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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 46958-2025

**Road vehicles - Test scenarios for automated driving systems -
Scenario based safety evaluation framework**

道路车辆 自动驾驶系统测试场景 基于场景的安全评估框架

(English Translation)

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1 Scope

This document provides guidance on a scenario-based ADS safety evaluation framework. This framework describes a scenario-based safety evaluation process applied to the product development process.

This document applies to Category M and N vehicles equipped with ADS.

This document does not address safety-related issues concerning misuse, human-machine interaction, information security.

This document does not address non-safety-related issues such as comfort, energy efficiency, traffic efficiency.

2 Normative references

The following documents, through normative references herein, constitute essential provisions of this document. For dated references, only the edition cited applies; for undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 43267-2023 Expected functional safety of road vehicles (ISO 21448.2022, MOD)

Note: The content referenced in GB/T 43267-2023 and ISO 21448.2022 are not technically different.

GB/T 46896-2025 Road vehicles - Autonomous driving system - Test scenario terminology (ISO 34501.2022, MOD)

Note: There are no technical differences between the content referenced in GB/T 46896-2025 and the content referenced in ISO 34501.2022.

ISO 26262-3 Road vehicles - Functional safety - Part 3. Concept phase

Note: GB/T 34590.3-2022 Road vehicles - Functional safety - Part 3. Concept phase (ISO 26262-3.2018, MOD)

3 Terms and definitions

The terms and definitions defined in GB/T 46896-2025, as well as the following terms and definitions, apply to this document.

3.1

Critical scenario

A scenario that includes one or more risk factors (3.3).

3.2

Hazardous scenario

A scenario in which a hazard will occur unless prevented by an entity other than the ADS.

3.3

Risk factor

An element in a scenario that, if present, would increase the probability of a hazard occurring and/or the severity of the hazard.

3.4

Safety test objective

The safety attributes of the ADS demonstrated through a series of tests.

Note 1: Safety test objectives may be derived from the validation objectives and acceptance criteria of GB/T 43267-2023.

Note 2: Safety test objectives also include test completion criteria.

Note 3: Depending on the type of safety test objective, specific test scenario pass/fail criteria may be included in the safety test objective.

4.1.1 Purpose

The purpose of 4.1 is to achieve the following objectives.

The system-based approach (Task 1.2) starts with the system itself. This document focuses on the scenario-based approach (Task 1.1), which starts with the scenario space related to system functionality, identifying risk factors by analyzing the relevant scenario space. This document only considers general physical limitations of the system, such as the sensing range of sensors based on the physical characteristics of the sensing system. This document does not address specific system implementation issues, such as machine learning algorithms failing to correctly classify sensed objects or sensor failures due to random hardware malfunctions. A system-based approach can better analyze these system execution problems.

The advantage of a scenario-based approach is that it has minimal dependency on the system's implementation details (e.g., in regulatory applications). As long as the relevant scenario space is the same, the analysis results can be reused across different systems. However, in certain specific scenarios, the system configuration (e.g., the exact number and location of sensors) can still affect the maximum value of scenario risk factors.

Note 1: Knowledge gained during the implementation of one method (e.g., a system-based approach) can be used for analysis using another method (e.g., a scenario-based approach).

Note 2: System-based security analysis results can also serve as test scenarios to be implemented.

This document does not cover all tasks of ADS security evaluation, but primarily focuses on the following aspects.

- Task 1.1.1. Identify and assess potential hazardous scenarios by analyzing the relevant scenario space (see 4.3);
- Task 1.1.2. Explore unknown hazardous scenarios by deriving a set of typical test scenarios (see Appendix J), to demonstrate the adequacy of the relevant scenario space coverage.

Guidelines for the execution of other security tasks can be found in other documents, such as.

- Task 2.GB/T 43267-2023;
- Task 3.ISO/SAE 21434;
- Tasks 1.2 and 1.3.GB/T 43267-2023, ISO 26262 (all parts).

Note 3: Some security issues can be assigned to multiple tasks.

Example. Adversarial attacks, also known as "physical unauthorized intrusions", such as stickers on traffic signs to deceive sensors, can be assigned to both Task 3 and Task 1. In Task

3, the relevant attack scenarios are identified; in Tasks 1.1 and 1.2, the robustness of the system evaluation process in this document;

- The second column from the left is the preparation phase prior to identifying critical scenarios, which defines the safety testing objectives;
- The third column from the left provides the relevant scenario space norms and identifies the risk factors and critical scenarios for safety evaluation based on the safety evaluation framework;
- The fourth column from the left illustrates the connection between the scenario-based safety testing and evaluation process in the safety analysis phase and the remaining product development phases;
- The fifth column from the left illustrates how the outputs of the scenario-based safety evaluation framework adapt to the whole-vehicle safety verification process, including other safety confirmation steps;
- The lines represent iterative cycles and conditions of action, which can contain new findings and trigger necessary adjustments, such as functional modifications required for safety reasons.

Chapter 4 provides guidance on addressing the following issues to refine the overall scenario-based safety evaluation process.

- 4.1 Applying this process throughout the overall development process. How this framework can be integrated into existing product development processes;
- 4.2 Safety testing objectives. How to define the safety testing objectives the system needs to achieve;
- 4.3 Relevant scenario space norms. How to define the relevant scenario space;
- 4.4 Derivation of critical scenarios based on risk factors. How to define a set of critical scenarios and derive a test scenario set from them;