Working Party on Road Traffic Safety

Seventy-first session

Geneva, 5-7 October 2015

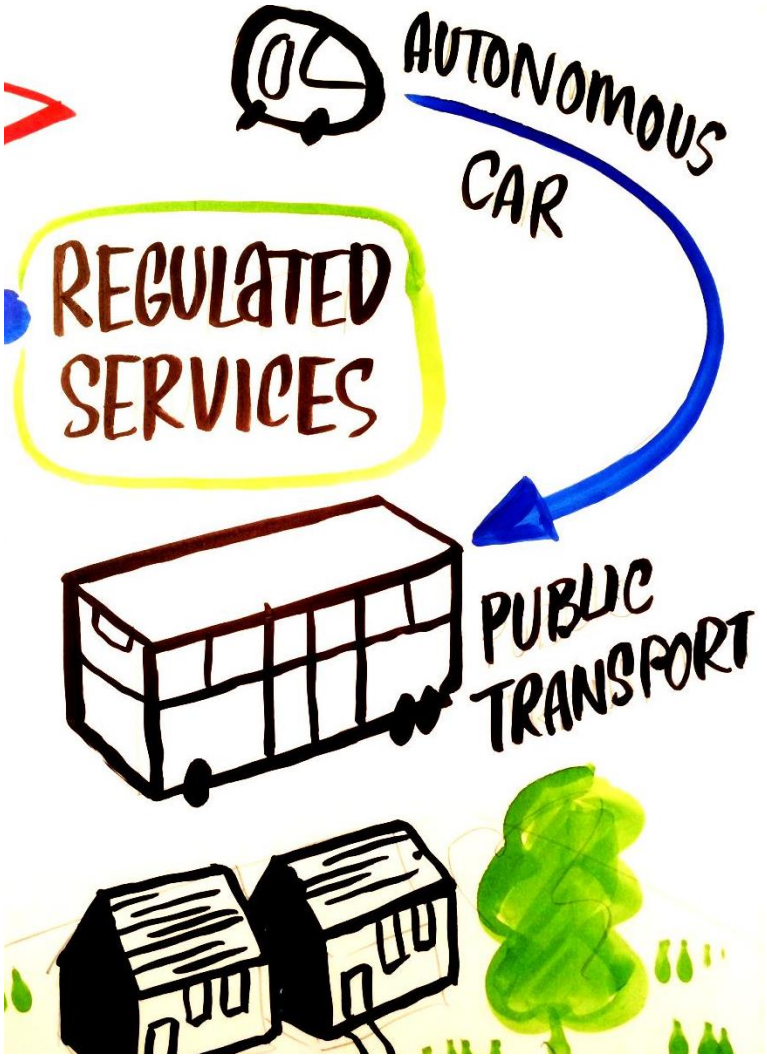
AUTOMATED DRIVING :

Recommendations for trials and tests on open public roads

A WORLD IN MOTION

- Global context
- The importance of trials and tests
- Regulatory framework
- Main concerns for the users

