



Bringing research to deployment: Concrete implementation of Cooperative Systems

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Introduction (1/2)



- Peek Traffic established in the Nordic region since early-1990s
- Key supplier of urban traffic equipment
- Product portfolio includes
 - Traffic signals
 - Traffic controllers
 - Measurement systems
 - Network management
 - Adaptive control
 - Cooperative systems
- In 2007, acquired by Imtech NV





Introduction (2/2)



- Technical service provider in electrical engineering, ICT and mechanical engineering
- 28,000 employees & 4,5 billion euro revenue (2011)
- 23,000 customers worldwide
- Stock exchange listed
- 150 year old
- Royal since 2011



1860
Jan Jacob van Rietschoten starts his company

1888
First combination of electrical and mechanical solutions

1900
First electrical tram in Amsterdam

1932
First district heating system in the Vatican



1963
First analogue computer for Dutch universities

1967
Public lighting for first Dutch cloverleaf

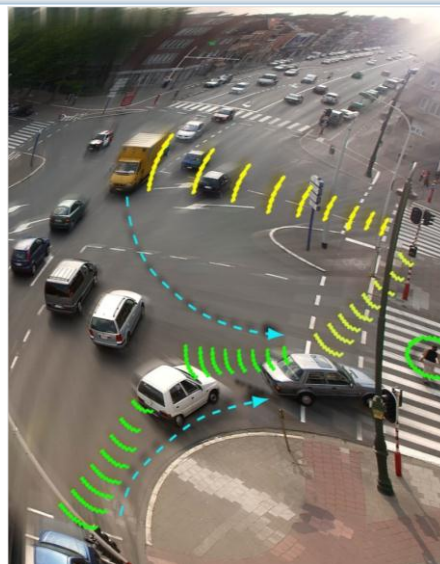
1980
Technology for former Dutch state mines

2012
Imtech 28,000 employees in Europe



Cooperative systems

- Mobile communication
 - V2V (Vehicle to Vehicle)
 - V2I (Vehicle to Infrastructure)
- Application areas
 - Efficiency
 - Safety
 - Comfort
 - Eco-driving
- European research projects



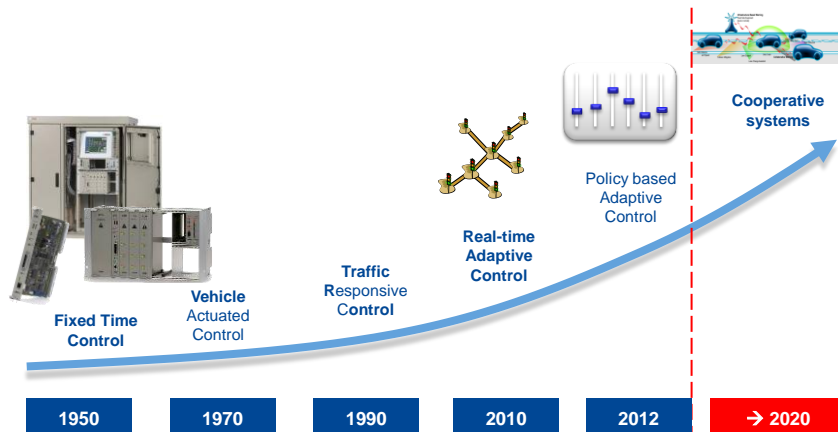


Cooperative systems

- Cooperative systems combined with urban traffic control:
 - Positively influence emission levels of heavy goods vehicles
 - Improve regularity and punctuality of public transport vehicles
 - Prioritize certain modes of transportation such as pedestrians and cyclists
- by:
 - Affecting choice of transportation towards low emission modes
 - Avoiding unnecessary mileage
 - Avoiding acceleration, idling and deceleration
 - Stops
 - Congestion
 - Promoting 'eco' driving behaviour



1950-2020 Integrated approach





Cooperative Systems

From research to deployment

- Research projects
 - CVIS *802.11p ISO CALM FAST*
 - Safespot *Local Dynamic Map*
- Technology project
 - SPITS *Road side and in-car platforms*
- Field Operational Test
 - FREILOT *One year real life operation*
- European standardisation
 - eCoMove *802.11p ETSI Geonet*



Target is to reduce by 20% fuel consumption and therefore CO₂ emission

- Co-funded by the EC





Freilot



- Co-funded by the EC



Project goals

- CO₂ and fuel efficiency services
- Pilot in four cities in Europe
Bilbao, Helmond, Krakow, Lyon
- Supported by the European Commission
- Operational pilot period of one year
- Targeted at continuing the services after the pilot



