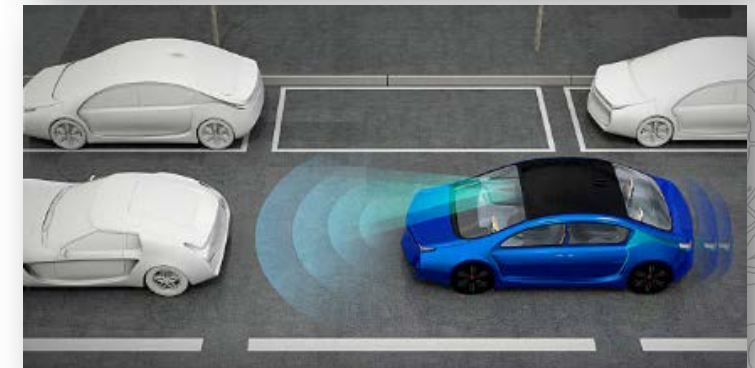




Workshop "Autonomous shipping and inland navigation"
Geneva, Palais des Nations, Room VIII
14 February 2018

Automation and ITS
- With examples taken from the broad automotive sector -

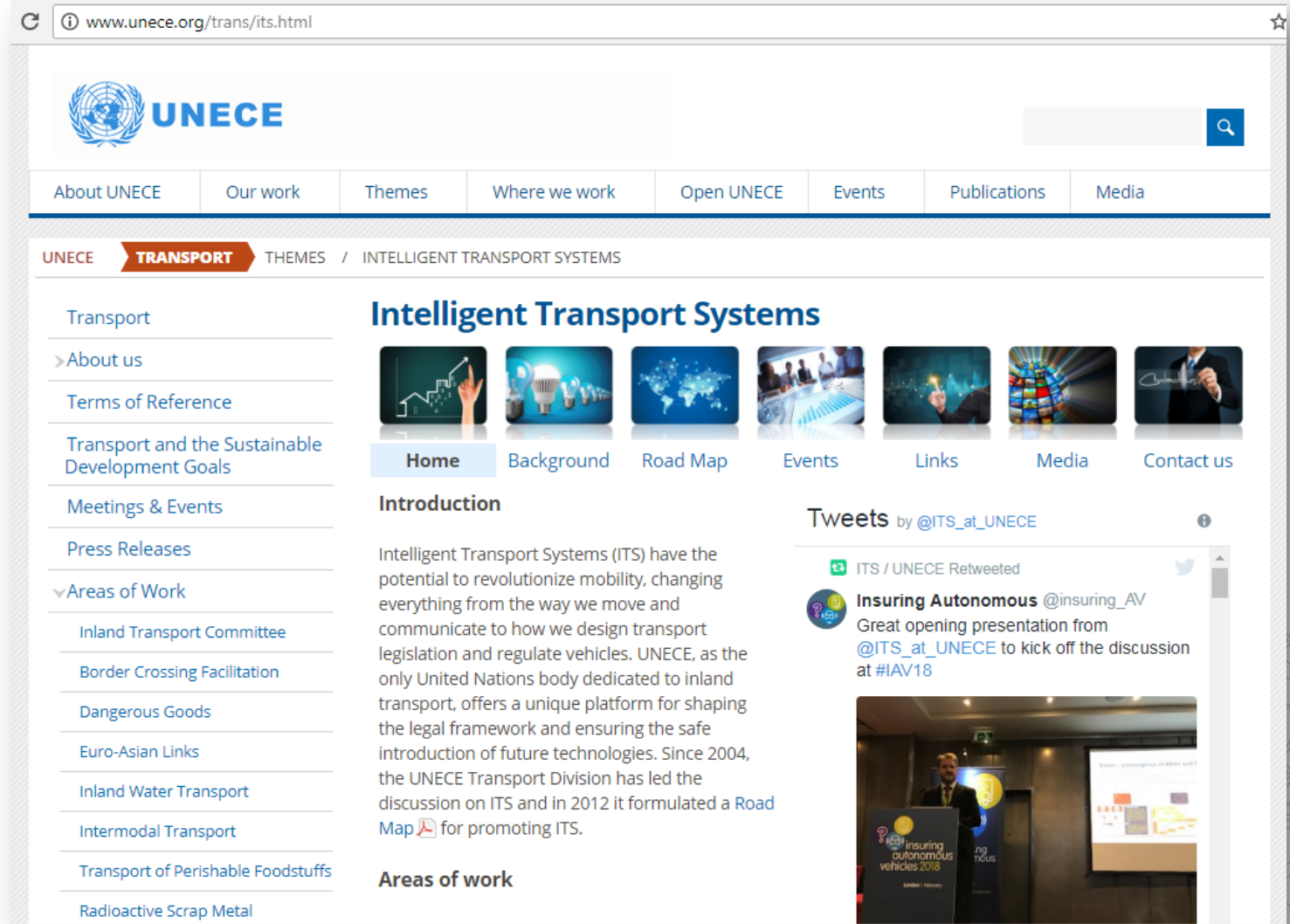
François E. Guichard
Mechanical Engineer
Secretary of the Vehicle Active Safety Forum (WP.29/GRRF)
Intelligent Transport Systems / Automated Driving Focal Point



