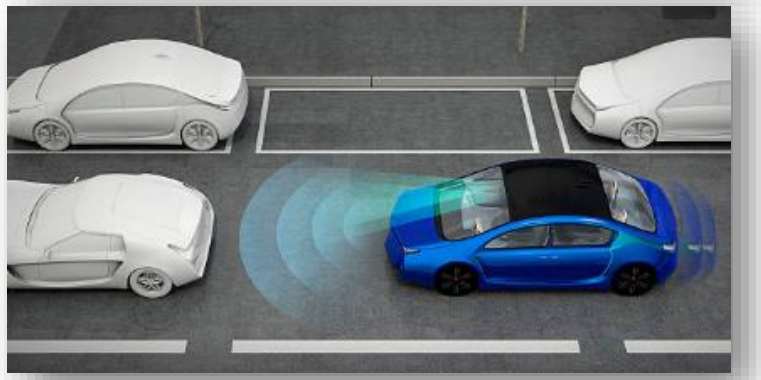
International Energy Agency
Secure Sustainable Together

CLEAN ENERGY MINISTERIAL
Accelerating the Global Clean Energy Transition

Electric Vehicles Initiative



Paris
13 June 2018

Automation, connectivity, electrification, and sharing (ACES): Transforming road transport services

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Mechnical Engineer

Secretary of the Vehicle Active Safety Forum (WP.29/GRRF)

Focal point of the IWG on ITS/AD

Agenda 2030 - SDGs

Automated Driving vehicles are expected to contribute to the solutions needed to address the transport related issues:

- Congestion
- Pollution
- CO_2 emissions
- Road safety crisis

UNECE and vehicle regulations

Social Rules
(driving and rest hours)

Road Traffic Rules

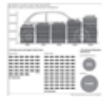
Drivers' License

Road Signs and Signals

Vehicle Regulations

E19

Infrastructure (standards and parameters, tunnel safety, all land modes)



Statistics

Customs

Border Crossing Facilitation

Dangerous Goods

Incl. their sub-systems and parts

The World Forum for Harmonization of Vehicle Regulations (WP.29)

- UNECE Transport Division: secretariat to WP.29 for more than 60 years
- Since 2000, WP.29 is:
  - the unique worldwide regulatory forum for the automotive sector
  - administrating three Multilateral UN Agreements

Construction regulations
1958 Agreement - Type Approval Regulations with mutual recognition of the type approvals
1998 Agreement - Global Technical Regulations

In Use PTI regulations
1997 Agreement - Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspection

The challenges

- Autonomous vehicles do not really exist yet - only prototypes and trials, but no mass market product.
- The regulatory work is preempting the technology.

➔ The regulator has to be *moderately proactive* to enable innovation.

Goal:

- Integrate the technologies into the existing transport system,
- ensuring that the benefits of these new technologies can be captured.

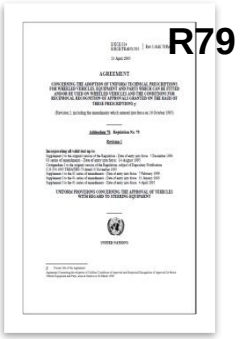
The UN Member States do so without compromising on:

safety and achievements so far (e.g. international transport, trade, interoperability and environmental performance).

Lower levels of automation – WP.29 achievements

Achievements:

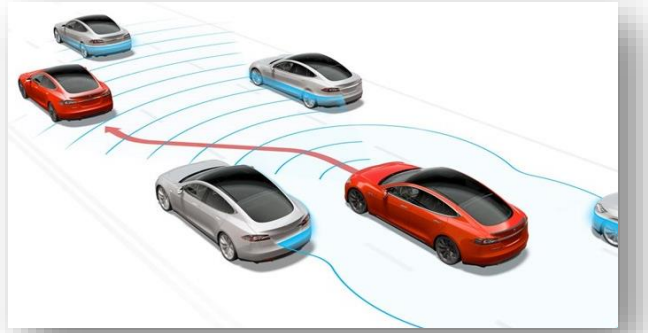
- Package 1 (ACSF Cats A and B1) Adopted in March 2017
- Package 2 (ACSF Cat C + CEL Annex) Adopted in March 2018
- Package 3 (ACSF Cat E) Draft review expected in September 2018



R79

ACSF Cat. A: e.g. RCP

ACSF Cat. B_1 (Lane keeping «hands on»)