Source: Honda Motor



USA & Canada
Google, Audi, Mercedes, Delphi, Nissan & NASA

United Kingdom
TRL, VENTURER Consortium, Milton Keynes Council

Singapore
Singapore Land Transport Authority

Australia
NSW Centre for Road Safety

Germany
OEMs, Tier1

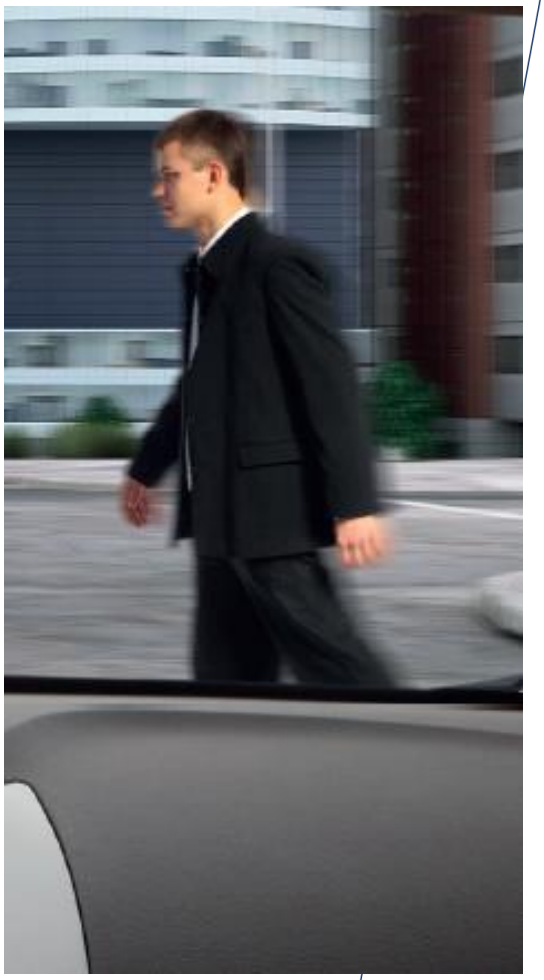
Japan
Toyota, Nissan

Sweden
Volvo Cars

The Netherlands
Scania, RDW, DAF/TNO

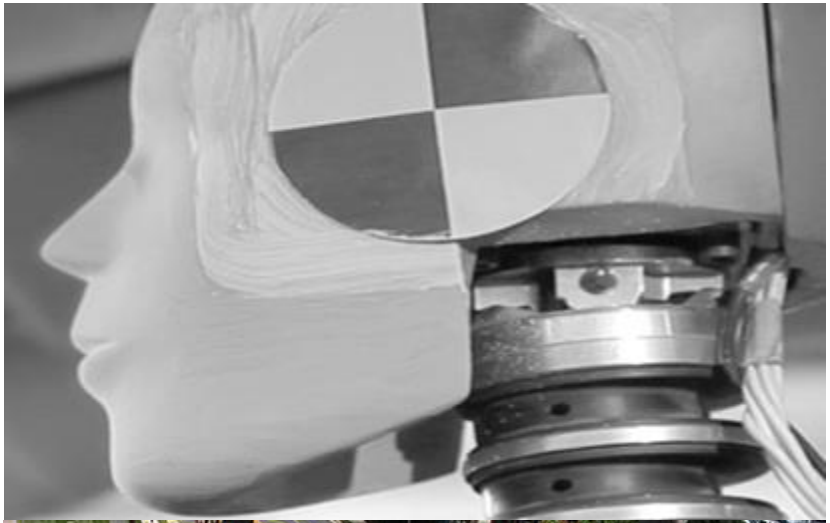
France
Renault/Nissan Group

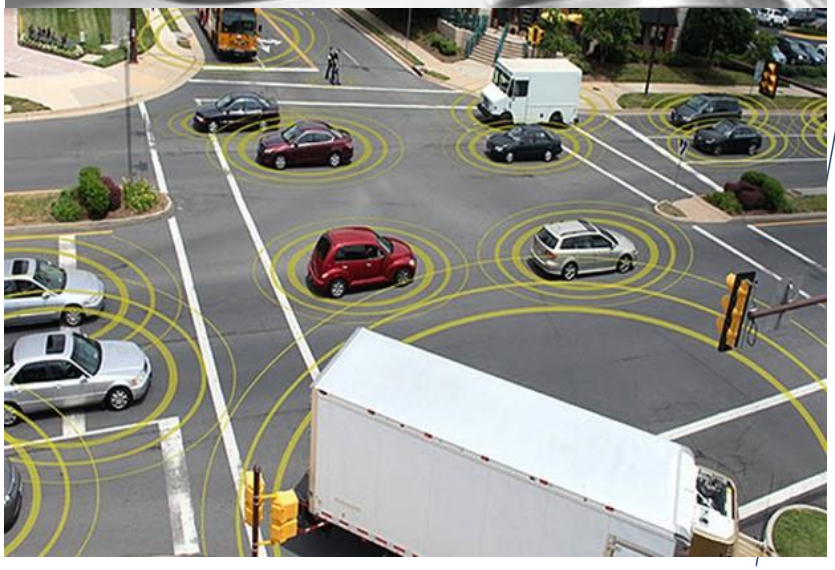
South Korea
Hyundai-KIA Motors, Renault, Samsung, GM-Daewoo



Tests are essential to:

