

# Terms of Reference

## ITU-T FG on AI for autonomous and assisted driving (FG-AI4AD)

(Approved by ITU-T SG16 on 2019-10-17)

### 1. Rationale and Scope

The application of AI on our roads will enable new services and applications and accelerate progress towards the United Nations Sustainable Development Goals.

AI can play a significant role to reduce road deaths and injuries (SDG 3.6) whilst also encouraging safe, affordable, accessible and sustainable transport systems (SDG 11.2). However, the widespread, socially acceptable, deployment of AI on our roads is dependent upon technology achieving public trust.

To realise AI's potential to reduce the 1.3 million annual road deaths, it is important to define a minimal acceptable performance threshold for AI deployed on our roads and meet the public expectation that;

1. AI never engages in careless, dangerous or reckless driving behaviour
2. AI remains aware, willing and able to avoid collisions at all times
3. AI meets, or exceeds, the performance of a competent & careful human driver

Achieving these performance thresholds requires a combination of both 'vehicle performance' and 'driver performance'.

In this instance 'vehicle performance' would refer to the traditional vehicle platform hardware, the introduction of drive-by-wire actuators and the sensing, processing and communications equipment required for running the AI software. These areas relate closely to the work of the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) including the 'Proposal for the Future Certification of Automated/Autonomous Driving Systems' (published by the Working Party on automated/Autonomous and Connected Vehicles 19<sup>th</sup> November 2018 as ECE/TRANS/WP.29/GRVA/2019/13).

Until the introduction of AI on our roads 'driver performance' has always referred to the skills, behaviour and licencing of human drivers. These efforts being more closely associated with the UNECE Global Forum for Road Traffic Safety (WP.1) and specifically in relation to AI 'the resolution on the deployment of highly and fully automated vehicles in road traffic' (published on the 3<sup>rd</sup> October 2018 as ECE/TRANS/WP.1/165).

WP.29's proposal for ADS (Automated/Autonomous Driving Systems) certification to include Real World Test Drives and Driving Licence Tests using a performance threshold comparable to an experienced driver provides a foundation for the proposed ITU Focus Group.

Additionally, the Focus Group should consider UNECE WP.1's recommendations that automated vehicles should; make road safety a priority; be capable of monitoring and safely interact with the surrounding traffic environment; endeavour to safely tolerate errors of other road users in order to minimize potential effects of such errors; react to unforeseen situations in a way that minimizes danger to the vehicle's users and other road users; communicate with their users and other road users, in a clear, effective and consistent way, by providing sufficient information about their status and intention, and enabling an appropriate interaction.

As recognised by RDW (the Netherlands Vehicle Authority), the next phase of AI enhanced mobility requires a shift of focus; from hardware to behaviour, from compliance to performance;

from admission to continuous monitoring and harmonisation between Worldwide, European and National approaches.

## **2. Objectives of the FG-AI4AD**

The objective of the Focus Group is to support standardisation activities of AI evaluation in autonomous and assisted driving. To this end, the FG aims to create an open framework for collaboration and sharing of expertise that leads towards international harmonisation on the definition of a universal minimal performance threshold for AI enabled driving functions (such as AI as a Driver) which is essential to building the global public trust required for widespread deployment of AI on our roads.

More precisely, the objectives include;

- a) To establish liaisons and relationships with other organisations which could contribute to the standardisation activities for services and applications for AI in autonomous and assisted driving.
- b) To stimulate public engagement and international collaboration to help realise the potential for AI to reduce road deaths and injuries (SDG 3.6) whilst also encouraging safe, affordable, accessible and sustainable transport systems (SDG 11.2).
- c) To study, gather information and develop a standards research orientation and standards research plan related to AI evaluation within vehicles featuring autonomous and assisted driving functions.
- d) To identify and study the enabling technologies and key tasks within assisted and autonomous driving for standardization of AI evaluation.

NOTE: interconnection between communication technologies e.g. IMT-2020 and the applications for AI in autonomous and assisted driving, may be considered for the related use cases, where relevant.

- e) To produce a gap analysis of standardisation, legislation, Voluntary Safety Self-Assessment (VSSA) and independent assessment programmes in the areas of autonomous and assisted driving.

