Rijkswaterstaat
Ministry of Infrastructure and the Environment

Connected & Automated Driving in the NL

SIP-adus 2017, Tokyo

Tom Alkim
Senior Advisor
Connected & Automated Driving

Rijkswaterstaat

14 November 2017

https://www.volkskrant.nl/economie/minister-schultz-test-zelfrijdende-auto~a3543435/

NL presidency EU in 2016

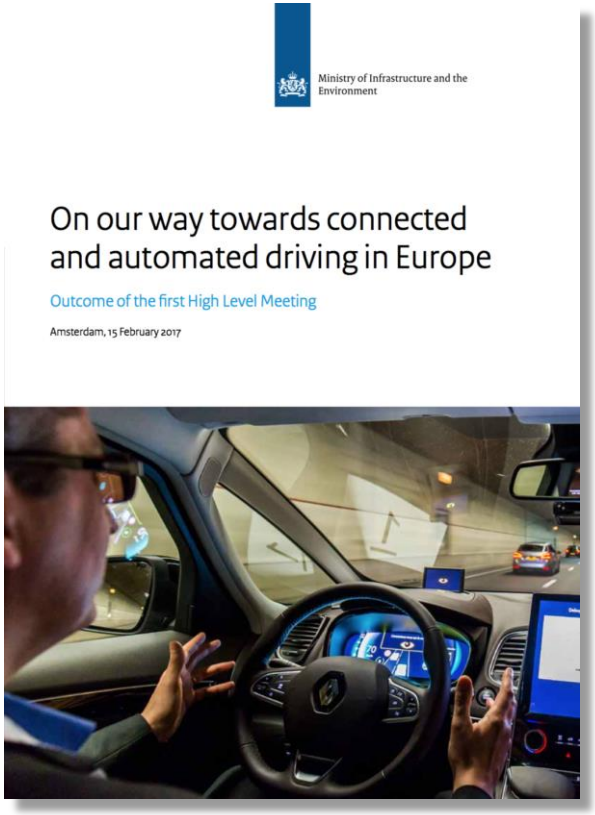
Smart mobility on the agenda

- Declaration of Amsterdam; strategic approach C-ITS and automated driving
- Experience; showcase providing experience to Ministers with automated vehicles
- EU-Truck Platooning Challenge

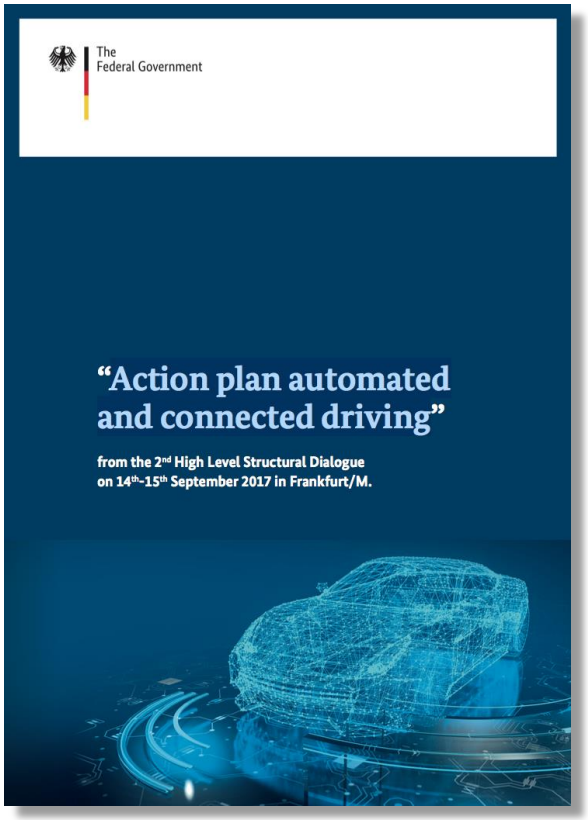
Declaration of Amsterdam

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

High Level structural dialogue



https://www.government.nl/documents/leaflets/2017/05/18/on-our-way-towards-connected-and-automated-driving-in-europe



Joint working agenda

- Data sharing
- V2X communication technologies
- Cross border testing
- Coherent regulation
- Joint European approach

https://www.bmvi.de/SharedDocs/EN/Documents/DG/action-plan-automated-and-connected-driving.pdf?__blob=publicationFile

Regeerakoord (coalition agreement)

Vertrouwen in de toekomst

Regeerakkoord 2017 – 2021

VVD, CDA, D66 en ChristenUnie

10 oktober 2017

3.2 Mobiliteit

Een slim en duurzaam vervoerssysteem waarvan de delen naadloos op elkaar aansluiten. Zo willen we Nederland mobiel en bereikbaar houden. Nu de economie weer goed draait, is een extra investering in infrastructuur nodig en mogelijk om toenemende drukte op de weg, het spoor, het water en in de lucht te verminderen. Tegelijkertijd nemen we maatregelen om de belasting voor het klimaat, de luchtkwaliteit en de leefomgeving te beperken. Innovatie biedt daarbij enorme kansen. De technologische ontwikkeling biedt de mogelijkheid om uiteindelijk tot een meer geïntegreerd vervoerssysteem te komen dat steeds schoner wordt.

Personenvervoer

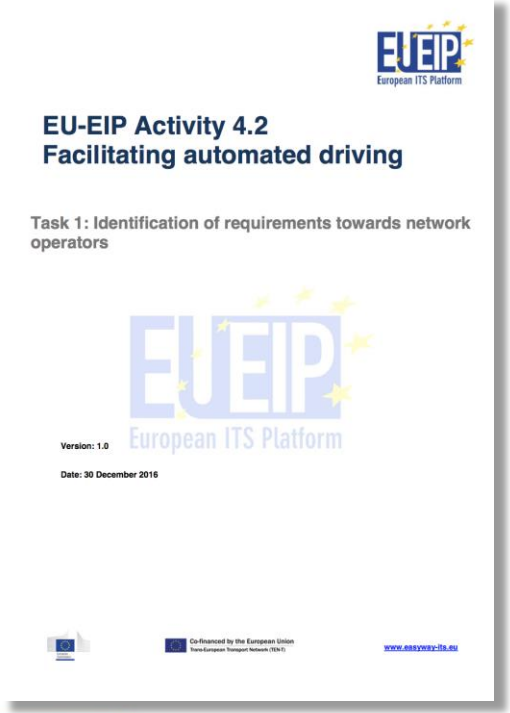
- Bij ontwerp, aanleg en onderhoud van infrastructuur houden we rekening met zelfrijdende voertuigen en benodigde systemen in of langs de weg. Overheidsinformatie over verkeer wordt zoveel mogelijk via open data beschikbaar gesteld voor voertuigen, apps en reisplanners. Om ieders privacy te waarborgen leggen we spelregels vast over de eigendom en het gebruik van reisdata.