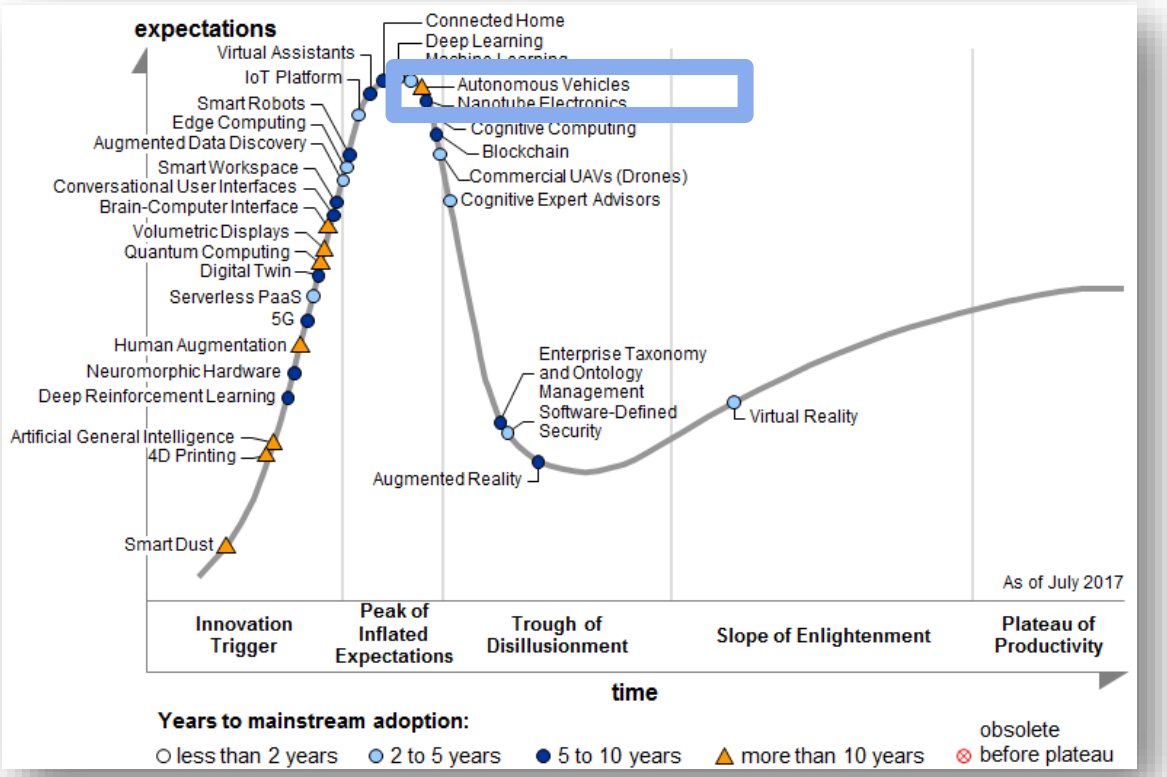


ACSF Cat. C (Lane change)

Slower than expected?

After peak hype, self-driving cars enter the disillusionment phase

(According to the the Gartner hype cycle)



Source: Wired

Other industrial priorities

Level 2+ in the pipeline, according to Intel/Mobileye
(L2+ = L2 + HD maps)

Source: youtube channel Mobileye

Automation - new products, new concepts, new usages

This car is a passenger car.
May be automated.

This is a light duty/goods vehicle.
It does not have a driver
It probably has a remote operator
Does it meet regs. requirements?

Is this a passenger car? or a bus?
Not designed for a driver!
How to assess it for safety?

This is not really a passenger car
This is not really a quadricycle
How to assess it for safety?

Need to review existing regs?

Remote controlled?
Only off road?
Geofencing necessary?

Higher automation levels: Horizontal Regulation – work ongoing

Use-Cases: Urban, Highway, Interurban, [Parking] for automation levels 3*, 4 and 5
Requirements address vehicle behavior in road traffic and further general safety requirements

Physical Certification Tests

Dedicated, reproducible worst-case tests for specific scenarios that cannot be guaranteed to occur in real world test drives

\+ Objective performance criteria
– Significant testing efforts
– Transfer of requirements into reproducible tests technically difficult or likely to result in remarkable functional restrictions

Real World Test Drive

Test drive to assess the vehicle's standard behavior in public road traffic, compliance with traffic laws and maneuvers according to defined checklist

\+ Limited testing efforts
\- Subjective influence on judgments
\- Requires highly skilled and qualified test house/certification agency to appropriately assess systems

Audit

OEM provides e.g.:
- Safety concept / functional safety strategy
- Simulation and development data to verify vehicle behavior in edge cases
- Manufacturer's self declarations
- etc.