NOTE- The above need to consider the existing solutions brought to the table by various stakeholders and migration strategies to the future.

- f) To identify the minimal universally accepted expectations for driver behaviour that are the prerequisites for the Safe System approach to road safety including the principles that; humans are fallible; humans are vulnerable; road safety is a shared responsibility amongst everyone, including those that design, build, operate and use the road system; all parts of the system must be strengthened in combination to multiply their effects, and road users are still protected if one part fails.
- g) To support the ongoing efforts within UNECE WP.1 and WP.29 to address the shift in mobility towards vehicles featuring automated and assisted driving.
- h) To identify tools and mechanisms for promoting participation and supporting incentives to be available to all stakeholders, and to leverage the global reach of the AI for Good Global Summit in this regard.
- i) To study the expectations and requirements of law enforcement, accident investigators, insurers and judicial systems in the context of driving behaviour, impacts, collisions and near-misses.

- j) To establish the technical and/or proprietary issues that may prevent/restrict access to data captured by the AI required for continual assessment of performance on AI as a Driver.
- k) To analyse the privacy challenges associated with the individuals' fundamental right to privacy associated with the collection, sharing and use of data acquired during autonomous and assisted vehicle operation.
- l) To analyse, in the context of vehicles featuring autonomous and assisted driving, the EU Ethics Guidelines for Trustworthy AI to be met throughout the system's entire life cycle; (1) it should be lawful, complying with all applicable laws and regulations (2) it should be ethical, ensuring adherence to ethical principles and values and (3) it should be robust, both from a technical and social perspective since, even with good intentions, AI can cause unintentional harm.
- m) To stimulate public debate and media reporting in the concept of an evaluation for AI on our roads and enhance the quality of discussion beyond the narratives around the Trolley Problem.

### **3. Specific tasks and deliverables**

The activities, tasks and deliverables for the proposed FG-AI4AD will focus upon the behavioural evaluation of AI responsible for the dynamic driving task in accordance with the 1949 and 1968 Convention on Road Traffic of the UNECE Global Forum for Road Safety. This will include in-use assessment of AI driving behaviour using onboard vehicle systems. The assessment is expected to become an integral part of the field monitoring of assisted and automated vehicles required to ensure continual validation of safety performance.

- a) To develop the specification for evaluation of AI on our roads that defines a minimum performance threshold and establishes a definition for the burden of proof;
- b) To provide information about the evaluation of AI on our roads to increase global public acceptance.
- c) To develop guidelines for the deployment of the evaluation of AI on our roads within private vehicles, commercial fleet operators, public transport operators, mobility-as-a-service operators and emergency response vehicles.
- d) To develop a list of SDOs, forums, consortia and other entities, including opensource, dealing with services and applications aspects of AI for autonomous and assisted driving and liaise with the organizations that could contribute to the related ITU standardization activities.
- e) To gather information on initiatives pertaining to AI on our roads, identify existing standards, best practices and challenges for adoption of autonomous and assisted driving.
- f) To analyse the standardization gaps related AI on our roads and develop a future standardization roadmap for evaluation, taking into consideration the activities currently undertaken by other ITU groups, various standards developing organizations (SDOs) and forums;
- g) To describe the roles and activities of the different stakeholders required to realise the potential of AI on our roads within the safe system approach.
- h) To provide terminology and taxonomy for evaluation of AI used for autonomous and assisted driving, including a mapping that aims to harmonise the language used in existing standards, legal frameworks and guidelines.
- i) To define specifically the terms 'careless', 'dangerous', 'reckless', 'aware', 'willing', 'able', 'competent', 'careful', and similar, in the legal context of autonomous and assisted

driving in such a manner that they can be implemented and interpreted in software while being understood by humans.

