GEFÖRDERT VOM

Bundesministerium
für Bildung
und Forschung

ConnRAD – Connectivity and Resilience for Automated Driving

Midterm Presentation
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ConnRAD
Connectivity & Resilienz für automatisierte Fahrfunktionen in Deutschland

Legal, regulatory and organizational aspects and requirements

Scope

Regulatory and organizational aspects and requirements for scalable safeguarding and approval of products for external (distributed) safety-critical driving functions are examined. To this end, the status quo and the state of the art are evaluated and the relevant regulatory and normative requirements are derived on this basis.

To expand the current regulatory and normative framework, new concepts and approaches for distributed safeguarding are being evaluated.

Initial situation

Whitepaper IAMTS00042023041: Assuring Regulatory Compliance of Connected and Automated Vehicles during their Operational Lifetime

“For the connected and automated vehicles (CAV) to fully or partly perform their operational and tactical functions within their ODD, they are dependent on signals and communications from other road users as well as infrastructures and additionally installed Road Side Units (RSU). … For this reason, it will not be sufficient in the future to consider only the vehicle and its components, systems and functions, but also those that are established in the infrastructure, which are enabling the V2X communications and therefore improve and expand the performance of the DDT of CAVs, by also creating redundancies.”

Regulation for external (distributed) safety-critical driving functions

- AFGBV, Annex 1, clause 6: Transmission and processing of data from external technical units for autonomous management of the driving task in autonomous operation
- Implementing Regulation (EU) 2022/1426, Annex 1, point 17.2.1.2: External functions relevant to the ADS safety concept
- UN-R155 and 156: Manufacturers' obligations regarding cybersecurity and OTA updates

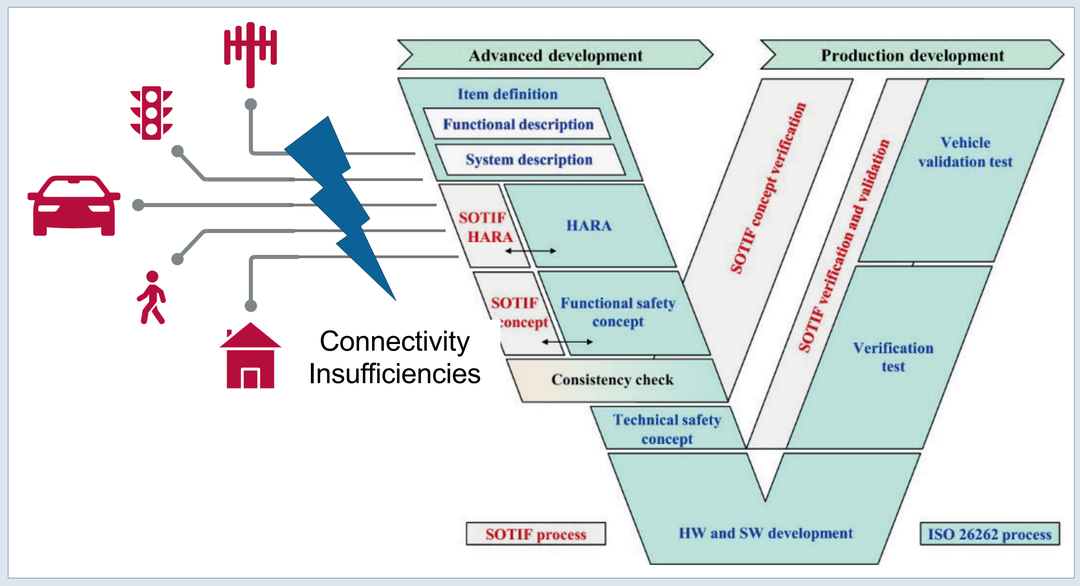
Basic requirement

Not to harm other road users or to endanger, obstruct or inconvenience them more than is unavoidable (§30(1) StVZO / “safety and ease" of traffic)

Scale

Human driver (behavioral law, e.g. StVO)

Integration of external (distributed) systems in safety process by consideration of “Connectivity Insufficiencies” in SOTIF-HARA



[Vermesan, O. et al. (2021). Advancing the Design of Fail-Operational Architectures, Communication Modules, Electronic Components, and Systems for Future Autonomous/Automated Vehicles. In: Zachäus, C., Meyer, G. (eds) Intelligent System Solutions for Auto Mobility and Beyond. AMAA 2020. Lecture Notes in Mobility. Springer, Cham. https://doi.org/10.1007/978-3-030-65871-7_5] (Picture credit: Vector Informatik GmbH)

Requirements for future scalable safeguarding and approval

Communication

- For integration of external (distributed) systems in safety-critical driving functions, it must be defined which data is to be exchanged and via which networks the exchange takes place
- Developers of external (distributed) systems must be familiar with protocols / rules that guarantee the safety, security, reliability and trustworthiness of communication
- Technical implementation in external (distributed) systems should not play a role in the integration of data from these systems into safety-critical driving functions

In-vehicle systems

- must be able to check the safety, security, reliability and trustworthiness of transmitted data and
- perform driving functions safely regardless of the result of this check, possibly with reduced performance

Basis

- Development, safeguarding and operation of ADS in accordance with regulations including safety and security standards
- Positive risk balance and avoidance of unreasonable risks

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