- Assess the need for regulation to establish the scope of responsibility for the safe operation of automated vehicles rests when in autonomous mode
- Investigate behavioural aspects, specifically:
  - requirements for the driver-vehicle interface
  - expectation of drivers of conventional vehicles with respect to autonomous vehicles
  - factors leading to driver acceptance
  - training requirements needed for progressive levels of automation
- Establish the liability in the automated driving mode
- Build consumers' trust, creating consumer information about functions, limitations and opportunities of the advanced systems
- Get insights on user acceptance

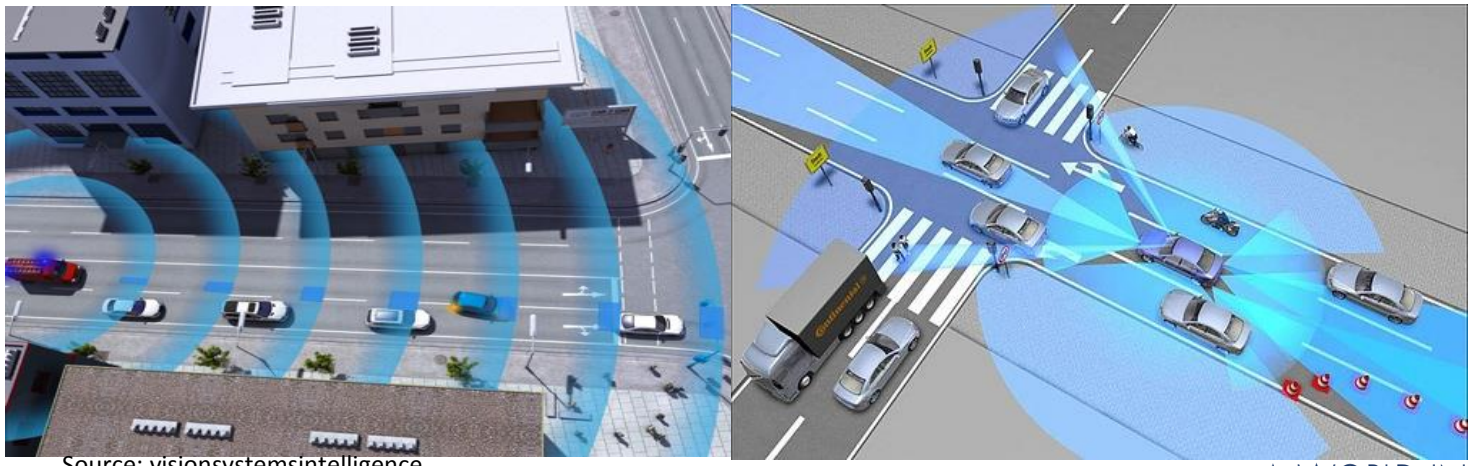




Source: NHSTA, US DoT

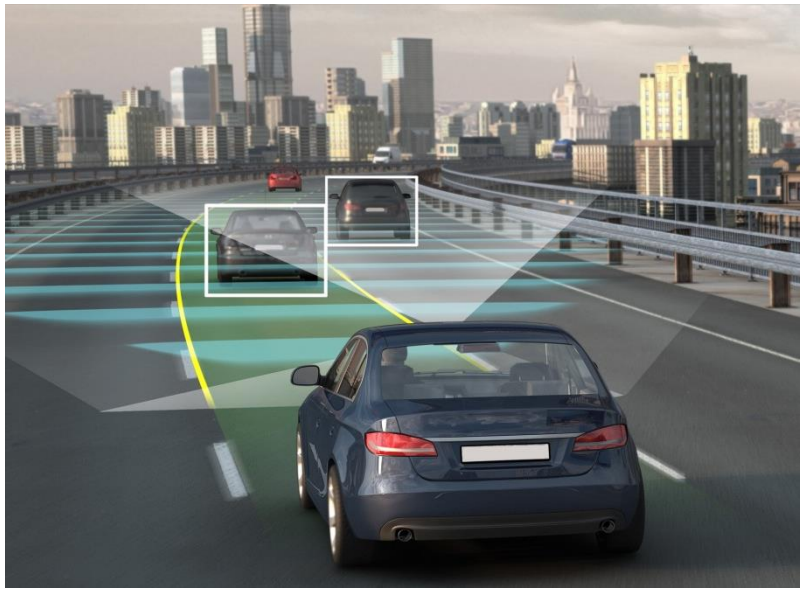
TESTS on OPEN ROADS: RECOMMENDATIONS

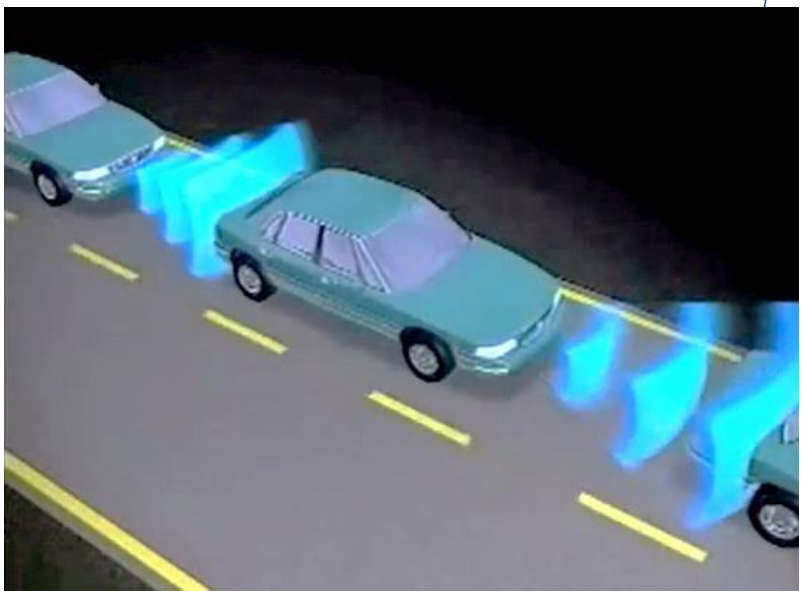
- Governments should consult key stakeholders to agree on the scale of the trials
- Test driver should monitor the process and be ready take over the control if needed
- Driver must be qualified and be able to demonstrate knowledge of vehicle technology features and their limitations
- Authorities should establish a database of test drivers, of the network of roads and of the vehicles
- Car manufacturers should take full responsibility for mechanics, system and software in automation mode



Source: visionsystemsintelligence

- In the event of an **incident or collision** the information collected by the vehicle should be made available to the relevant authorities to assess both responsibility and potential risks arising with a higher level of deployment of automated vehicles
- **Data collected** by an automated car should comply with data protection rules
- Manufacturers should provide all information about the **vehicle warnings** regarding the risks of using new features of vehicle automation
- **Governments** should support implementation of autonomous cars by using the trial tests to perform cost-benefit analysis of new technology and mandate the solutions which have positive ratio





Sources: whatisitwellington, smithsonianmag

Global regulatory framework is necessary to:

- Ensure a standardized switching between automated and manual modes:
  - System actions should be easy to override quickly at any time during normal driving situation
  - Drivers should be informed of the conditions of the system
  - Warning symbols and system for the driver to re-take control in an automated vehicle should be standardised
- Engage the international community to examine the vehicle type approval framework and its detailed technical standards to ensure suitability for automated vehicles
- Address cyber security issues
- Ensure that manufacturers commit to making repairs information available on a non-discriminatory basis to independent repairers
- Consider privacy issues, which concern potential data-use benefits

Sources: Oxford University, ABCnews

DEFINITIONS: BUT WHAT THE DRIVER IS EXPECTED TO DO?

REGION	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Europe[1]	Driver Only	Assisted	Partial Automation	Conditional Automation	High Automation	Full Automation
USA[2]	No Automation	Function-Specific Automation	Combined Function Automation	Limited Self-Driving Automation	Full Self-Driving Automation	
Japan[3]	Driver Only	Safe Driving Assistance System	Combined Function Automation	Conditionally Automated Driving	Fully Automated Driving	

→ BASt[4], SAE[5] & OICA[6] have consistent understanding of automation levels

→ NHTSA shows divergence with BASt, SAE & OICA, different terminology, no distinction between level 4 and 5



[1] Europe includes definitions from BASt, SAE & OICA.
[2] NHTSA's *Policy on Automated Vehicle Development*, published at 30. Mai 2013.
[3] Japanese Ministry of Economy, Trade and Industry, METI Journal, *Autonomous Driving Creating an Optimal Relationship between People and Automobiles*, published 2014.
[4] BASt report, *Legal Consequences of an Increase in Vehicle Automation*, Tom M. Gasser et al., ISBN 978-3-86918-189-9, January 2012. The German terms slightly differ due to translation, however the content is identical to SAE/ OICA.
[5] SAE J3016, *Taxonomy and Definitions for Terms Related to On-Road Automated Motor Vehicles.*
[6] OICA working group „Automated Driving". The definitions herein are not intended to supersede any existing regional standards, like for example SAE J3016.