ECO Driving Support



Delivery Space Booking



Energy Efficient Intersections



Acceleration Speed Limitation

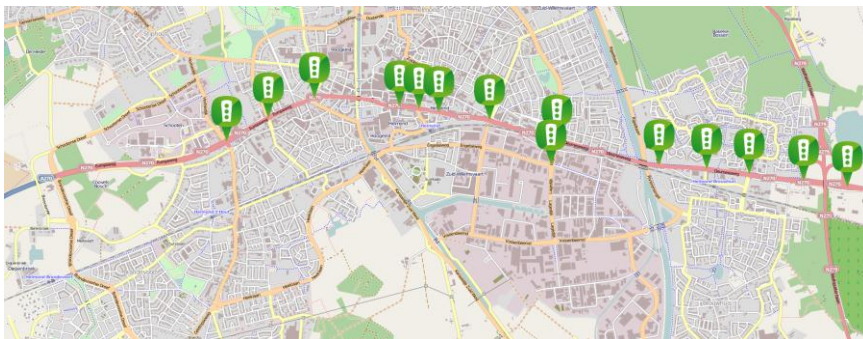


Energy-efficient intersection control

- Acceleration for heavy goods vehicles is expensive
 - 0,3 – 1,0 litre fuel to accelerate from 0 to 70 km/h
- Cooperative communication between trucks and the intersection controller
- Provide priority for scheme member trucks only
- Speed advice for the driver to pass the intersection without stopping
- Time-to-green or time-to-red feedback for the driver



Pilot site Helmond (NL)



- Main corridor through the city
- 14 intersections



Stakeholders

- Van den Broek Logistics
- City of Helmond
- Emergency Services
- Technology providers
 - Peek Traffic
 - Volvo



Implementation in traffic light controller





Router and antennae

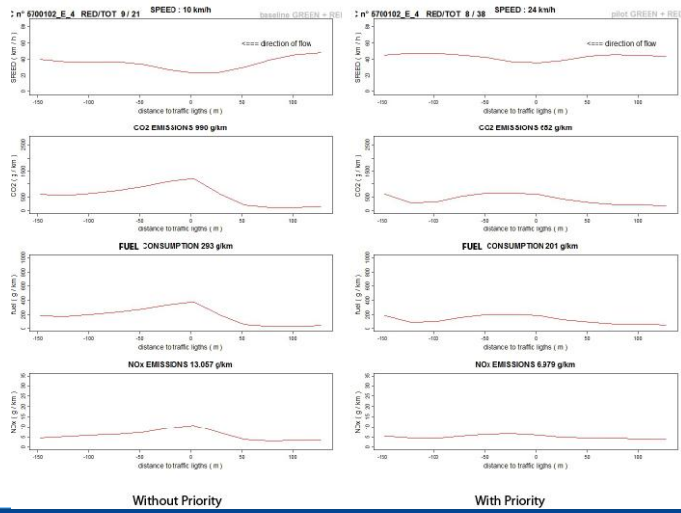


On-board units





Preliminary results





Copenhagen 2025



- Copenhagen
 - Very ambitious environmental targets
 - CO2-neutral by 2025
 - Innovative traffic control
 - Prioritize public transport & cyclists
- Peek Traffic
 - Technical partner for traffic to Copenhagen
 - Service & operations of all ITS installations from 2012 until 2020
 - 365 traffic light controllers
 - Central control systems



Achieving environmental targets using ITS

- Implementation of enabling infrastructure
 - Replacing bulbs with energy-efficient LED traffic signals
 - Modern traffic light controllers
 - IP Network
 - Open Protocols
 - Central Control Systems
 - Traffic Management Center
- ITS scenarios
 - Handling of large events
 - Adaptive bus priority
 - Environmental control of heavy goods vehicles

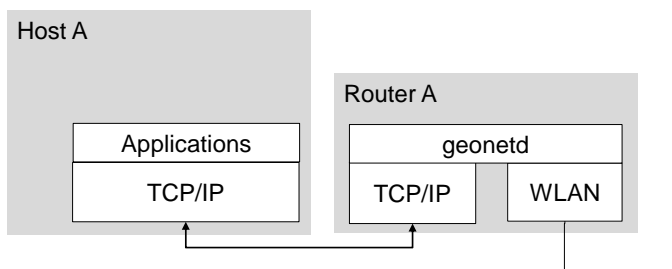
Concrete examples of possible applications

- Heavy goods priority on rødt rutenet
- Green time extension for public transport
- Green time extension for cyclists
- Information about availability of resting areas or loading zones



Onboard units

- Very portable router solution: Linux application in C
- Patches for existing WLAN driver (802.11a → 802.11p)
- Host system only needs to support TCP/IP; no OS dependencies
- Less code, less bugs...





Onboard units

- Open implementation
remove all proprietary software components
- Increase portability
to support off-the-shelf hardware
- Reduce complexity
to reduce maintenance effort
- Reduce restrictive system requirements
to increase the choice of user interfaces
- **Stimulate local application suppliers**



Conclusion

- Ambitious environmental targets by Copenhagen
- Concrete ITS platform for implementation being implemented
- Open discussion with possible stakeholders:
 - Institutions, Universities
 - Application providers
 - Transportation companies
 - Public transport
 - Emergency services
 - Green mobility (cyclists)



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