UNECE and Intelligent Transport Systems (ITS)



- Background document
- Strategic note
- Road map
- ➔ Adopted in 2012



The screenshot shows the UNECE website page for Intelligent Transport Systems (ITS). The page features a navigation menu with links to About UNECE, Our work, Themes, Where we work, Open UNECE, Events, Publications, and Media. The main content area is titled "Intelligent Transport Systems" and includes a sidebar with links to Transport, About us, Terms of Reference, Transport and the Sustainable Development Goals, Meetings & Events, Press Releases, and Areas of Work. The Areas of Work section lists: Inland Transport Committee, Border Crossing Facilitation, Dangerous Goods, Euro-Asian Links, Inland Water Transport, Intermodal Transport, Transport of Perishable Foodstuffs, and Radioactive Scrap Metal. The main content area also includes a section for "Introduction" and a "Tweets" section by @ITS_at_UNECE.

Intelligent Transport Systems

Home Background Road Map Events Links Media Contact us

Introduction


Intelligent Transport Systems (ITS) have the potential to revolutionize mobility, changing everything from the way we move and communicate to how we design transport legislation and regulate vehicles. UNECE, as the only United Nations body dedicated to inland transport, offers a unique platform for shaping the legal framework and ensuring the safe introduction of future technologies. Since 2004, the UNECE Transport Division has led the discussion on ITS and in 2012 it formulated a [Road Map](#) for promoting ITS.

Areas of work

Tweets by @ITS_at_UNECE

ITS / UNECE Retweeted

Insuring Autonomous @insuring_AV
Great opening presentation from @ITS_at_UNECE to kick off the discussion at #IAV18



