THE NEXT STEP IN COOPERATIVE AUTOMATION

Demo 23rd of February, Helmond
“Verdere informatisering van het verkeerssysteem en verdere automatisering van het voertuig komen op termijn samen en versterken elkaar”*
TRENDS AND DEVELOPMENTS – COOPERATIVE & AUTOMATED DRIVING

› Focus on individual Automated Vehicles and Cooperative Technology
› Cooperative Car2Car applications ➔ focus on advisory and warning applications
   ‣ Interoperability on wireless communication
   ‣ Standardisation is moving forward (ISO, ETSI, CEN, SAE)

› Combining Automation and Cooperative technology (e.g. CACC) ➔ High impact, but still moving slowly
MAIN OPPORTUNITIES COMBINING AUTOMATION AND COOPERATIVE DRIVING

- Create low-cost, high-impact application for end-customers
  - Cooperative adaptive cruise control (CACC)
- Guarantee safety and improve throughput and comfort

By means of:
- Generate high-level of acceptance by drivers
- Generate acceptance by other road users
- Identify and validate early business-case
- Interoperability on technical and non-technical level
- Evaluation of CACC technology on public roads, focusing on both highways and cities
WORK IN PROGRESS

Nov 2013
First demo on A10, Amsterdam

June 2014
Letter to parliament
Announcement new legal framework for testing AD in preparation

January 2015
New framework developed. Change of existing legislation for admission of special vehicles.

July 2015
New framework for admission of AD test vehicles in place

Dec. 2015-1st half of 2016
Kamerbrief
Momentum of Dutch Presidency

Both legal framework and technology have developed rapidly
We are ready for the next step!

Start deployment

Legal framework is developing rapidly

23 February 2016
VIRTUALLY-LINKED AUTOMATED CARPOOLLING
SEARCH STARTED FOR LEADING INNOVATIVE CITIES IN EU THAT WANT TO BE FRONT RUNNERS IN DEPLOYMENT

via managed/express lanes into/out and inside cities
OPPORTUNITY

- Automotive market and EU national/local governments have a mutual interest in automated driving and want to be amongst frontrunners in cooperative automated driving.

- OEMs and suppliers:
  - Need for large scale pilots on public roads to accelerate deployment.
  - Need for a front runner country (clear roadmap on AD) to start pilots and deployment.
  - Need to align along member states (legal framework) and automotive players.

- Cities (EU):
  - Improved road capacity, traffic flow, safety and accessibility.

- Dutch government:
  - Solution to improve road capacity, throughput and safety.
  - Positioning NL as a frontrunner, policy support for cooperative automation, upscaling ITS and harmonisation.

- Business sector / end user:
  - Cost reduction (travel time to offices, accidents, fuel).
  - Time saving, improved access, people are more effective (travel-time → quality-time).
OPPORTUNITY FOR DEPLOYMENT IN THE NETHERLANDS?

» Growing mobility in NL, mostly due to commuters (more, further, frequent)

» Commuters lose precious time through (unpredictable) congestion, prefer single travel modality*

» Metropolitan Areas/Cities are looking for innovations to improve regional economy, quality of life and accessibility ➔ new ways of public and personal transport

» OEMs have a need for large scale pilots on public roads to accelerate development and deployment
  » Netherlands has no major car OEMs, neutral position opens up for multi-brand implementation
  » High quality infrastructure (highly equipped intersections, dynamic traffic controllers, special lanes (bus/taxi/smart lanes ("spits strook"))

*Bron: Onderzoek van VNA (Vereniging van Nederlandse Autolease maatschappijen) naar de ontwikkelingen in de zakelijke (auto)mobiliteit.
VIRTUALLY-LINKED AUTOMATED CARPOOLING
SEARCH STARTED FOR LEADING INNOVATIVE CITIES IN EU THAT WANT TO BE FRONT RUNNERS IN DEPLOYMENT

First *real* demonstration of *virtually*-linked automated carpooling
The first step towards deployment!
THANK YOU FOR YOUR ATTENTION
TNO has a extensive knowledge and experience in Cooperative Automation

- Realizing real-time safety critical cooperative and automated systems (e.g. C-ACC), covering fundamental theory, model-based development, simulation and real-time implementation
- Defining, evaluating and improving performance of cooperative automated applications
OPERATIONAL CONCEPT

- Virtually-linked automated carpooling → personal vehicle platooning
  - At 0.5-1 sec. time gap
  - Automated braking, throttle (and steering)
  - Enabled by WiFi-based CACC
CACC ACTIVITIES ABROAD

- **US CAMP consortium**: develop, test and validate
  - First focus is V2I safety warning applications
  - Next step: assess feasibility of prototyping CACC system
    - Working on standardized CACC algorithm
    - Still in an early phase, not an open approach
- **Japan ITS Green Safety Consortium**: public-private demonstration project
  - Ended in 2013, deployment *target* after 2014
  - Included smartway with ACC/CACC (I2V,V2V): reduce shockwaves
  - First focus: V2V message specification (2015), still in an early stage