← *pros/cons: see RWTD*

* If not covered by UN-R 79 ACSF – ACSF results for highway could also be transferred afterwards

Type Approval

- Existing TA + use case tests
- Verification of sensor processing

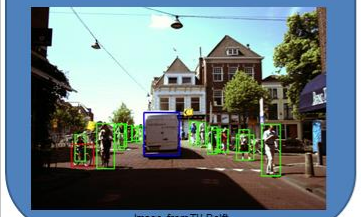
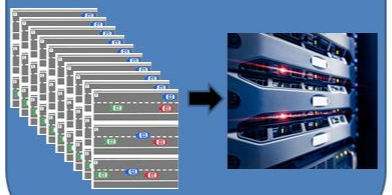


Image from TU Delft

ADS Audit

- Supplementary to OICA ideas: simulate many scenarios



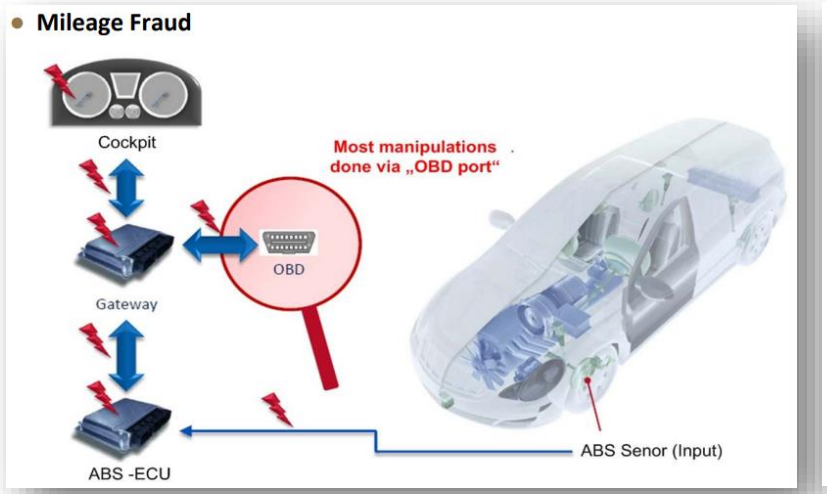
Real World Test Drive

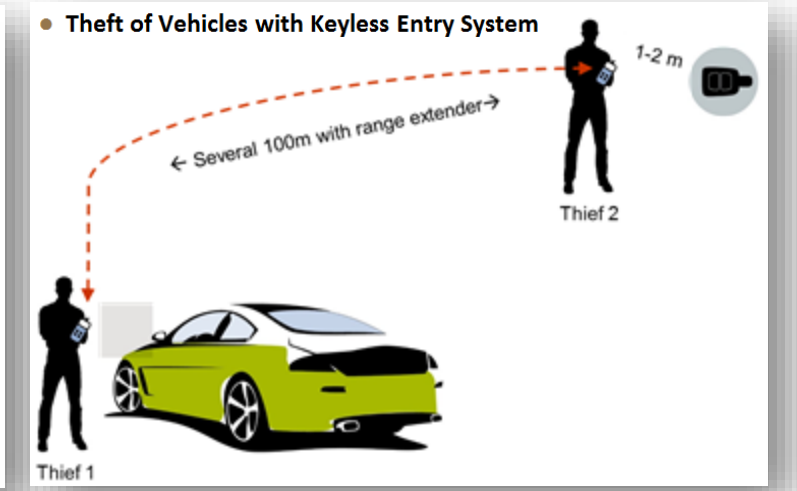
- Key part of process
- Is 60 minutes enough?

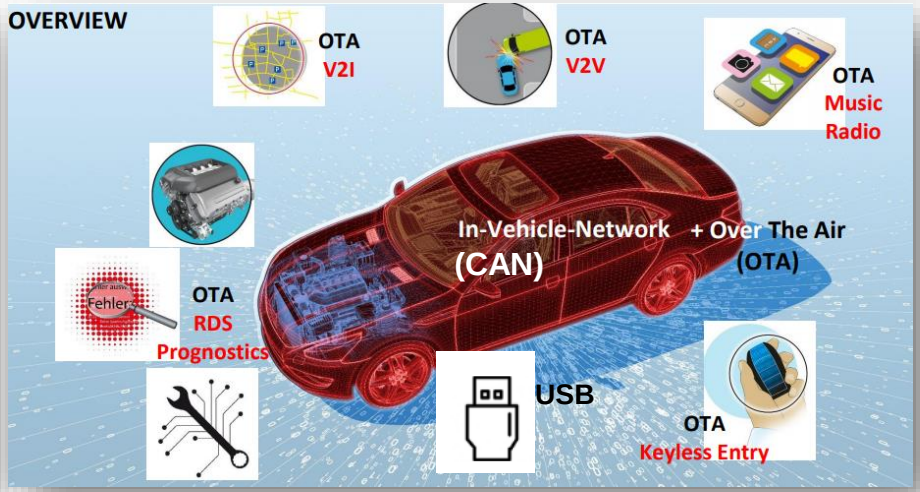
CATAPULT Transport Systems

Cyber security

Advocacy groups presented the following cases to WP.29







They also raised the concern of data protection

- Malicious or fraudulent activities
- Fully legal activities but not in the interest of the consumers
- (Concerns related to privacy, which is mentioned in the Universal Declaration of Human Rights)

➔ WP.29 adopted guidelines on Cyber Security and Data Protection
➔ Task Force on Cyber Security and Over the Air

THANK YOU VERY MUCH FOR YOUR ATTENTION

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http://www.unece.org/trans

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