When designing, building or maintaining infrastructure, take into account self driving vehicles and the required systems in or along the road.

EU EIP SA 4.2 – Aim of workshop Utrecht

- Relationship between connected & automated driving and:
  - infrastructure (physical and digital)
  - network operations
  - traffic management
- What can road operators do now, in short- and long-term future related to different levels of automation
- Help road operators to understand their role
- Provide input for a joint road operator's action plan
- Cooperation, sharing knowledge & experience
- Networking!

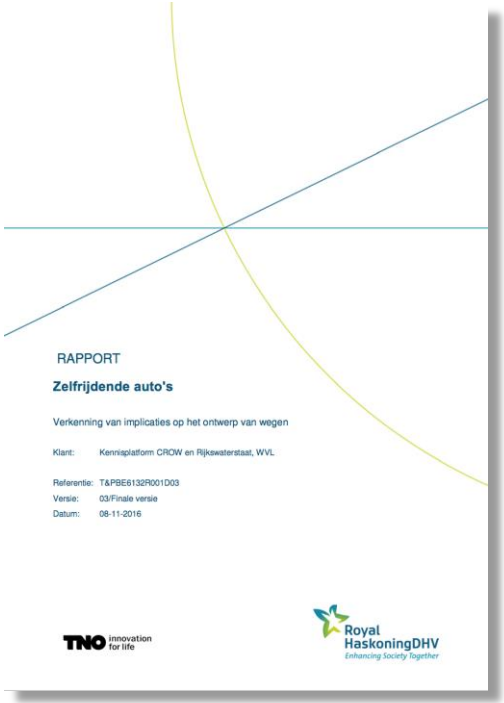
Results of studies, input for workshop


EU-EIP Activity 4.2
Facilitating automated driving

Task 1: Identification of requirements towards network operators

Version: 1.0

Date: 30 December 2016


RAPPORT

Zelfrijdende auto's

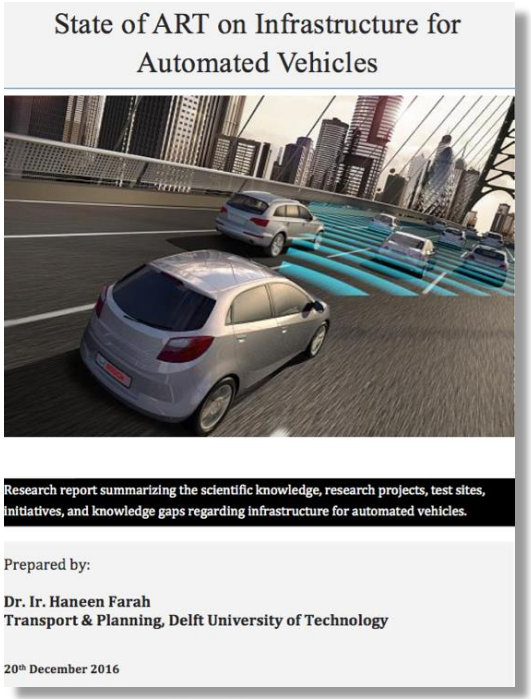
Verkenning van implicaties op het ontwerp van wegen

Klant: Kennisplatform CROW en Rijkswaterstaat, WVL

Referentie: T&PBE6132R001D03
Versie: 03/Finale versie
Datum: 08-11-2016

TNO innovation for life

Royal HaskoningDHV
Enhancing Society Together


State of ART on Infrastructure for Automated Vehicles

Research report summarizing the scientific knowledge, research projects, test sites, initiatives, and knowledge gaps regarding infrastructure for automated vehicles.

Prepared by:

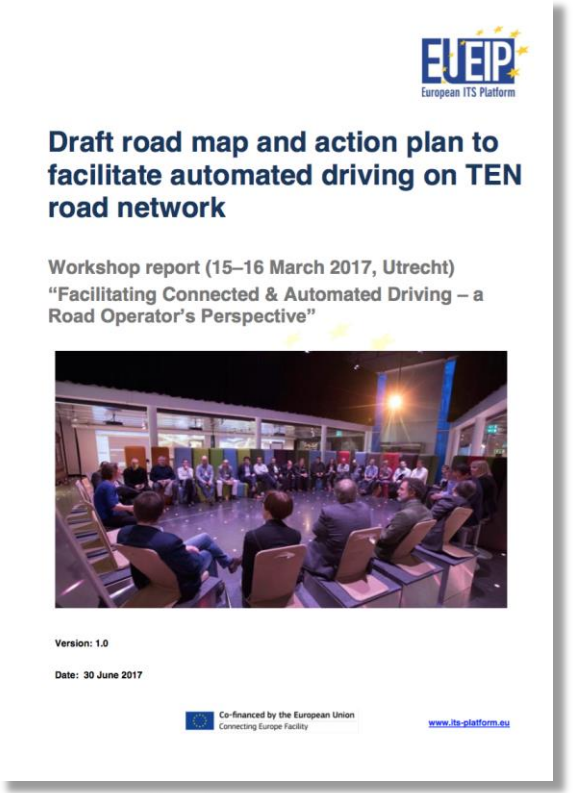
Dr. Ir. Haneen Farah
Transport & Planning, Delft University of Technology