Agenda 2030 - SDGs



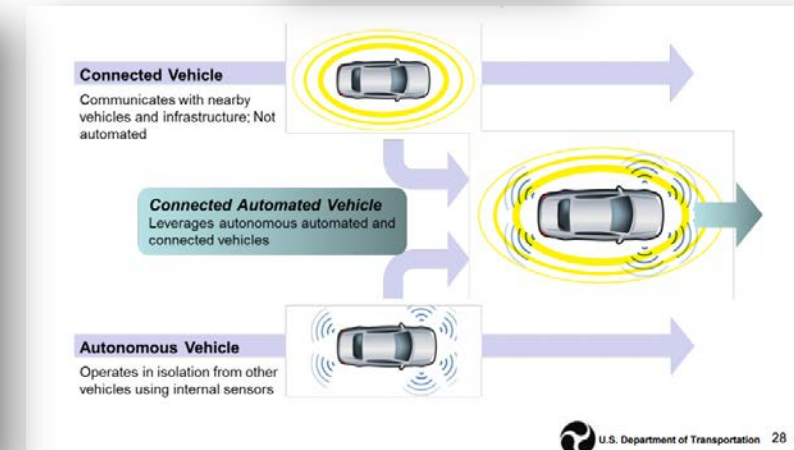
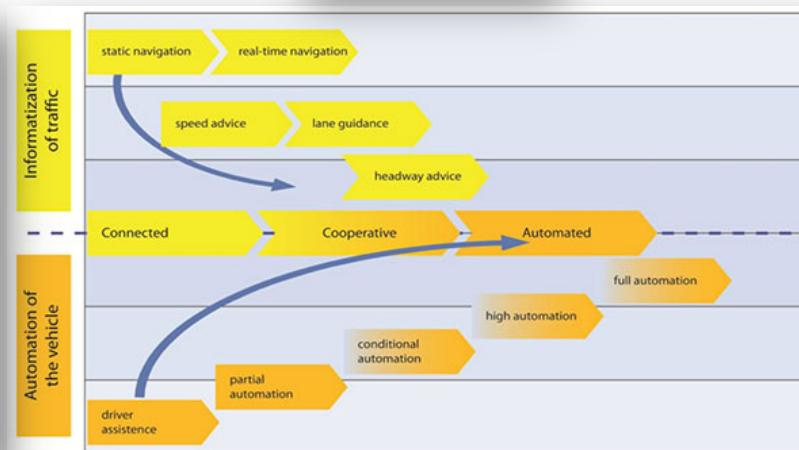
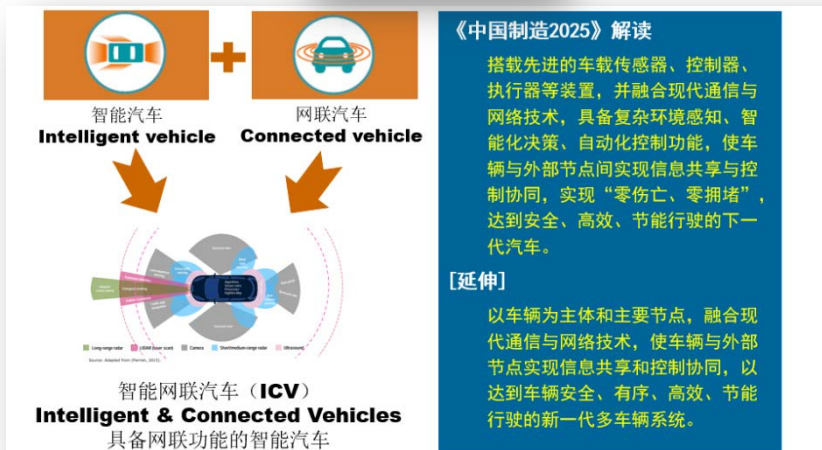
Automated Driving vehicles are expected to contribute to the solutions needed to address the transport related issues:

- Congestion
- Pollution
- CO₂ emissions
- Road safety crisis

Vision – convergence of ADVs and CVs

In the context of the mega trends

- Urbanization: 54% of the world's population lives in cities. +66% by 2050 (UN DESA)
- Road safety: 1.2 Mio fatalities per year on roads
- Aging population: the number of people older than 60 would surpass one billion within a decade (UN, 2012)
- Digitalization



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: not too quick, not too slow.
- The subject is highly visible in the media (Communication versus Reality)
 - ➔ An «**autopilot**» is actually an «**assistance**» [Technically] and not an «**automation**» [marketing]

Goal:

- Integrate the technologies into the existing transport system,
- ensuring that the benefits of these new technologies can be captured
- We do so without compromising:
safety and achievements so far (e.g. international transport, trade, interoperability and environmental performance)



Automation - new products and new concepts



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? (less than 9 seats)
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?