- Driver's awareness regarding vehicle's level of automation and his responsibilities
- Driver's sustained attention in "partial" automation
- Activity unrelated to driving (allowed? Liability?)

Automation Focus: Safety First

2015 DrIVE Report:

- at least 20% of new-vehicle owners have never used 16 of the 33 technology features measured.
- The technologies owners most often want are those that enhance the driving experience and safety, which are only available as a built-in feature

Automated technology

How does the automated system improve safety?

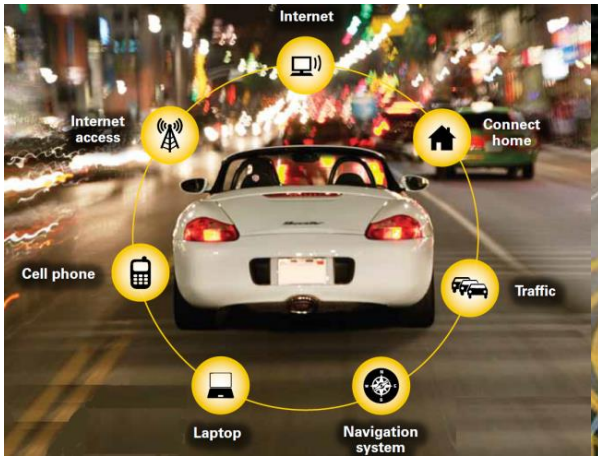
Which target crashes it can address;
Is it effective?

Is the automated system designed safely?

Designed for functional safety;
Designed for cyber security

Key observations:

- Recent changes of the Vienna Convention already allow:
  - to bring new technology to cars, yet we need to ensure those system are robust and reliable enough;
  - to launch trials on open roads;
- It is essential to proceed in parallel with technology development;
- It is necessary to increase integration between WP29 and WP1;
- Vigilance is a central concept in partial automation, where the driver has to monitor very reliable automation systems to detect and control rare errors in a timely manner;
- Trial tests will help us to understand such aspects better.
- Premature decisions should be avoided

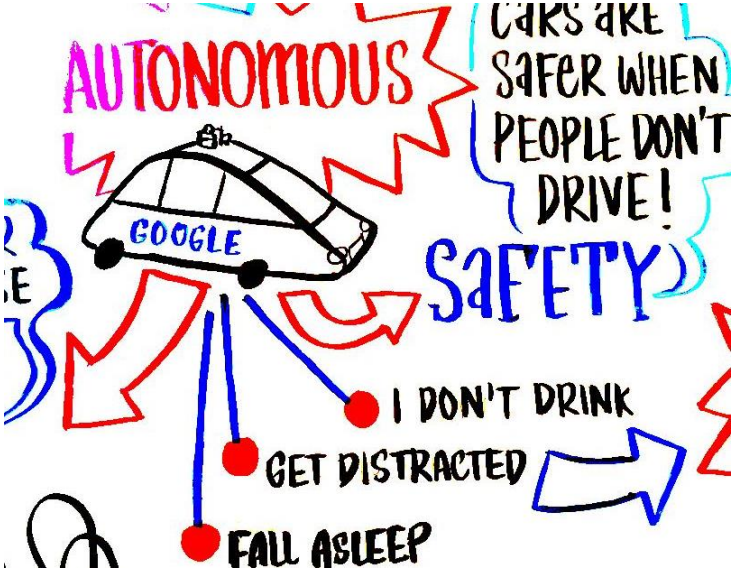


Sources: US DoT, startupbootcamp

The path to automation:

- Building consumer awareness, through large scale demos on public roads (conventions seem to allow this already now)
- Resolving the liability issue, also by learning during scaling-up of operations
- Getting regulatory support

Source: Telegraph



Thank you for your attention

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