20th December 2016

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

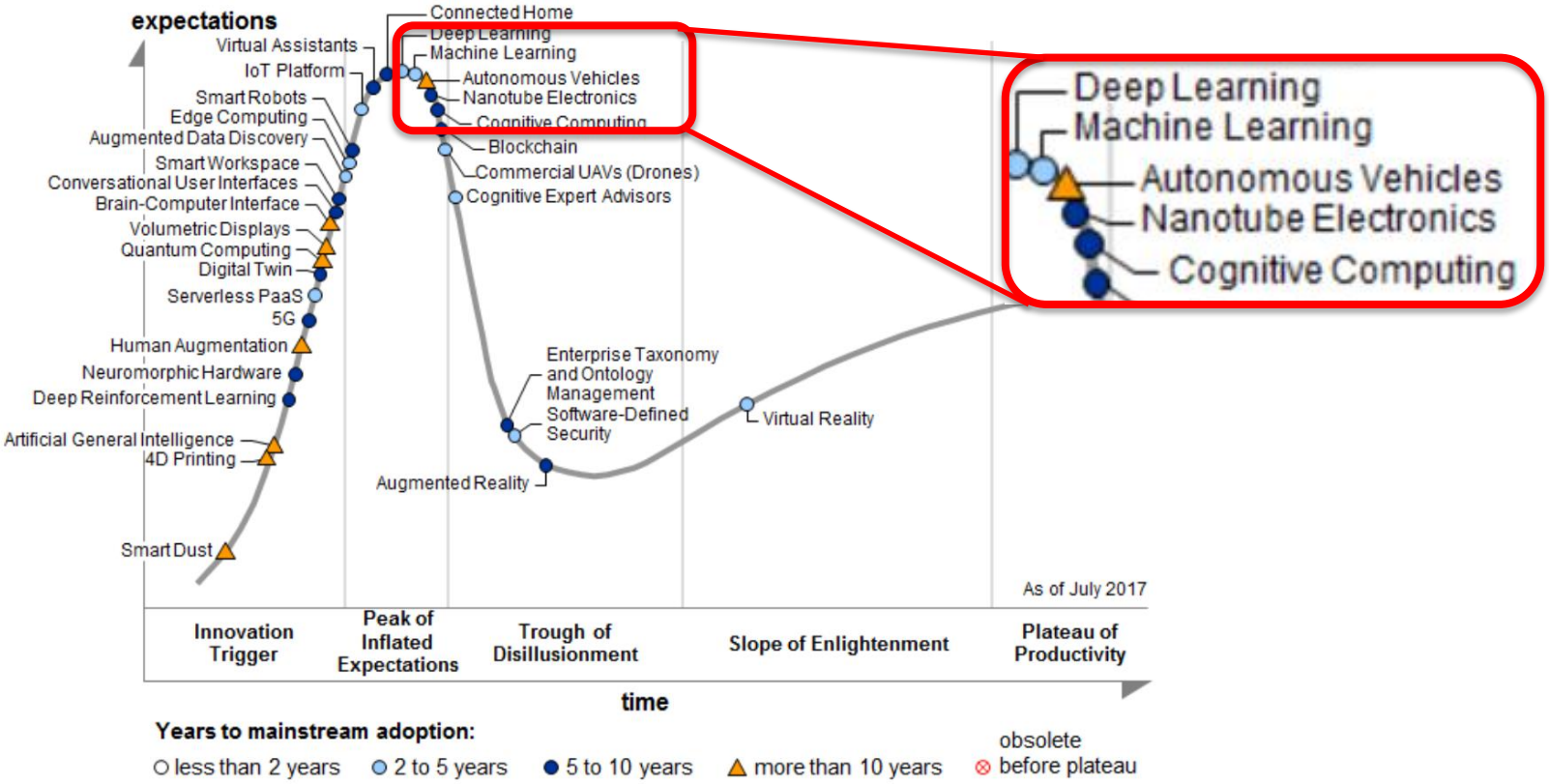
Conclusions

- Still a lot of uncertainty
- Need to have a dialogue with automotive industry
- SAE levels are too general for detailed dialogue about requirements, functional description is needed
- Mixed traffic vs dedicated infrastructure, different requirements
- What about (physical) transition zones?
- Adding elements vs leaving out elements



Deliverable is published in June 2017:
https://www.its-platform.eu/filedepot_download/1950/6112

Past the hype?



Operational Design Domain

SAE INTERNATIONAL

SURFACE VEHICLE RECOMMENDED PRACTICE

J3016™ SEP2016

Issued 2014-01
Revised 2016-09

Superseding J3016 JAN2014

(R) Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles

RATIONALE

This Recommended Practice provides a taxonomy describing the full range of levels of *driving automation* in on-road *motor vehicles* and includes functional definitions for advanced levels of *driving automation* and related terms and definitions. This Recommended Practice does not provide specifications, or otherwise impose requirements on, *driving automation systems*. Standardizing levels of *driving automation* and supporting terms serves several purposes, including:

- Clarifying the role of the (human) *driver*, if any, during *driving automation system* engagement.
- Answering questions of scope when it comes to developing laws, policies, regulations, and standards.
- Providing a useful framework for *driving automation* specifications and technical requirements.
- Providing clarity and stability in communications on the topic of *driving automation*, as well as a useful short-hand that saves considerable time and effort.

This document has been developed according to the following guiding principles, namely, it should:

- Be descriptive and informative rather than normative.
- Provide functional definitions.
- Be consistent with current industry practice.
- Be consistent with prior art to the extent practicable.
- Be useful across disciplines, including engineering, law, media, public discourse.
- Be clear and cogent and, as such, it should avoid or define ambiguous terms.

The current revision contains updates that reflect lessons learned from various stakeholder discussions, as well as from research projects conducted in Europe and the United States by the AdaptIVe Consortium and by the Crash Avoidance Metrics Partnership (CAMP) Automated Vehicle Research (AVR) Consortium, respectively.