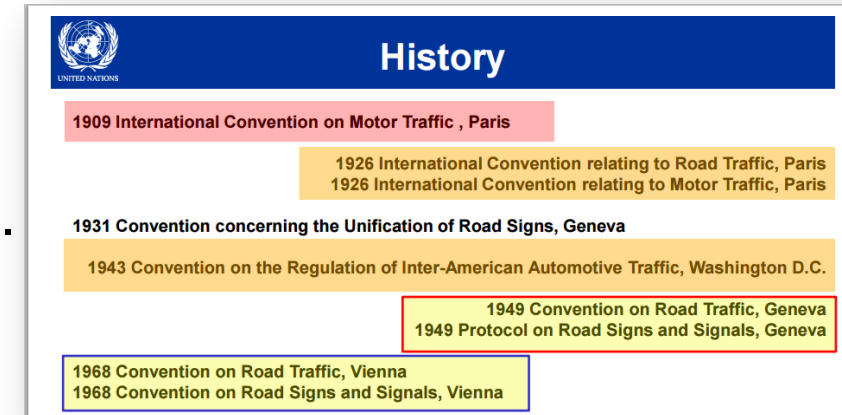
Clarity is needed:

- the technical requirements – especially for safety
- the driver/user interaction and interface design,
- defining the level of technology/autonomous capability.

Solving these issues is crucial for manufacturers, governments and users.

Conventions on Road traffic safety (WP.1)

- The 1968 Vienna Convention was amended. EIF on March 2016.
- The 1949 Geneva Convention could not be amended.



Some more work is ongoing in order to:

- (i) Create a “document” containing a set of basic recommendations addressing most pressing issues with regard to the integration of highly and fully automated vehicles in road traffic;
- (ii) Commit to continuing development of this document by expanding its scope; and
- (iii) First focus the work on elements such as interactions of fully automated vehicle systems with driving environment and with other road users and interactions of the fully automated vehicle systems with their users.

UNECE and Automated Driving – Achievements

• WP.29/GRRF - Active safety

Mandate:

- Review 10 km/h ACSF limitation
- Develop the ACSF requirements
- Interurban journey
- HMI
- Can be overridden
- Can be deactivated
- Also address PTI



ongoing



ongoing



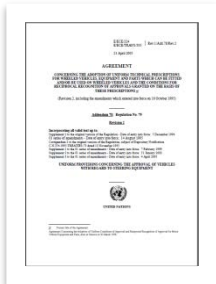
ongoing

Timeline:

- Package 1 (CSF, ACSF Cats A and B1) Completed in 09/2016
- Package 2 (ACSF Cat C and ESF) Completion by 12/2017

Former POTUS said:

«... and if you talk to Larry Page and others their general attitude, understandably, is, “The last thing we want is a bunch of bureaucrats slowing us down as we chase the unicorn out there.”»



ACSF Cat. A: e.g. RCP



ACSF Cat. B₁: e.g. LKA

Still some work to do on ACSF...

