



Delft University of Technology

Automated Driving Research in the Netherlands (PPT)

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Publication date
2016

Citation (APA)
van Arem, B., & Alkim, T. (2016). *Automated Driving Research in the Netherlands (PPT)*. 1-15. Workshop Sino-Dutch Cooperation In Transport, Beijing, China.

Important note
To cite this publication, please use the final published version (if applicable).
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AUTOMATED DRIVING RESEARCH IN THE NETHERLANDS

自动驾驶的影响

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Automated Driving Research in the Netherlands
Workshop Sino-Dutch Cooperation in Transport, Beijing, 21-22 April 2016



Outline

- Policy framework and projects by the ministry of Infrastructure and Environment
- Projects at Delft University of Technology
- Outlook



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The Netherlands

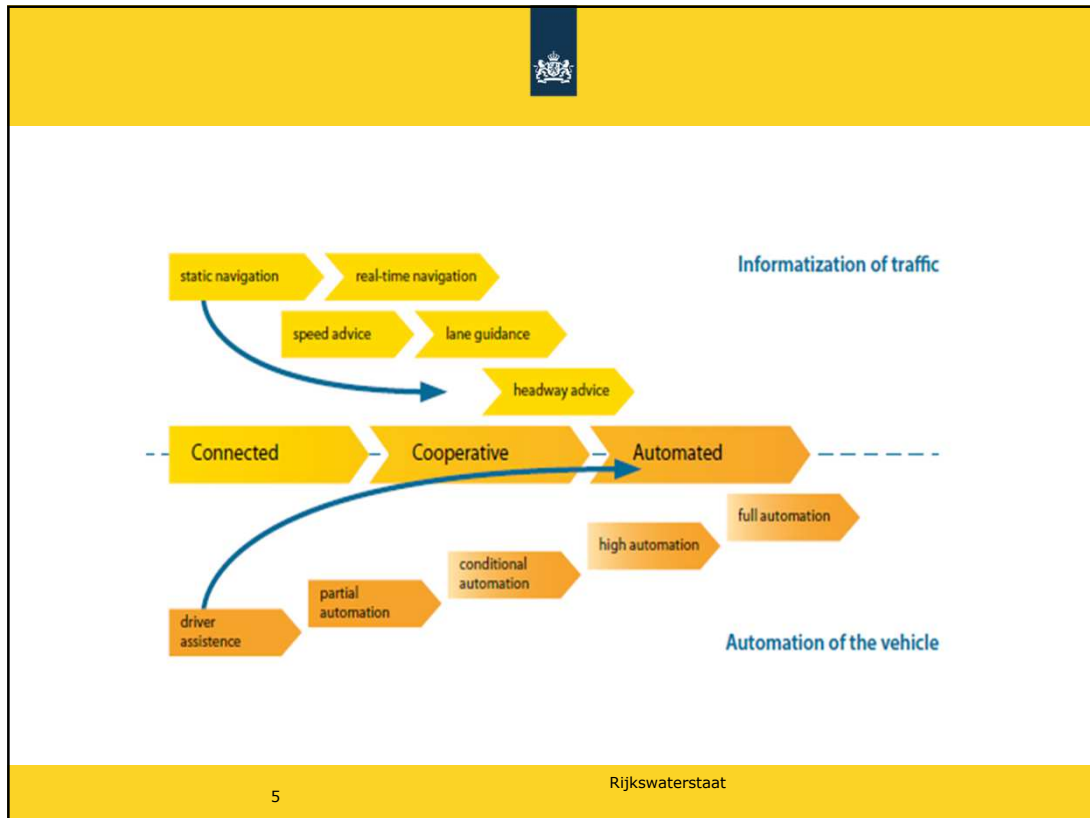


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Our ambition





The Netherlands is a suitable country for these innovations

- High quality infrastructure and dense use of infrastructure
- Positive cooperation between business (automotive industry), knowledge institutes (research) and government:
 - Dutch integrated testsite for cooperative mobility (DITCM)
 - Dutch Automated Vehicle Initiative (DAVI)
- Experience with autonomous driving and vehicle to vehicle communication:
 - Demo '98
 - Cooperative ITS Corridor Rotterdam-Frankfurt-Vienna
 - Practical Trial Amsterdam



Working group "the Self Driving Car"

- Ministry of Infrastructure & the Environment
 - Rijkswaterstaat, national road operator
 - RDW, type approval authority
1. Adjustment of (inter)national law
 2. Facilitate large-scale practical tests
 3. International efforts to make deployment a reality
 4. Stimulating and developing knowledge

People

- 20.000 BSc and MSc students
- 2.700 Scientific staff members

Faculties

- Physics
- Mathematics, electronics, information science
- Civil Engineering and Geosciences
- Mechanical, Maritime and Materials Engineering
- Aerospace Engineering

Ranking

- Times Higher Education ranking 71
- Part of Leiden (64) –Delft – Erasmus (Rotterdam, 72) federation

- Industrial design
- Architecture
- Technology, policy and management

TU Delft

Dutch Automated Vehicle Initiative (DAVI)

Stimulates research and development of automated vehicles on public roads.

