



**AI for Autonomous
and Assisted Driving**
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Convention on Road Traffic in view of Automated Driving Observation #1- Equivalence between all drivers is implicit

- Equivalence in **behavioural expectations** between all drivers is the **foundation for safety** in a shared traffic environment. Which enables **behavioural prediction** of other road users and **compensatory actions** to accommodate others mistakes.
- The principle of **equivalence** should apply **equally to** “**automated driving algorithms**” and “**humans**” which are both responsible for **situational awareness**, **risk assessment** and **appropriate action** required for safe execution of the dynamic driving task in road traffic.
- The objective of holding "automated driving algorithms" to the same “**reasonable and prudent**” account as human drivers defines the **need for continual behavioural evaluation** during execution of the dynamic driving task. This is the core need around which the **ITU FG-AI4AD** was established.



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Convention on Road Traffic & Automated Driving Observation #2- Driver “learning” is implicit & essential

- The safety assumptions in the issuance of **International Driving Permits** are based on assumed “*transfer learning*” capability e.g. safe driving in London transfers to safe driving in New York without any requirement for retraining or acquisition of local skills
- Both “*continual learning*” and “*transfer learning*” underpin the issuance of **Domestic Driving Permits**. It’s these cognitive skills that enable drivers to adapt to different cars, roads, weathers and traffic situations beyond those assessed in a one-time licensing test.
- Both “*continual learning*” and “*transfer learning*” abilities are **not proven** for **automated driving algorithms**.
- Until this proof **scenario-based testing** will remain an **inadequate measure** of the **real world driving behavior** that is expected within the Convention on Road Traffic.
- The issuance of driver permits for different vehicle categories is well established. However, current proposals for issuance of **Operational Design Domain (ODD) restricted driving permit** is a completely new category of driver licensing not considered in the Convention on Road Traffic Highly Restricted During



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Convention on Road Traffic & Automated Driving

Observation #3 - Separation of driving algorithms from vehicles

- **Automated driving algorithms** *drive*, **Automated vehicles** *are driven*.
- The SAE J3016 terminology of **Automated Driving System (ADS)**, which includes software and hardware, is **not congruent** with the Convention on Road traffic definitions of “**driver**” and “**vehicle**”.
- A new definition that clearly separates “**automated driving algorithms**” which are **responsible for driving behaviour** and the underlying “**automated driving system**” that provides a platform of sensors, actuators, communications, computers and operating systems as part of an “**automated vehicle**”.
- “**Automated driving algorithms**” should be **permitted to drive** specific **categories** of “**automated vehicle**”. Based upon a matching of the “automated driving algorithm” requirements and the “automated vehicle” capabilities.
- The **interface** between “**automated driving algorithms**” and “**automated vehicles**” needs to be defined to ensure an open market place for “drivers” and “vehicles” used to create “mobility services”.



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Convention on Road Traffic & Automated Driving Observation #4 - Two regulatory systems for “drivers”

- Convention of Road Traffic changes that position **automated vehicles** as **not requiring** a **driver**, thereby **violate** the principle of **equivalence** between the entities responsible for the **dynamic driving** task. The risk leading towards **two independent regulatory systems** for **drivers**;
 - **Humans** drivers comply to a "**Safety by Design**" regulatory system, with common acceptance of the Safe System approach and guided by the Global Forum for Road Traffic Safety (**WP.1**).
 - **Automated Driving Systems** comply to a "**Liability by Design**" regulatory system guided by the World Forum for Harmonization of Vehicle Regulations (**WP.29**).
- In terms of EU Product Liability Directive "**justified expectation of users**" for the **driving behaviour** of the "**automated driving algorithms**" should be set by the **Convention on Road Traffic**.
- Clear separation between "**automated driving algorithms**" from "**automated driving system**" is required to remove this ambiguity.



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ITU-T Focus Group on AI for Autonomous & Assisted Driving FG-AI4AD

- Expected behavioural proofs for “**automated driving algorithms**” on our roads



Prove AI Software never engages in **careless, dangerous or reckless driving behaviour.**

In accordance to Article 7 of the 1949 Convention on Road Traffic “*not to endanger*”



Prove AI Software **meets, or exceeds**, the performance of a **competent and careful** human driver

In accordance with Article 10 of the 1949 Convention on Road Traffic “**reasonable and prudent**” driving



Prove AI Software remains **aware, willing** and **able to avoid collisions** at all times

In accordance to Article 7 of the 1949 Convention on Road Traffic “**shall avoid all behaviour that might cause damage to persons, or public or private property.**”



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Next FG-AI4AD meeting: 4-5th May 2020

Hosted by ITU

Coinciding with the AI for Good Global Summit: <https://aiforgood.itu.int/>



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