7 Glossary

(VULNERABLE) ROAD USER	A (vulnerable) road user is anyone who uses a road (including sidewalk and other adjacent spaces). Alternatively, (vulnerable) road users are defined as non-motorized (vulnerable) road users, such as pedestrians and cyclists as well as motorcyclists and persons with disabilities or reduced mobility and orientation.
ACCEPTABLE RISK	This refers to the remaining risk of a developed system that is argued to be acceptable by the developing company and also acceptable with respect to legal and social acceptance criteria.
ACCIDENT	An accident is an undesirable, unplanned event that leads to an unrecoverable loss of service due to unfavorable external conditions, typically involving material damage, financial loss and (lethally) injured humans.
ARTIFICIAL MARKERS	An artificial marker is an object or painting introduced into a scene with the purpose of marking positions in a three-dimensional space. A marker typically an easily recognizable shape such as a high contrast disk, square or another simple geometric object. In addition, a marker could also carry coded information that can be extracted and decoded by the automated driving system to assist in parking lot localization and other related features.
AUTOMATED DRIVING SYSTEM (ADS)	An automated driving system comprises a set of elements that offer a specific conditional or higher automated driving use case in or for a specific ODD.
AUTOMATED VEHICLE (AV)	Automated vehicles are vehicles equipped with at least one conditional (SAE L3) or higher (SAE L4/L5) automated driving system that enables them to provide an automated dynamic driving task.
AVAILABILITY	Availability is a system state with the ability to readily provide correct service.
CAPABILITY	A capability is the ability of a product to deliver a function, feature or service.
CRASH	A crash is an undesirable, unplanned event that leads to an unrecoverable loss of service caused by scientifically explainable unfavorable external conditions (e.g. human error), typically involving material damage, financial loss and severe or fatally injured humans.
DEGRADATION	Degradation is the reduced performance of the system or function, but which still provides safe operations/service in the presence of hazardous events.
DEPENDABILITY	Dependability is the ability to provide Reliability, Availability, Maintainability, Safety and Security (RAMSS).

DETERMINISM	Determinism refers to the concept that an output is directly defined by its defined input. In this context, noise is defined as an undefined input that accompanies a defined input.
DRIVER-IN-THE-LOOP (DIL)	Target software is executed on prototypical or target hardware in the target vehicle or a mockup, and the environment is modified with virtual stimuli, whereas the driver's reaction influences the vehicle's behavior. E.g.: driving simulator or ViL (augmented reality for safety-related maneuvers).
DYNAMIC DRIVING TASK (DDT): [SAE J3016]	Dynamic driving tasks comprise all the real-time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selecting destinations and waypoints, and including without limitation: ○ Lateral vehicle motion control via steering (operational) ○ Longitudinal vehicle motion control via acceleration and deceleration (operational) ○ Monitoring the driving environment via object and event detection, recognition, classification, and response preparation (operational and tactical) ○ Object and event response execution (operational and tactical) ○ Maneuver planning (tactical) ○ Enhancing conspicuity via lighting, signaling and gesturing, etc. (tactical)
ELEMENT	Elements result from a first-level decomposition of capabilities to a logical system architecture. One or more elements realize one or more capabilities.
FAIL-DEGRADED	This means that the system is still able to operate safely when degraded.
FAIL-OPERATIONAL	This refers to full & safe operations/service in the presence of hazardous events. The loss of safety-related functions or system components shall not lead to a hazard.
FAIL-SAFE	This means that the system still operates in a safe state in the event of a failure.
FAILURE [ISO 26262]	A failure is the termination of an intended behavior of an element or an item due to a fault manifestation.
FAULT [ISO 26262]	A fault is an abnormal condition that can cause an element or an item to fail.
FAULT TOLERANCE	This refers to the ability to deliver a specified functionality in the presence of one or more specified faults.
FIELD OF VIEW (FOV)	Field of view describes the angle through with a sensor or device can pick up electromagnetic radiation. [HTTPS://WHATIS.TECHTARGET.COM/DEFINITION/FIELD-OF-VIEW-FOV]