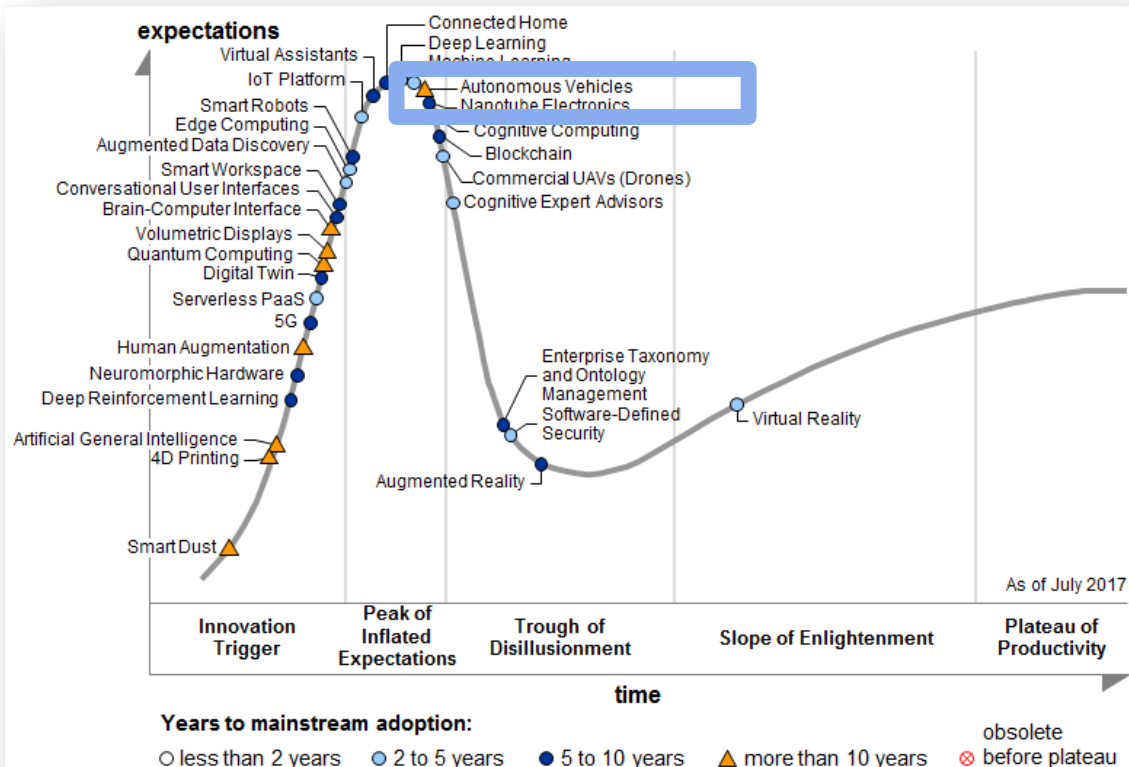
- 5 new Categories of ACSF ☒
- Minimum Sensor Performance (Radar, Lidar, Camera etc.) ☒ L2 ☐ ☐
- Longitudinal control and protective deceleration ☒ L2
- Minimal Risk Manoeuvre ☐
- Driver availability recognition system ☐
- Human Machine Interaction (HMI) ☒ L2
- Transition from manual steering to automatic steering and vice versa ☐
- Data Storage system ☐
- Periodic Technical Inspection (PTI) ☐
- Test requirements for ACSF ☒ L2

☒: Completed, in force
☒: L2, partially / not in force
☐: Not in force

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)

@CES 2018

Philosophy: a single effort

Level-4/5 Automation → derivatives → L2, L2+, L3

Economical Scalability

- Automating HD-maps through a crowdsourcing approach
- Controlling the explosive computational demands of Driving Policy (Planning)
- Scalable, workload-diverse and low-power SoC together with powerful ATOM cpu

Model for Safety Guarantees

- Decouple Sensing from Planning mistakes that could lead to an accident
- RSS - a formal model of the human judgement of common-sense of Planning
- Using RSS to provide safety guarantees

7:24 / 56:23

Source: youtube channel Mobileye

Level 3- 5: Ideas currently discussed

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

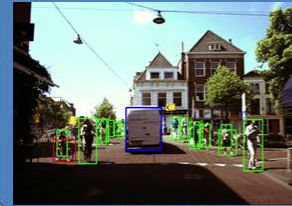
OEM provides e.g.:
- Safety concept / functional safety strategy
- Simulation and development data to verify vehicle behavior in edge cases
- Manufacturer's self declarations
- etc.