Focus on traffic and system safety, human factors and impact assessment.

Network organization open for parties that want to work together to achieve DAVI goals.

Instruments:

- Thematic meetings (human factors, ethics, insurance, infrastructure,...)
- Project initiation and execution
- Liaison with public authorities

DAVI Demo 2013



TU Delft

Core partners

Charter partners

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Human Factors and Automated Driving (HF Auto)

Human factors

- Transitions of control
- Acceptance, trust
- Use & misuse
- Interaction with other road users

Legal and market perspectives

| Partners HFAuto | |
|-----------------------------------|------------------------------|
| Full Partners | Associated Partners |
| Delft University of Technology | Volvo Technology Cooperation |
| Technische Universität München | Volvo Car Corporation |
| University of Southampton | BMW |
| University of Twente | Jaguar |
| Chalmers University of Technology | Toyota Motor Europe |
| IFSTTAR (France) | Continental |
| VTI (Sweden) | TNO |
| | SWOV |

3.6 M € ITN Marie Curie FP7 2013-2017

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Driverless shuttles



World first automated shuttle in mixed traffic with cyclists and pedestrians.

TU Delft and DAVI partners, 2014-2016.



provincie
GELDERLAND



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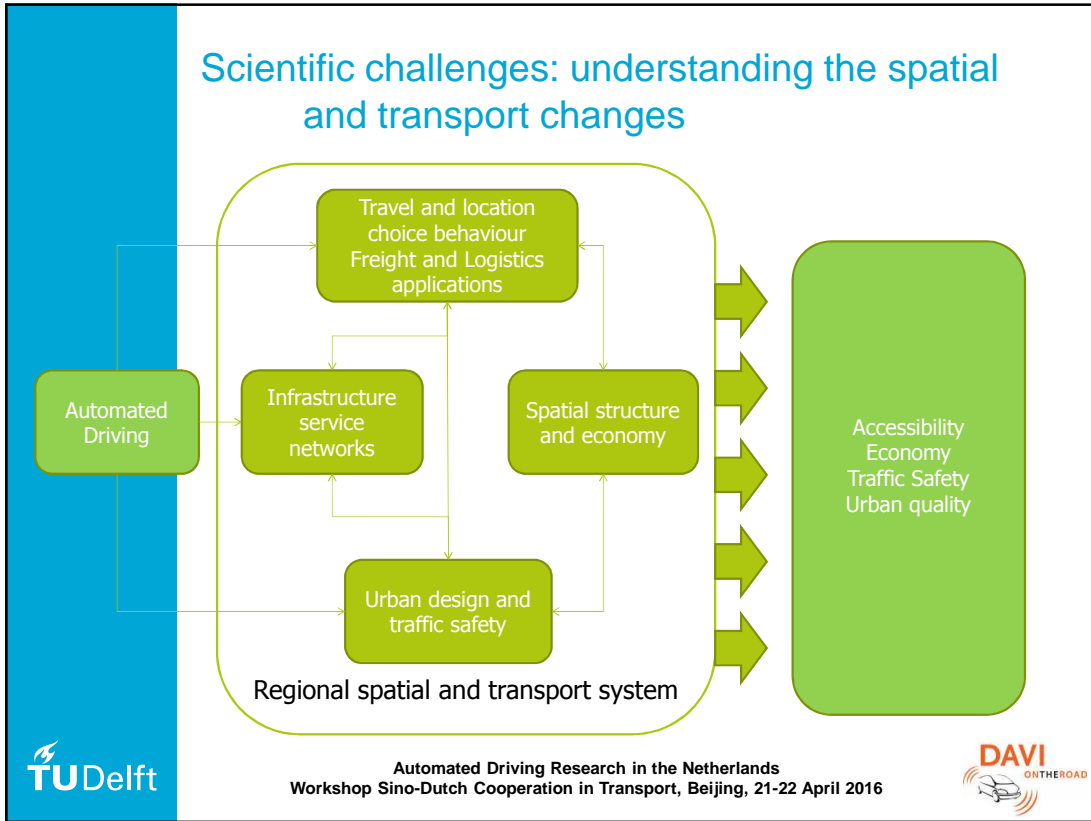
Driverless shuttles