FIELD OPERATIONAL TESTING (FOT)	Field operational testing refers to use of large-scale testing programs aimed at generating a comprehensive assessment of the efficiency, quality, robustness and acceptance of transport solutions. [HTTP://WIKI.FOT-NET.EU/INDEX.PHP/WHAT_ARE_FIELD_OPERATIONAL_TESTS%3F]
HD MAP	High Definition (HD) maps are very detailed maps with high level precision mostly used in the context of automated driving systems to give the vehicle precise information about the road environment to maneuver effectively and safely.
HARDWARE-IN-THE-CLOSED-LOOP (HIL)	Target software is executed on target hardware, whereas the hardware outputs influence the hardware inputs. E.g. AUTOSAR Stack on Radar with no frontend
HARDWARE REPROCESSING (OPEN LOOP)	Target software is executed on target hardware, whereas the hardware outputs do not influence the hardware inputs E.g. monitor hardware testbench
HUMAN-MACHINE INTERACTION	Human-machine interaction focuses on the interdisciplinary interaction between a human and computer and considers the human-machine interface (HMI). The aim is to develop an ideal user interface that satisfies the requirements regarding the mental, cognitive and manual abilities of the user. [HTTPS://WWW.ITWISSEN.INFO/HMI-HUMAN-MACHINE-INTERACTION-MENSCH-MASCHINE-INTERAKTION.HTML]
INCIDENT	An incident is an undesirable, unplanned event that leads to a recoverable loss of service due to favorable external conditions, typically sparing any material damage, financial loss and (lethally) injured humans.
ITEM DEFINITION (REFERENCE: ISO26262, P.16)	System or combination of systems, to which ISO 26262 is applied, that implements a function or part of a function at the vehicle level.
MINIMAL RISK CONDITION [SAE J3016]	A condition to which a user or an ADS may bring a vehicle after performing the Minimal Risk Maneuver in order to reduce the risk of a crash when a given trip cannot or should not be completed.
MINIMAL RISK MANEUVER [SAE J3016]	Minimal risk maneuver refers to a procedure aimed at minimizing risks in traffic and which is automatically performed by the system, e.g. when the driver does not respond to a takeover request.
MODE AWARENESS	Mode awareness refers to the driver's capability to identify the current automation mode and their driving responsibility.

NATURALISTIC DRIVING STUDIES (NDS)	Naturalistic driving study concerns studies carried out using unobtrusive observation during driving in natural settings. A new approach, the driver becomes unaware of observation as data is collected as discreetly as possible. This data is then used to examine the relationship between the driver, vehicle and/or environment. [HTTP://WIKI.FOT-NET.EU/INDEX.PHP/WHAT_IS_THE_DIFFERENCE_BETWEEN_AN_FOT_/_PILOT_/_NATURALISTIC_DRIVING_STUDY_(NDS)%3F]
NOMINAL PERFORMANCE	Nominal performance of the system is defined as a system free from fault and one that meets or exceeds its defined performance metrics.
OBJECT UNDER TEST (OUT)	Similar usage as ISO 16750 for Device Under Test: The item or object which is to be tested as planned and specified.
OPEN ROAD (OR)	Target software is executed on target hardware in the target vehicle with a human driver, whereas the driving environment is real and can be only partially controlled. E.g. field operational test or naturalistic driving studies, testing in the development vehicles.
OPERATIONAL DESIGN DOMAIN (ODD) [SAE J3016]	The ODD refers to the operating conditions under which a given automated driving system or feature thereof is specifically designed to function. “These limitations reflect the technological capability of the automated driving system.”
POSITIVE RISK BALANCE	In the sense of: Positive Risk Balance is the result of a risk benefit evaluation with a lower remaining risk of traffic participation due to automated vehicles. This includes the fact that automated vehicles causes less crashes on average compared to the average human driver.
PROVING GROUND (PG)	Target software is executed on target hardware in the target vehicle, whereas the driving environment is real and largely controlled. The driver can be real or a robot. E.g. EBA tests on soft crash target.
RELIABILITY	This refers to the ability of a system to continuously provide correct service.
REPROCESSING	Reprocessing is the generic activity which is done with SoL and HoL. Reprocessing is a replay of time stamped recorded data with a sufficient time accuracy to provide input for the OuT.

SAE LEVELS OF DRIVING AUTOMATION [SAE J3016]

SAE J3016™ Levels of Driving Automation

	SAE Level 0	SAE Level 1	SAE Level 2	SAE Level 3	SAE Level 4	SAE Level 5
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals, and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to uphold safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			**These are automated driving features**		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met		This feature can drive the vehicle under all conditions
Example features	▪ Automatic emergency braking ▪ Blind spot warning ▪ Lane departure warning	▪ Lane centering OR ▪ Adaptive cruise control	▪ Lane centering AND ▪ Adaptive cruise control at the same time	▪ Traffic jam chauffeur	▪ Local driverless taxi ▪ Pedals/steering wheel may or may not be installed	▪ Same as Level 4, but feature can drive everywhere in all conditions

SAFE STATE

Safe state is an operating mode without an unreasonable level of risk.