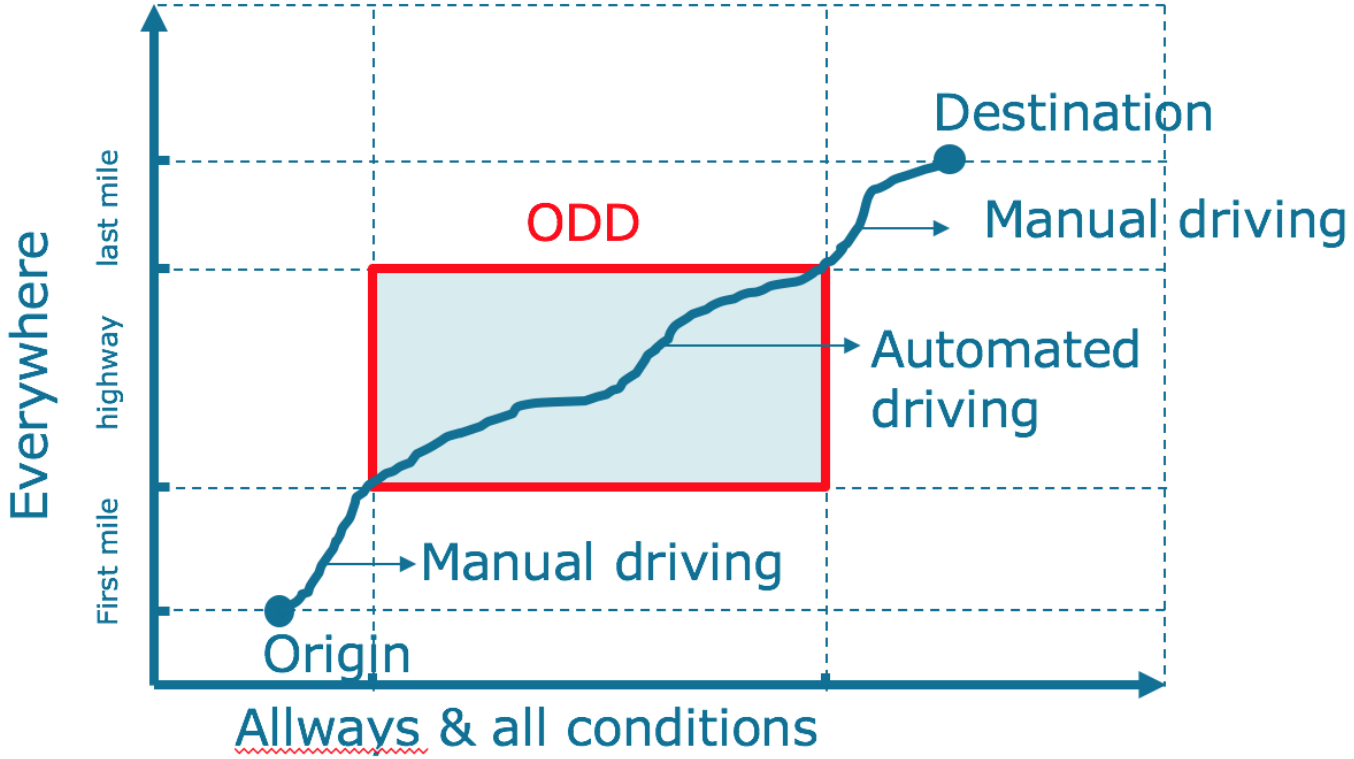
TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit http://standards.sae.org/J3016_201609

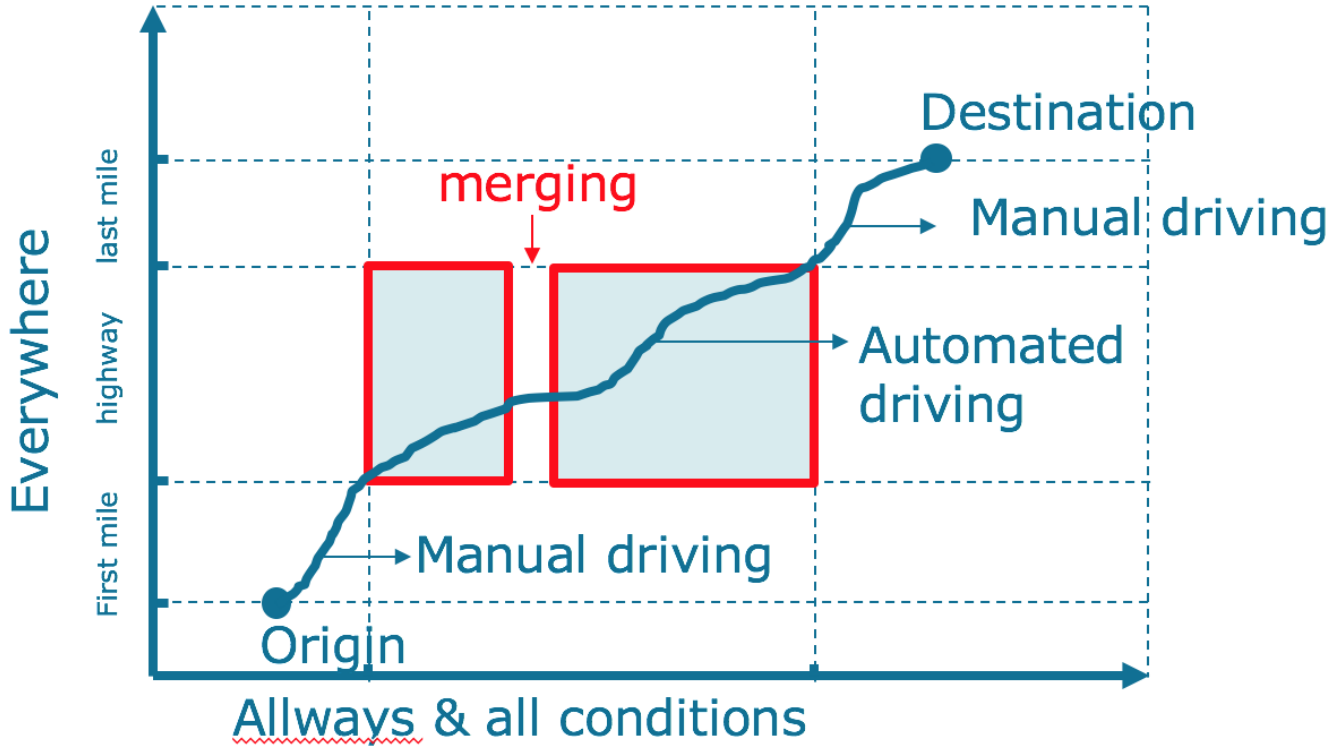
Level	Name	Narrative definition	DDT: Sustained lateral and longitudinal vehicle motion control	DDT: OEDR	DDT fallback	ODD
Driver* performs part or all of the *DDT						
0	**No Driving Automation**	The performance by the *driver* of the entire *DDT*, even when enhanced by *active safety systems*.	*Driver*	*Driver*	*Driver*	n/a
1	**Driver Assistance**	The *sustained* and *ODD*-specific execution by a *driving automation system* of either the *lateral* or the *longitudinal vehicle motion control* subtask of the DDT (but not both simultaneously) with the expectation that the *driver* performs the remainder of the *DDT*.	*Driver* and *System*	*Driver*	*Driver*	Limited
2	**Partial Driving Automation**	The *sustained* and *ODD*-specific execution by a *driving automation system* of both the *lateral* and *longitudinal vehicle motion control* subtasks of the *DDT* with the expectation that the *driver* completes the *OEDR* subtask and *supervises* the *driving automation system*.	***System***	*Driver*	*Driver*	Limited
***ADS* ("*System*") performs the entire *DDT* (while engaged)**						
3	**Conditional Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire DDT with the expectation that the *DDT fallback-ready user* is *receptive* to *ADS*-issued *requests to intervene*, as well as to *DDT performance-relevant system failures* in other *vehicle* systems, and will respond appropriately.	*System*	***System***	*Fallback-ready user (becomes the driver during fallback)*	Limited
4	**High Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	***System***	Limited
5	**Full Driving Automation**	The *sustained* and unconditional (i.e., not *ODD*-specific) performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	*System*	**Unlimited**

