

# Call for Paper: Workshop on “Ensuring and Validating Safety for Automated Vehicles”

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**Abstract**—The development of automated driving has made huge advances in the last years. Several companies have announced the deployment of highly automated vehicles into public traffic in the near future. However, safety aspects – which are one of the key challenges to be solved before deployment – still limit these ambitions to small operational domains. In order to ensure safe operation of automated vehicles in more extensive operational domains, comprehensive approaches towards safety are required. Additionally, the effectiveness of these approaches must be proven for all relevant operational scenarios. Thus, the workshop on “Ensuring and Validating Safety of Automated Vehicles” addresses multiple topics related to safe operation of automated vehicles. Among others, topics such as safety concepts, hazard analyses, handling of challenging and critical scenarios, as well as concepts for validating the functionality of automated vehicles are welcome contributions.

## I. AIM AND SCOPE

During automated operation, vehicles corresponding to SAE levels 3+ [2] are operated without human supervision within a defined operational design domain [3]. Consequently, the unquantifiable amount of possible operational scenarios must be handled by the technical system (in level 3 until take-over by the driver). Guaranteeing safe behavior in any of these scenarios is one of the key challenges heading towards series deployment of automated vehicles in public traffic. Despite this importance, holistic approaches towards safety as well as the proof of their effectiveness are still a niche topic in the ITS community – at least in our perception. Even industrial companies, which announce level 3 and 4 vehicles for the near future, only partially publish their approaches applied for ensuring safety of their systems. Hence, this workshop aims at encouraging contributions and promoting scientific exchange with respect to safety in the field of automated driving.

Developing safe systems requires a holistic consideration of safety throughout the development process. Thus, the scope of the workshop is on, but not limited to, selected aspects encountered during the development of automated vehicle functionalities.

Following a safety-by-design paradigm as proposed by the ISO 26262 standard [4], a first scope of the workshop is put on the process of the concept phase. Conventional approaches for addressing safety during the concept phase appear not to suffice for automated vehicles operated in extensive operational design domains. Systematic methods

for generating work products such as item definition or hazard analysis and risk assessment would not only enable traceability but also automation throughout the concept phase and subsequent development phases.

The second scope of the workshop is on safety concepts. As a human driver is no longer available as fallback, comprehensive concepts must be developed in order to implement all driver tasks in electronics and software. A crucial aspect in this context is a field of research which is addressed under the terms of self-awareness, self-perception or introspection (the latter especially in the robotics community). In order to enable the generation of safe driving behavior, an automated vehicle must be aware of its current and future capabilities. Hence, challenges arise regarding online performance monitoring for the whole system from perception via decision making and behavior generation to vehicle control. In this regard, communities such as the robotics community have already developed concepts which go beyond concepts available in the ITS community.

Another very important step for series deployment of automated vehicles is the third scope: Validation of the safety concept. Targeting the release for public traffic, the suitability of the implemented safety mechanisms must be validated. Due to the unquantifiable amount of possible driving scenarios, it is impossible to validate the system’s behavior in every scenario purely by real driving tests. Thus, methods must be developed in order to generate convincing statements that the vehicle automation system is capable of dealing with any possible driving scenario.

## II. TOPICS OF INTEREST

Targeting a full day workshop, we welcome and encourage contributions reporting on original research, work under development and experiments related but not limited to one of the following topics:

- System modeling
- Hazard identification
- Safety analysis
- Metrics for risk and safety
- Safety concepts
- Handling of challenging/critical scenarios
- Safety of environment perception in open environments
- Ensuring safety under uncertainty
- Self-perception, self-awareness, introspection and approaches of other communities
- Determination of environment perception performance
- Safety validation and testing
- Safety of the intended functionality (SOTIF)

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- Release for operation in public traffic
- Standardization
- Taxonomy and Terminology

### III. SUBMISSION INSTRUCTION AND PUBLICATION

Prospective authors are invited to submit contributions reporting on their current research and ideas that motivate discussion during the workshop. An International Program Committee will analyze each paper according to quality of presentation, relevance and potential contribution.

Accepted papers will be included in the conference proceedings as workshop papers and will be indexed in the IEEE Xplore Digital Library. Authors must follow the IEEE Conference format in the preparation of their manuscripts of maximum six pages in standard IEEE double column PDF format and submit them through the conference submission system for peer-review by the International Program Committee. Manuscripts will be submitted selecting the code number for the workshop on “Ensuring and Validating Safety for Automated Vehicles”.

All accepted papers will imply that at least one of the co-authors attends the workshop to present the work. Authors will be given a certain time to orally present their papers and discussion will be actively motivated among attendees.

### IV. IMPORTANT DATES

Submission deadline:	April 15, 2018
Notification of acceptance:	July 2, 2018
Camera ready version due:	September 9, 2018
Workshop:	November 4, 2018

### V. CONTACT

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### REFERENCES

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- [4] ISO, “ISO/DIS 26262:2016: Road vehicles - Functional Safety,” International Standard ISO 26262:2016, 2016.