- j) To develop a roadmap for the global deployment of evaluation of AI on our roads with the Vision Zero goal of eliminating of all deaths and serious injuries by 2050 while aligning with the United Nations 2030 Agenda for Sustainable Development. The roadmap must consider the cost and impact of deploying evaluation of AI on our roads. This should be considered within the context of holistic national investment in the Safe System approach to road safety.
- k) To draft technical reports which may include architectures, interfaces, protocols and data formats required to validate the performance threshold of AI on our roads. These technical reports describe the information a validation system would need to execute the performance evaluation of the AI.
- l) To identify the technical landscape, a technical standards investigation orientation and standards investigation plan related to AI within assisted and autonomous driving systems.
- m) To develop technical reports on the application of enabling technologies in evaluation of AI within assisted and autonomous driving systems. These technical reports describe the information the AI could provide to the validation system for the purposes of performance evaluation.
- n) To develop guidelines which address privacy and proprietary challenges that may prevent/restrict access to data captured by the AI required for continual assessment of AI Driver performance. Including reference to the work of ITU-T SG17 on security and protection of personal information for vehicular multimedia and public adoption of Black Box (Telematics) insurance.
- o) To organise thematic workshops and forums covering AI on our roads that bring together all stakeholders, promotes the activities and encourages both ITU members and non-ITU members to join its work.

NOTE – The needs of persons with disabilities and specific needs will be taken into account in undertaking the tasks above and preparation of deliverables. It is expected that using AI and drive-by-wire controls will enable new forms of adapted driving that will increase driving safety for persons with disabilities and increasing human autonomy as a mobility solution.

#### **4. Relationships**

The proposed AI4AD Focus Group will work closely with SG16 through co-located meetings when possible. It will establish and maintain task-appropriate collaboration arrangements with other groups in ITU.

The proposed AI4AD Focus Group will collaborate with, not limited to:

- ITU-T SG12 to leverage the P.1100-P.1199 series on communications involving vehicles and the outcomes of the Focus Group on Driver Distraction
- ITU-R SG4 and SG5 on connectivity for high precision navigation
- ITU-T SG17 on security and protection of personal information for vehicular multimedia
- ITU-T Q27/16 on vehicle gateway platform for telecommunication and ITS services and applications
- ITU-T FG-VM on vehicular multimedia
- ITU-T SG13 and ITU-T FG ML5G on the interaction between future networks and AI/ML mechanisms, specifically for autonomous driving vertical.

Furthermore, the FG-AI4AD will collaborate (as required) with other relevant groups and entities, in accordance with Recommendation ITU-T A.7. These include governments, non-governmental organizations (NGOs), policy makers, SDOs, industry forums and consortia, companies, academic institutions, research institutions, open source forums and other relevant organizations.

## **5. Structure**

The proposed FG-AI4AD may establish sub-groups if needed.

## **6. Parent group**

The parent group of the FG- AI4AD is **ITU-T Study Group 16** "Multimedia coding, systems and applications".

## **7. Leadership**

See clause 2.3 of Recommendation ITU-T A.7.

## **8. Participation**

See clause 3 of Recommendation ITU-T A.7. A list of participants will be maintained for reference purposes and reported to the parent group.

## **9. Administrative support**

See clause 5 of Recommendation ITU-T A.7.

## **10. General financing**

See clauses 4 and 10.2 of Recommendation ITU-T A.7.

## **11. Meetings**

The Focus Group will conduct regular meetings. The frequency and locations of meetings will be determined by the Focus Group management. The overall meetings plan will be announced after the approval of the terms of reference. The Focus Group will use remote collaboration tools to the maximum extent.

The meeting dates will be announced by electronic means (e.g., e-mail and website, etc.) at least four weeks in advance.

## **12. Technical contributions**

See clause 8 of Recommendation ITU-T A.7.

## **13. Working language**

The working language is English.

#### **14. Approval of deliverables**

Approval of deliverables shall be taken by consensus.

#### **15. Working guidelines**

Working procedures shall follow the procedures of Rapporteur meetings. No additional working guidelines are defined.

#### **16. Progress reports**

See clause 11 of Recommendation ITU-T A.7.

#### **17. Announcement of Focus Group formation**

The formation of the Focus Group will be announced via TSB Circular to all ITU membership, via the ITU-T Newslog, press releases and other means, including communication with the other involved organizations.

#### **18. Milestones and duration of the Focus Group**

The Focus Group lifetime is set for two years from the first meeting with possibility of extension.

#### **19. Patent policy**

See clause 9 of Recommendation ITU-T A.7.

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