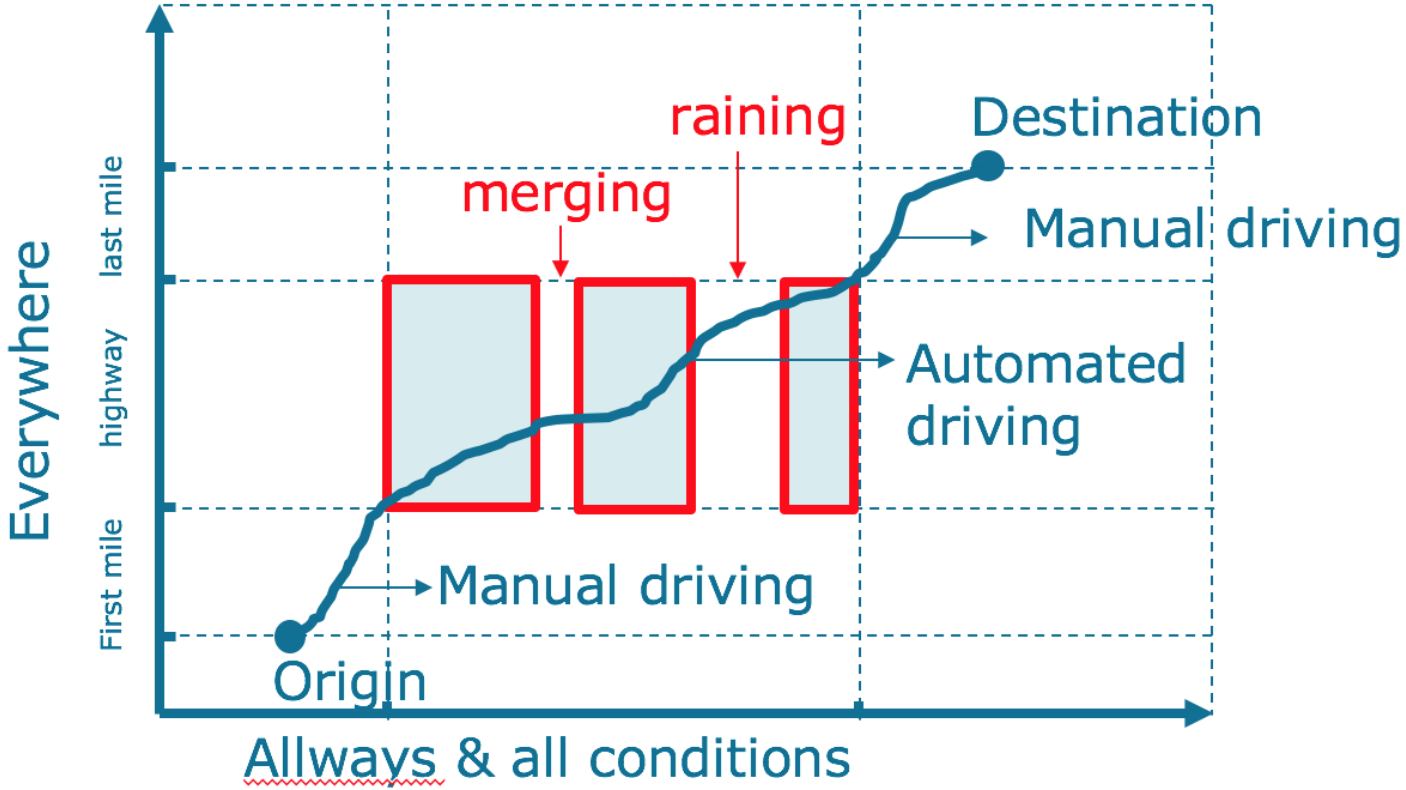
http://standards.sae.org/j3016_201609/

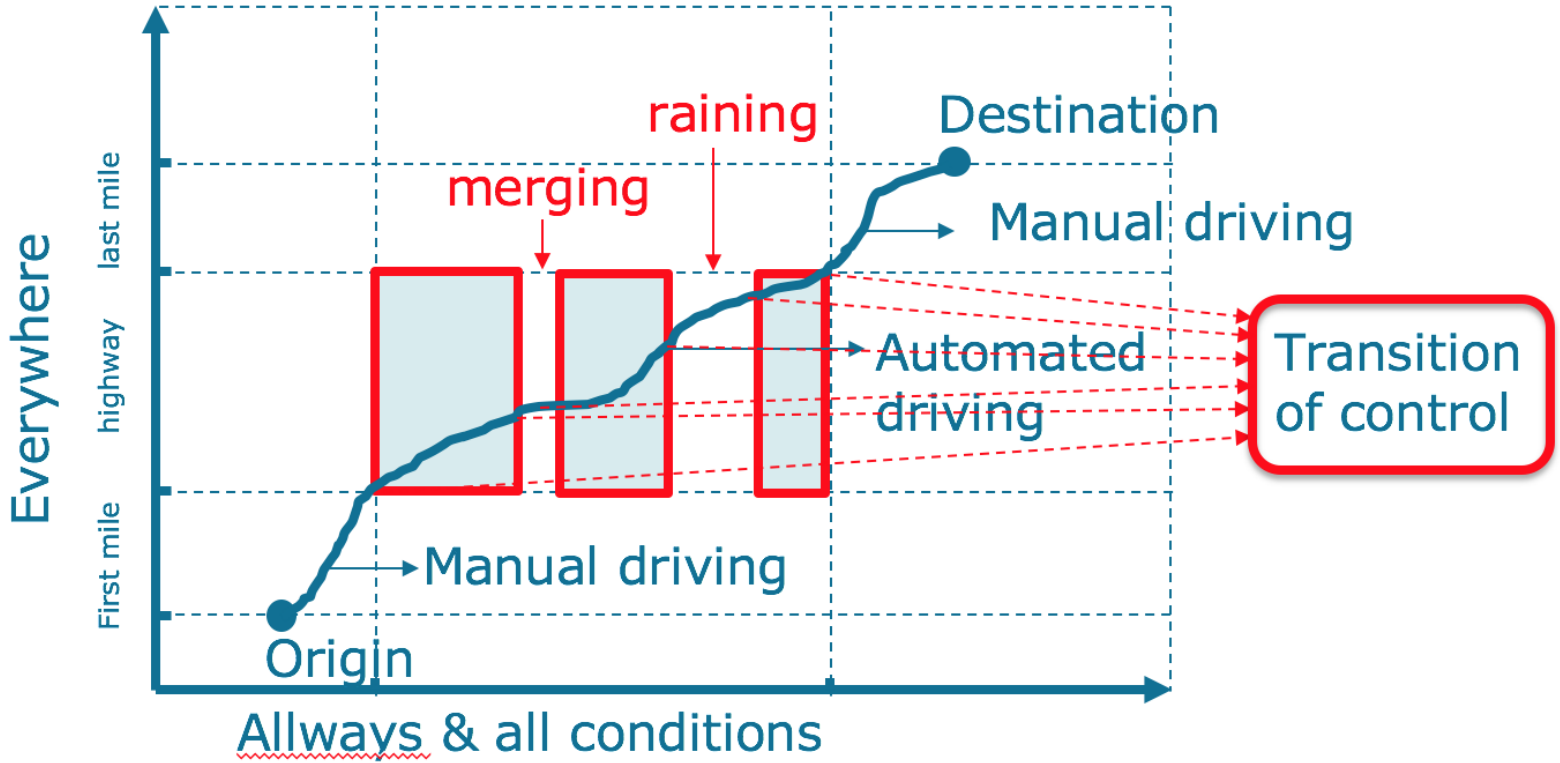
Level	Name	Narrative definition	DDT		DDT fallback	ODD
			Sustained lateral and longitudinal vehicle motion control	OEDR		
Driver* performs part or all of the *DDT						
0	**No Driving Automation**	The performance by the *driver* of the entire *DDT*, even when enhanced by *active safety systems*.	*Driver*	*Driver*	*Driver*	n/a
1	**Driver Assistance**	The *sustained* and *ODD*-specific execution by a *driving automation system* of either the *lateral* or the *longitudinal vehicle motion control* subtask of the DDT (but not both simultaneously) with the expectation that the *driver* performs the remainder of the *DDT*.	*Driver* and *System*	*Driver*	*Driver*	Limited
2	**Partial Driving Automation**	The *sustained* and *ODD*-specific execution by a *driving automation system* of both the *lateral* and *longitudinal vehicle motion control* subtasks of the *DDT* with the expectation that the *driver* completes the *OEDR* subtask and *supervises* the *driving automation system*.	***System***	*Driver*	*Driver*	Limited
