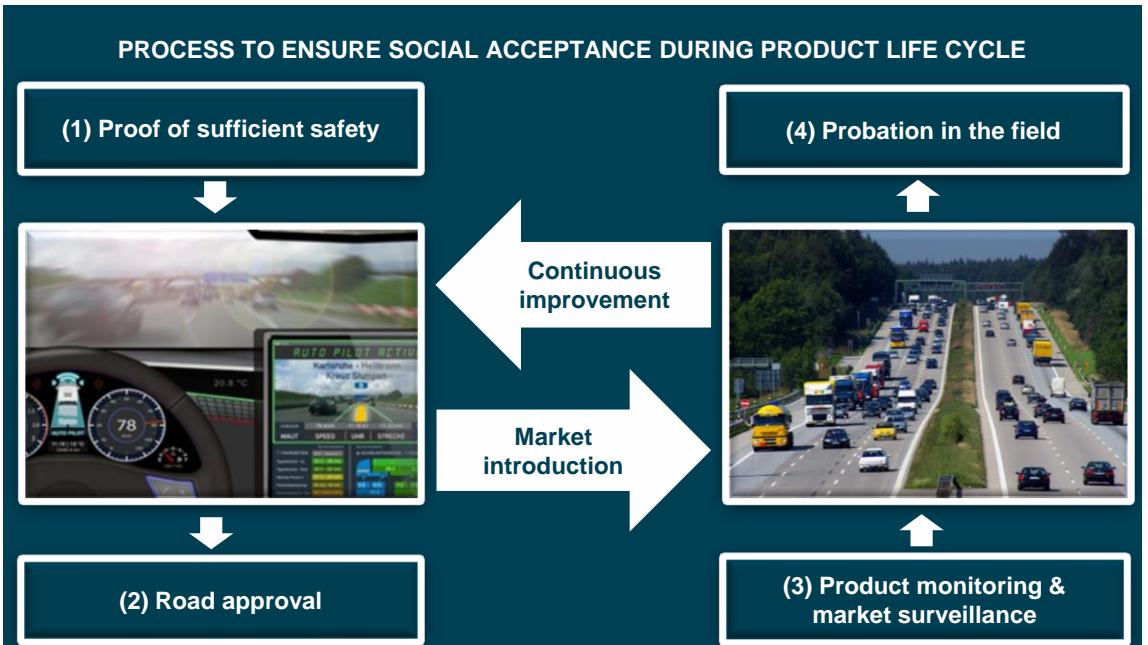


SOCIAL ACCEPTANCE OF HAD



For a successful market introduction and dissemination of HAD vehicles, *sufficient safety* must be demonstrated and *probation in the field* must be ensured to reach social acceptance during the entire product life cycle.



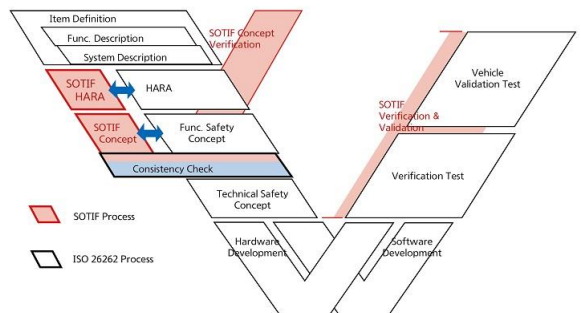
(1) PROOF OF SUFFICIENT SAFETY

Step 1: Necessary condition

Social consensus regarding acceptable risk is regulated by liability laws, e.g. German ProdSG §5(2): *A product that conforms to standards or other relevant technical specifications is presumed to comply with product safety requirements*

Development according to ISO 26262 ensures “absence of unreasonable risk”

Other relevant technical specification is ISO/PAS 21448 for SOTIF (considered by automation risks)



Interactions between SOTIF & Functional Safety [1]



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Step 2: Sufficient condition for road approval

Rules of the Ethics Committee [2]

- *HAD is reasonable if it promises to reduce damage in the sense of a positive balance of risk compared to human performance*
- *If there is a fundamentally positive balance of risk, technically unavoidable residual risks do not preclude an introduction*

In general, experts from several governments, scientific institutes and the business community expect a benefit of vehicle automation for traffic safety, e.g. NHTSA [3], EC [4], German Federal Government [5], VDA [6], VDI [7]

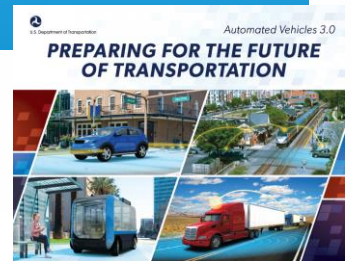
The test concept developed in PEGASUS ensures exemplarily that the systems achieve at least human driving performance



PREREQUISITES FOR ROAD APPROVAL (2) FULFILLED

General limitation of a-priori considerations: A valid statistical proof, that HAD vehicles actually meet the aforementioned safety expectations, can not be provided before they are launched on the market

This results in requirements for proof of probation in the field as well as in measures to be derived therefrom for the continuous improvement of the systems



Berliner Erklärung zur Fahrzeugsicherheit



(3) LIMITATIONS OF RECENT ACTIVITIES OF PRODUCT MONITORING AND MARKET SURVEILLANCE

- No consideration of special aspects of HAD vehicles
- No detection of rare events in a timely manner
- No consistency during complete product lifecycle



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SOCIAL ACCEPTANCE OF HAD



For a successful market introduction and dissemination of HAD vehicles, *sufficient safety* must be demonstrated and *probation in the field* must be ensured to reach social acceptance during the entire product life cycle.

(3) NECESSARY IMPROVEMENTS FOR PRODUCT MONITORING AND MARKET SURVEILLANCE

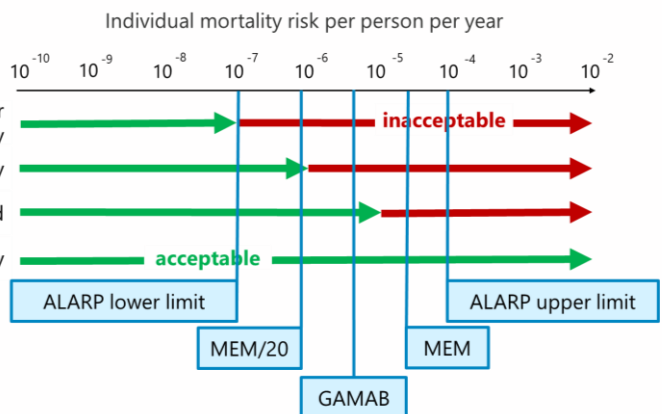
- Further development of accident models (e.g. by use of system theoretical approaches like STPA [8])
- Definition of clear indicators for deficiencies of HAD systems
- Increase density of accident analyses
- Field studies with HAD systems across manufacturers
- Surveys of customers who own vehicles with HAD systems
- Effective testing of HAD systems during PTI

(for more details see [9])



(4) CRITERIA FOR PROBATION IN THE FIELD

- Risk acceptance principles
- Analysis of recent road traffic accidents
- Expected future trends
- Experiences with other technologies



Application of ALARP, MEM and GAMAB delivers a valid range for social accepted risk of HAD vehicles, for more details see [10]



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SOCIAL ACCEPTANCE OF HAD



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