
























Meeting	FORMForum
Speaker	Bastiaan Krosse
Date	19/10/2016

**The next level in connected automated  
driving:**

***out of the loop and in control***

# (SAE) Levels of automation

Level	Name	Narrative definition	Execution of steering and acceleration/deceleration	Monitoring of driving environment	Fallback performance of dynamic driving task	System capability (driving modes)	BASK level	NHTSA level
<b>Human driver monitors the driving environment</b>								
0	No Automation	the full-time performance by the human driver of all aspects of the dynamic driving task even when enhanced by warning or intervention systems				n/a	Driver only	0
1	Driver Assistance	the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	 				Assisted	1
2	Partial Automation	the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task					Partially automated	2
<b>Automated driving system ("system") monitors the driving environment</b>								
3	Conditional Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene					Highly automated	3
4	High Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene					Fully automated	3/4
5	Full Automation	the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver				All driving modes		

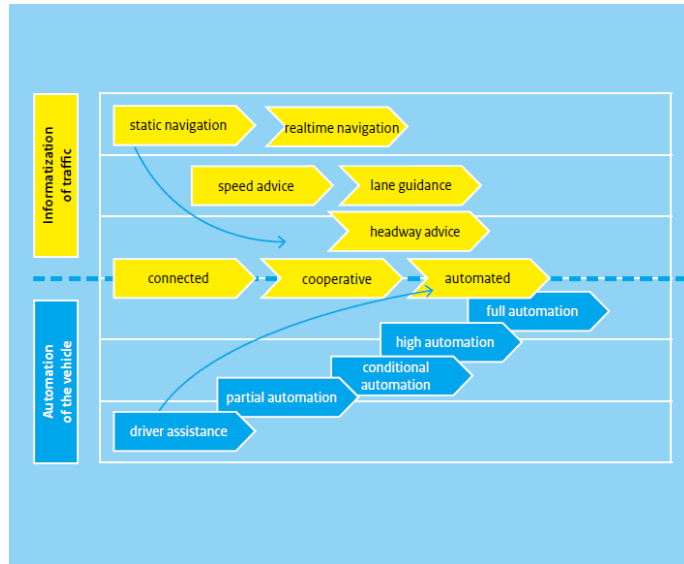
 = System     = Human driver     = Some driving modes

SAE levels work perfect for automation...

What if we would include a 2<sup>nd</sup> dimension in this picture:

**Interaction**

# Automation and connectivity do not just run in parallel, they highly interact...

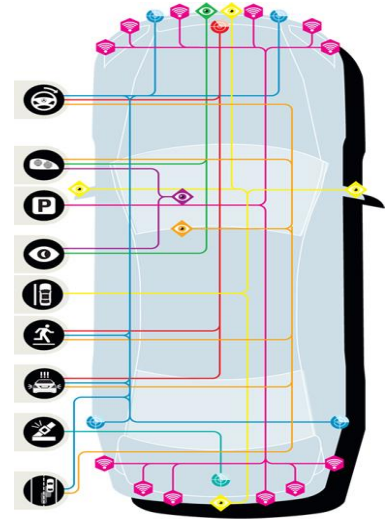
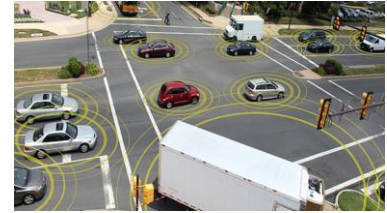


Source: Declaration of Amsterdam 2016

- We need a 3D perspective to see how connected and automated driving interact.

# Connectivity

- 1<sup>st</sup> revolution (*mechanisation*), the 2<sup>nd</sup> (*industrialisation*) and the 3<sup>rd</sup> (*digitalisation*), next step: 4<sup>th</sup> revolution (everything is connected to everything, the **physicalisation** of the digital world)
- Vehicle becomes an **element** in the **internet of things**
- Towards more integration of different communication technologies (e.g. ITS-G5 and 5G)
- More and more **fusion of different data sources**, both within the vehicle and outside (V2X)
- **Enormous amounts of data** are being generated and sometimes stored, although we do not always really now yet what to do with it.



## Race for data

- Big race going on: Google, Apple, and “new kids on the block”, the OEMs all over the world: **everybody wants to own the data.**
- Others want it too... insurance companies, fleetmanagers,..
- But what does it mean for us, **as drivers**, as users of our road and mobility system?
- We have a EURONCAP system that guides the OEMs in the development of safe passenger cars
  - the data “steers” the automated vehicle, but is it:
    - Accurate, reliable and **TRUSTWORTHY?**



# (Cyber) Security and Privacy

- Is NOT about crisis management, is about being pro-active
- Needs “security-by-design” and “privacy-by-design” approaches
- More and more integration of connectivity and autonomous driving functions calls for the **co-design of solutions for security, safety and reliability** from individual components up to the complete vehicle system.
- ***Although the vehicle takes us more and more out of the loop (increasing levels of automation), we have to stay in control (at a strategic level) of the generated data***

They have a file on you – but for how long?



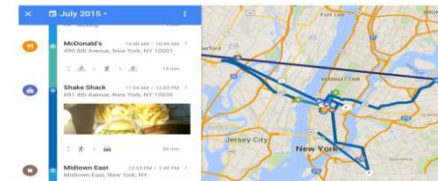
(Newspress)

Absent federal standards, the Auto Alliance, a consortium of 12 automakers active in the US, notified the US Federal Trade Commission that it had adopted voluntary standards for how the companies would collect and use passenger-vehicle data. The rules include minimising the amount of time automakers retain driver data, asking for consent before using it for marketing purposes, and not handing over information to law enforcement agencies without a court order. The new standards go into effect for 2017-model-year vehicles, but could be changed or augmented if the US government determines the voluntary rules do not go far enough to protect drivers' privacy.



Google Maps shows what it knows about everywhere you've (ever) been

By Richard Lueder | @rld | 8 hours ago



Google's Location History feature keeps track of the places your mobile device has been off you opt-in and turn it on and now you can look back through that data with "Your Timeline". Rolling out on the desktop and Android versions of Google Maps, it gives you an easy-to-navigate look at your comings and goings.

## Data to learn from, how do we prevent reinventing the wheel

- It is and will be a continuous and ongoing challenge to deal with privacy and security issues when it comes to data collection... and not only in the automotive sector. However... we will (have to) come to some solution.
- How can we design architectures that support privacy and security by design for both real-time data usage, as well as for the collection of data for development and evaluation assessment purposes?
- How do we **harmonize** different database approaches, e.g. UDRIVE, ART-projects, ...?





## Opportunity for EARPA members

- EARPA members could support the industry in developing new approaches to deal with cyber security\*:
  - Vehicle as a cyber physical entity
  - Secure vehicle within an unsecure world
  - Secured operations in an unsecure environment
  - Secured ownership in an unsecure environment
- And by developing database design approaches :
  - architectures, interfaces, collection principles, data management, ...

*\*Source: EARPA Cross-cutting Position Paper on Cyber security 2016*

## Next level: out of the loop and in control

Towards a future, being

- Out of the loop: when it comes to automation
  - In control: when it comes to secure data
- Or do we prefer driver *in* the loop and .... **out** of control



# Questions?





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FUTURE OF ROAD MOBILITY 2016