***ADS* ("*System*") performs the entire *DDT* (while engaged)**			*System*	***System***	*Fallback-ready user (becomes the driver during fallback)*	Limited
3	**Conditional Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire DDT with the expectation that the *DDT fallback-ready user* is *receptive* to *ADS*-issued *requests to intervene*, as well as to *DDT performance-relevant system failures* in other *vehicle* systems, and will respond appropriately.				
4	**High Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	***System***	Limited
5	**Full Driving Automation**	The *sustained* and unconditional (i.e., not *ODD*-specific) performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	*System*	**Unlimited**


Everywhere
First mile
highway
last mile
Destination
ODD
Manual driving
Automated driving
Manual driving
Origin
Allways & all conditions


豊洲
Toyosu
10
B
横浜
Yokohama
11
有明
Ariake
出口 005
Haneda
87-28
MOBILITY TEAMMATE
CONCEPT
31-94
48-48


Everywhere
last mile
highway
First mile
Destination
merging
Manual driving
Automated driving
Manual driving
Origin
Allways & all conditions


raining
Destination
merging
last mile
Manual driving
highway
Automated
driving
Everywhere
First mile
Manual driving
Origin
Allways & all conditions


raining
Destination
merging
Manual driving
Automated driving
Transition of control
Manual driving
Origin
Everywhere
First mile
highway
last mile
Allways & all conditions