← *pros/cons: see RWTD*

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

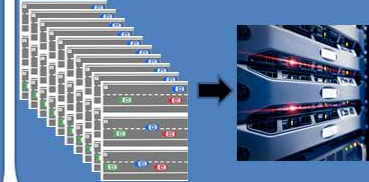
Type Approval

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



ADS Audit

- Supplementary to OICA ideas: simulate many scenarios



Real World Test Drive

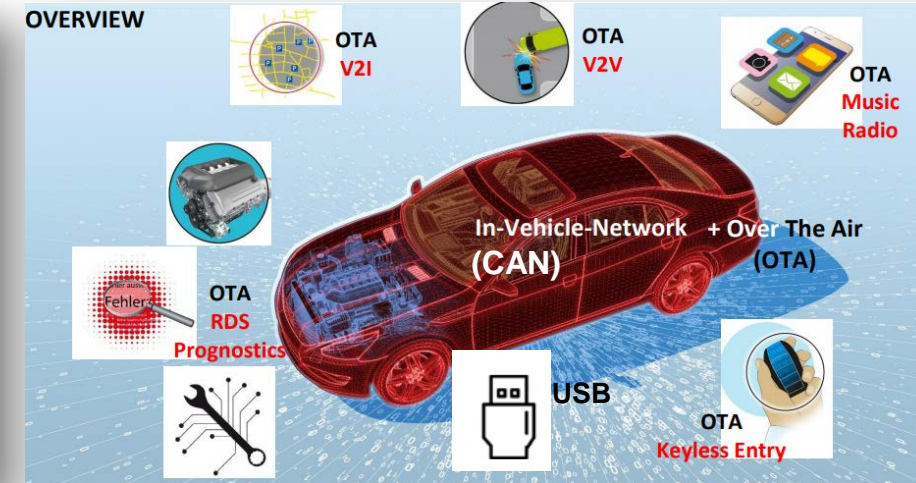
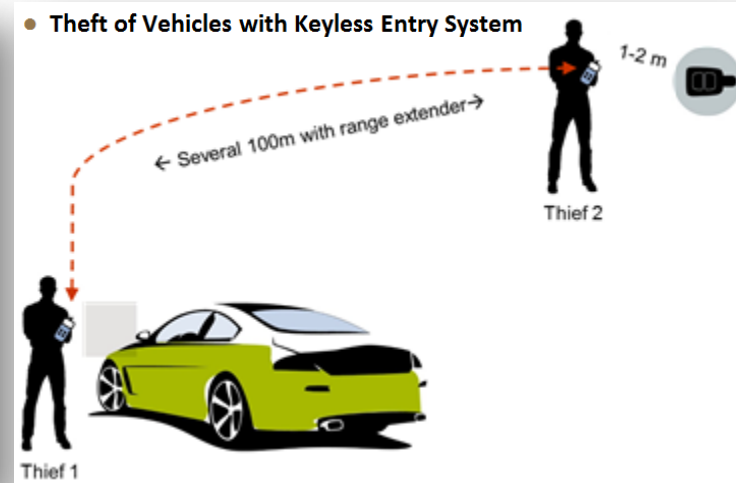
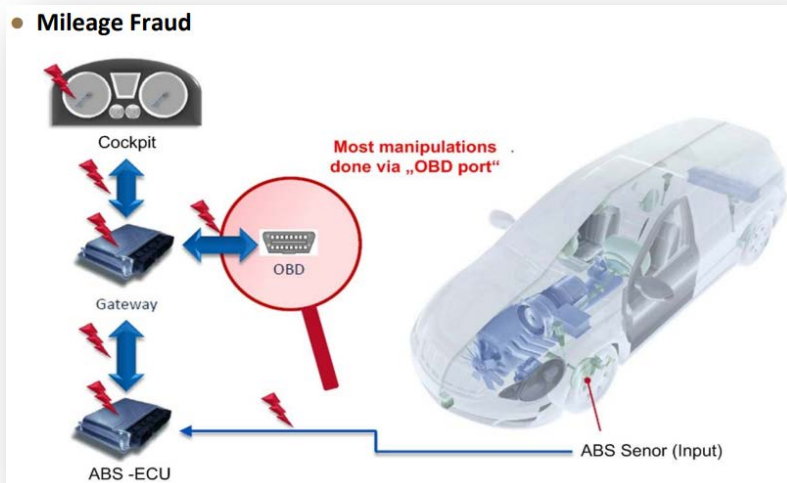
- Key part of process
- Is 60 minutes enough?

CATAPULT
Transport Systems

- ☺ Certification system compatible with existing TA or Self Certification – maybe little / no impact on registration
- ☹ Real world test drive
- ☹ High workload – high number of scenarios → simulation (validation?)

