemptions throughout Europe; speed up
- Discern which technology is better for each use case
- Technology is constantly evolving and 5G technology will open the opportunity to include new functionalities (network slicing, low-latency communications, different MEC architectures, etc) which will provide new opportunities to implement V2X services in the future
- The experience gained in the CONCORDA project will be exploited by the stakeholders (OEM's, Road Operators and suppliers), for an improved plan of the new C-ITS investments: first deployment of existing usecases and assets, which assets on the different road types, technologies, standards, but also the integration steps to follow between connected vehicles and digital roads in the pre-production phase (or when upgrading the products/technology)

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# GET IN TOUCH

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