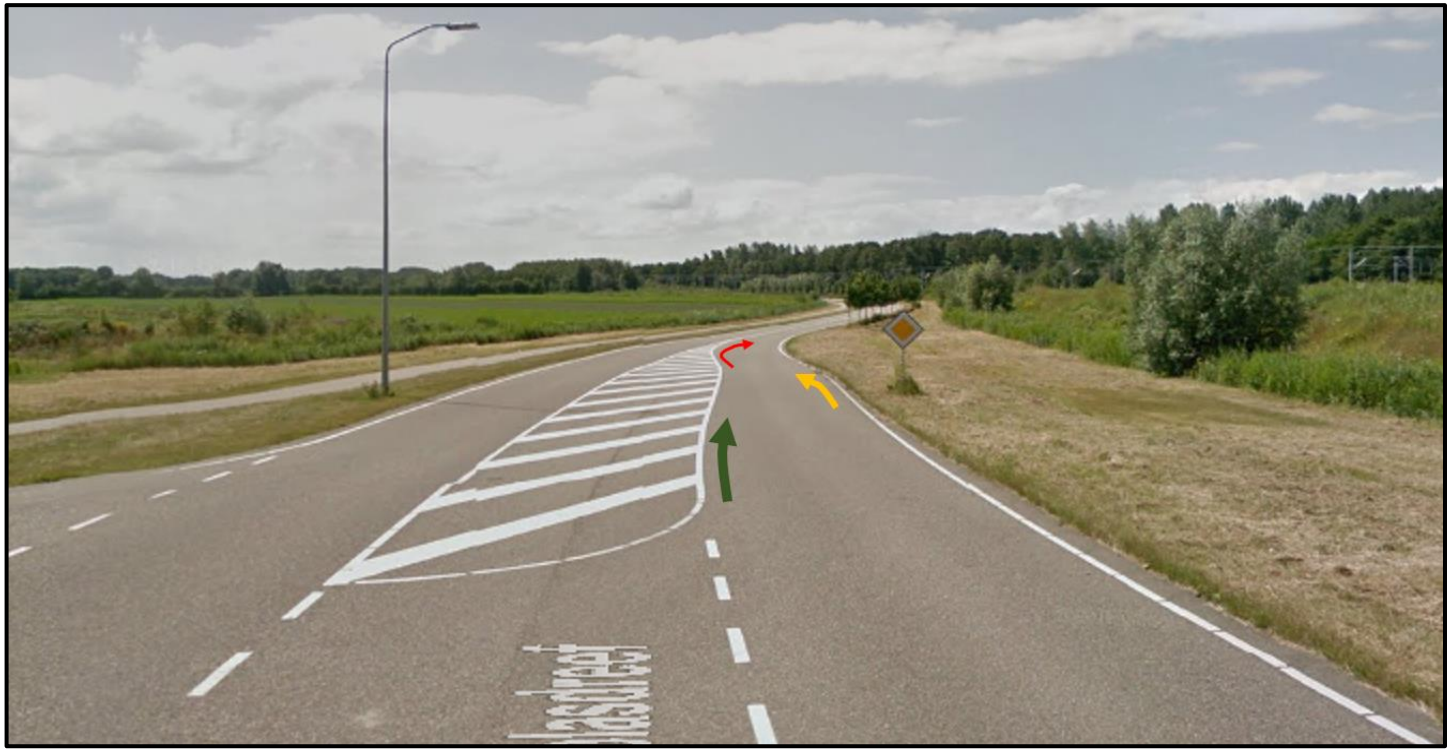
Driving experience

- 5 days (2 Dec 2016, 3 Feb, 10 Mrt, 31 Mrt, 12 May 2017)
- 170 participants
- 317 trips (1 hour trajectory)
- 10920 kilometers
  - 53% HWN (5820)
  - 36% OWN (3930)
  - 11% City(1170)

Sources

- Enquiries
- Log books
- Focus groups
- Camera footage


KT-870-
KH-469-F
KL-059-Z



Auto 8

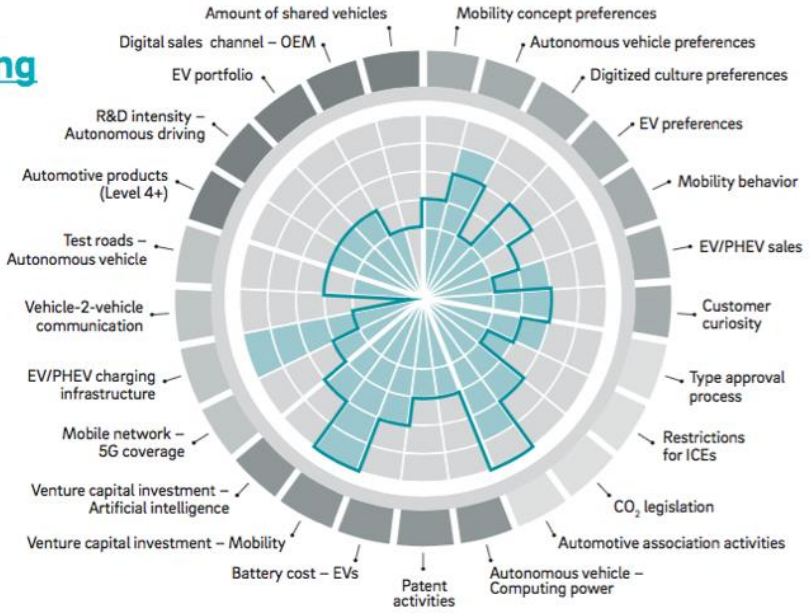

“seam”
Interupted
lane marking

https://www.rolandberger.com/en/press/First-Roland-Berger-Automotive-Disruption-Radar-Autonomous-driving-and-electric.html
https://www.rolandberger.com/de/Publications/pub_asia_ahead_automotive_disruption_radar_2.html

Country ranking

#1 The Netherlands

A winning combination: The Netherlands has comparatively high electronic vehicle sales, a very good EV charging infrastructure and a strong interest in autonomous driving.



Country ranking

The Netherlands

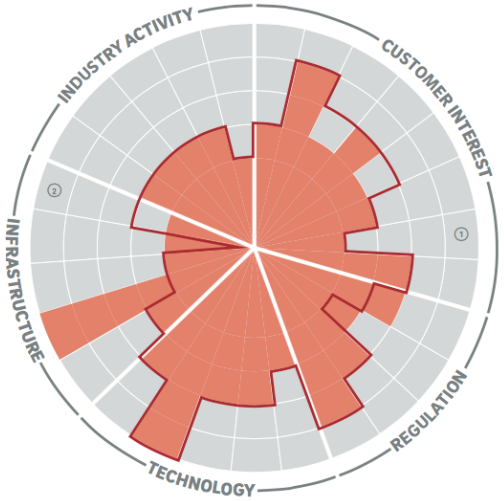
#1

Leading or scoring high on all criteria, the Netherlands currently has the most balanced set of prerequisites.