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
- (Related to privacy, which is mentioned in the Universal Declaration of Human Rights)

First outcome: Guideline on Cyber Security and Data Protection

Guideline adopted by WP.29 in March 2017

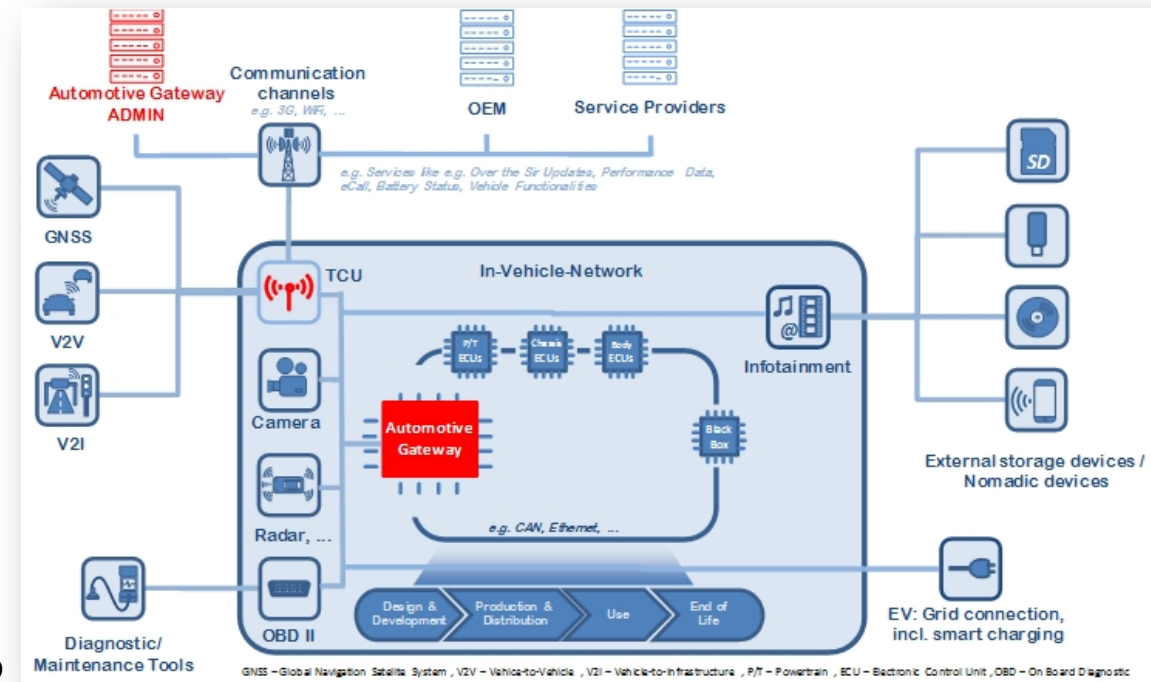
It contains:

- Definitions
- Data protection requirements, e.g.:
 - Everyone's right for privacy and communications shall be respected
 - Privacy «by design» and «by default»
- Cyber Security and Safety requirements, e.g.
 - Avoid fraudulent manipulation
 - Detect fraudulent manipulation by a cyber-attack, inform driver
 - Secure software updates
- Verifiable through independent authorized audit.



The Task Force on Cyber Security and OTA

- Initiated in November 2016, by WP.29,
- Reporting to the IWG on ITS/AD,
- The group includes trade bodies, industry and governments
- The aims of the group are to:
 - Define requirements for addressing cyber threats
 - Define requirements for software update management with respect to safety type approval
 - Define guidance or measures for how to achieve this
 - Address the effect of OTA on cyber security and the overall Type Approval system
(Potential challenge for administration of vehicle “in use”)
- Aim to deliver these in 2018 to WP.29
 - The output may then be adopted as a UN Regulation possible linked to a Resolution (dynamic)
- Recommendations are being drafted on Cyber security and on OTA issues



**THANK YOU VERY MUCH
FOR YOUR ATTENTION**

UNECE

<http://www.unece.org/trans>

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