- *Experimental driverless last mile transport between Train Station Delft-Zuid and TU Delft campus*
- *Dual mode: manual operation, automatic relocation on cycling paths*



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STAD: Spatial and Transport Impacts of Automated Driving

APPROVED

MRDH
METROPOOLREGIO
ROTTERDAM DEN HAAG

**PROVINCIE HOLLAND
ZUID**

DAVI
ON THER ROAD

NWO
Netherlands Organisation
for Scientific Research

Duration 2016-2020;
Budget 2,5M€

TU Delft

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DAVI
ON THER ROAD



Informal Transport meeting, Amsterdam, April 14-15, 2016

Rijkswaterstaat



Experience



Rijkswaterstaat



Experience



Rijkswaterstaat



Rijkswaterstaat



EU Truck Platooning Challenge



Rijkswaterstaat



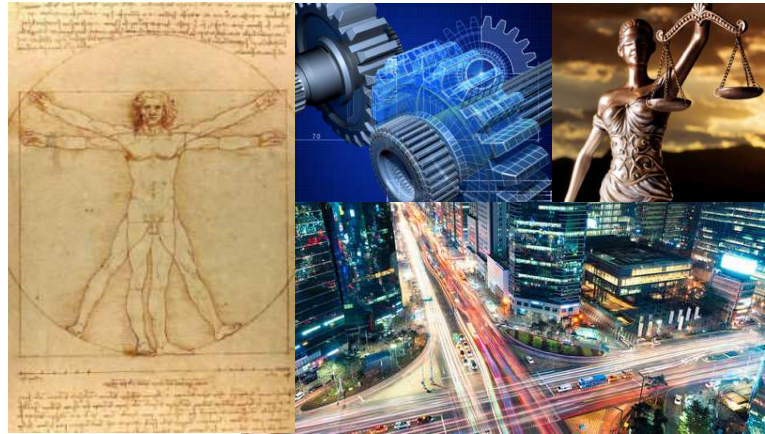
EU
2016

Rijkswaterstaat



Knowledge agenda

- Legal
- Technical
- Human Factors
- Impact
- Deployment



<http://knowledgeagenda.connekt.nl/engels/>



Declaration of Amsterdam



<http://english.eu2016.nl/documents/publications/2016/04/14/declaration-of-amsterdam>

Declaration of Amsterdam

Cooperation in the field of connected and automated driving

14-15 April 2016



Joint effort

- **Shared conceptual framework and phasing on (highly) automated/ autonomous and connected/cooperative driving**
- **Adapt and make compatible international legislation so that it allows automated, autonomous and connected driving**
 - E.g. Vienna Convention, traffic law, liability, privacy laws.
 - Informal working groups?
- **Focused investments in research, infrastructure, technology, ..**
- **Set (research) agenda for:**
 - Legal issues (privacy, liability, traffic law,...)
 - Data (ownership, exchange, infrastructure, harmonisation, security, maps, ...)
 -

Rijkswaterstaat



Joint effort

- **Facilitate a continuous dialogue**
 - Member States, European Commission , Industry and knowledge institutes
 - on (highly) automated, autonomous systems and its integration with C-ITS.
 - linking together existing platforms and give them a joint focus Eg. C-ITS platform DG Move
 - allow flexibility and a plurality of approaches
- **Learning by doing: provide large scale cross border possibilities to test on public roads across Europe**
 - define cross border corridors + urban networks (cities) to test
 - guiding principles on a joint exemption (procedure), agreements on mutual recognition,
 - give insight in the possibilities within Europe to test.
- **Develop joint agenda/ learning on relevant topics:**
 - Ensure new services and systems are compatible on a EU level
 - Ensure privacy and data ownership
 - Harmonize security policies
 - Focus investment strategies for industry and Member States attuned to these developments
- **Connecting to current activities**
 - C-ITS platform, Amsterdam Group, various (inter)national activities)

Rijkswaterstaat

The road to automated driving...

Develop efficient and reliable technology

Collect, analyse and publish large scale real-world experience

Study spatial, transport and societal impacts

Regulations, type approval

Awareness, ambitions, expectations, reality checks

International cooperation



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THANK YOU!