Insights and key changes since Issue #1:

① Significant decrease of EV/PHEV sales (from 5.1% to 1.5% sales share) due to lowered subsidies – customers claim cost of buying an EV is too high. However, the Netherlands leads in EV infrastructure

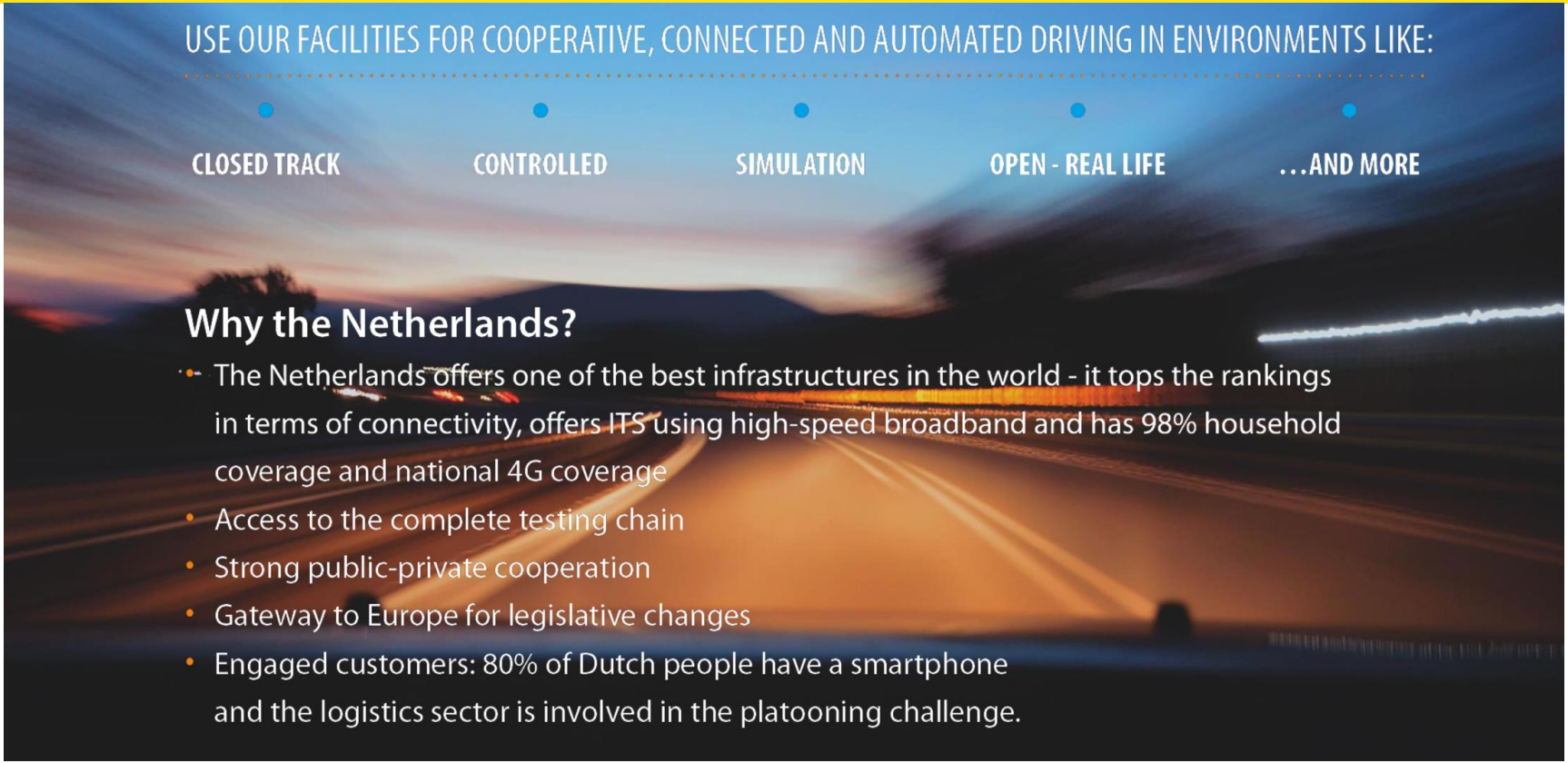
② Current low level of autonomous test tracks expected to be enhanced through the "Autonomous Vehicle (Trial) Bill", a regulatory initiative for removing legal barriers to testing autonomous vehicles



Global average Country score

Source: Roland Berger


SMART
MOBILITY
EMBASSY
The gateway to knowledge and experience in the Netherlands
One-stop shop for all questions on Smart Mobility
Experience Smart Mobility in the Netherlands
Export Smart Mobility knowledge from the Netherlands
www.smartmobilityembassy.nl • info@smartmobilityembassy.nl • +31 (0)15 251 6565


USE OUR FACILITIES FOR COOPERATIVE, CONNECTED AND AUTOMATED DRIVING IN ENVIRONMENTS LIKE:
CLOSED TRACK
CONTROLLED
SIMULATION
OPEN - REAL LIFE
...AND MORE
Why the Netherlands?
The Netherlands offers one of the best infrastructures in the world - it tops the rankings in terms of connectivity, offers ITS using high-speed broadband and has 98% household coverage and national 4G coverage
Access to the complete testing chain
Strong public-private cooperation
Gateway to Europe for legislative changes
Engaged customers: 80% of Dutch people have a smartphone and the logistics sector is involved in the platooning challenge.

The Netherlands ‘preferred choice’ candidate-host country European ITS Congress 2019

(ENG) The ERTICO – ITS Europe Supervisory Board indicated Brainport Eindhoven as “preferred choice” candidate to host the ITS European Congress 2019. The announcement was done after a selection process in which submissions of different cities in Europe were considered. The choice was made on the basis of the recommendation of the European Selection Committee which reviewed all submissions.

First week June 2019

Now the final negotiation process with Brainport Eindhoven will start, and, if successful, this will lead to final appointment. As soon as this is formalized, the official communication on the selected City hosting the ITS European Congress 2019 will be done


Thank you for your attention
tom.alkim@rws.nl