SAFE(TY)

This refers to the absence of unreasonable risk due to hazards.

SAFETY OF THE INTENDED FUNCTIONALITY (SOTIF)

"The absence of unreasonable risk due to hazards resulting from functional insufficiencies of the intended functionality or by reasonably foreseeable misuse by persons is referred to as the Safety Of The Intended Functionality (SOTIF)."

[HTTPS://WWW.ISO.ORG/STANDARD/70939.HTML]

SCENARIO

A scenario is a temporal sequence of scenes and covers a certain time span.

SCENE

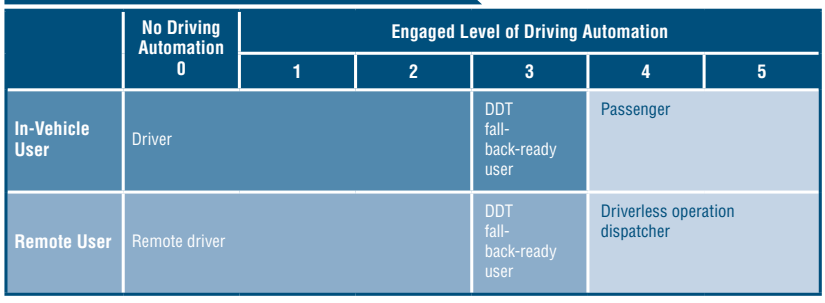
A scene describes a snapshot of an environment that describes the scenery, dynamic elements, and the self-representation of all actors and observers as well as their connection. Only a simulated scene can be all-embracing (i.e. objective, otherwise known as ground truth), whereas a real-world scene is incomplete, afflicted with faults and uncertainties, and observed from a subjective perspective.

SCENERY

The scenery includes all spatial stationary elements: The lane network (lanes, lane markings, etc.), stationary elements (obstacles, curbs, traffic signs, traffic lights, etc.), vertical elevation, and environmental conditions.

SECURITY

Security is the protection against intentional subversion or forced failure.

SIMULATION	The approximated imitation of selected behavioral characteristics of one physical or abstract system by a static or dynamic model [according to ISO 2382/1]. The simulation represents the behavior over time in which the system or parts of it are replaced by the model. It includes SiL, SoL, HiL, HoL and DiL.
SOFTWARE REPROCESSING (OPEN LOOP)	Target software is executed on prototypical hardware, whereas the software decisions have no influence on the stimulus. E.g. replay or synthetic data to simulate a CEM
SOFTWARE-IN-THE-CLOSED-LOOP (ABBREV.: SIL)	Partial target software is executed on prototypical hardware, whereas the software decisions influence the virtually generated stimulus. E.g. MATLAB Simulink model, AUTOSAR Stack, C++ DLL
SYSTEM LIMITS	The defined limits of the operation as stated in the ODD for the specific system of interests.
TAKEOVER	Transfer of responsibility for the driving task from the automated vehicle to the operator.
UNREASONABLE RISK	This refers to a risk that is judged to be unacceptable in a certain context according to valid societal moral concepts
USE CASE	This is the specification of a generalized field of application, possibly entailing the following information about the system: ○ one or several scenarios; ○ the functional range; ○ the desired behavior; and ○ the system boundaries Note: The use case description typically does not include a detailed list of all relevant scenarios for this use case. Instead a more abstract description of these scenarios is used.
USER [SAE J3016]	**User Roles in the Automated Driving System**  A driver is a human being who is using a vehicle. This human being takes over different tasks, depending on the level of automation. A user is a general term that refers to the human role in driving automation (SAE):A passenger is a user in a vehicle, who has no role in operating the vehicle.

V2X	Vehicle-to-Everything (V2X) is an emerging technology that augments an automated vehicle to receive additional information from infrastructure or other vehicles or vice versa send information. V2X can provide a growing number of helpful information such as parking space availability, upcoming road hazards and map updates, or support tele-operation of the automated vehicle in relevant scenarios. A direct communication to human (vulnerable) road users is handled in human-machine interaction.
VALIDATION [ISO 15288]	"Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled" [ISO/IEC15288]. Takes place during validation testing to determine if an outcome is best for the end customer. Typically done at a later development stage with much slower feedback, as validation is normally performed via statistical methods with high number of tests.
VEHICLE OPERATOR	The person who operates the vehicle either in the vehicle itself behind the steering wheel (L3 or L4) or via teleoperation (L4).
VERIFICATION [ISO 15288]	"Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled" [ISO 15288]. Typically used to obtain fast feedback during development.