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

GB/T 44721-2024

**Intelligent and connected vehicle - General technical
requirements for automated driving system**

智能网联汽车 自动驾驶系统通用技术要求

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1 Scope

GB/T 44721-2024 sets the general technical requirements for the automated driving system of an intelligent and connected vehicle, and it is one of the central documents of the Chinese autonomous vehicle framework. Its structure follows the logic that has become standard internationally: the system is defined by the dynamic driving task it performs within a declared operational design domain, and the requirements follow from that. It sets the general requirements, then the execution of the dynamic driving task, that is the perception, decision and control performance the system must deliver and the behaviours it must

exhibit in defined scenarios; then the DDT fallback, what the system must do when it can no longer continue, including the transition demand to the driver and the minimal risk manoeuvre when the driver does not respond, which is where most of the safety argument actually lives; then the human-machine interaction, the modes, the indications and the driver monitoring; and then the instruction manual. A normative annex carries the special safety requirements for the automated driving system. It took effect on 29 September 2024, and any Level 3 or higher system offered in China is assessed against it.

This document specifies the overall requirements, dynamic driving task execution requirements, dynamic driving task backup requirements, human-machine interaction requirements, etc. for automated driving system. This document applies to M-category and N-category vehicles equipped with automated driving system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 34590.1, Road vehicles - Functional safety - Part 1: Vocabulary

GB/T 34590.3-2022, Road vehicles - Functional safety - Part 3: Concept phase

GB/T 40429-2021, Taxonomy of driving automation for vehicles

GB/T 41798, Intelligent and connected vehicles - Track testing methods and requirements for automated driving functions

GB/T 43267-2023, Road vehicles - Safety of the intended functionality

GB/T 44298-2024, Intelligent and connected vehicles - Symbols for controls, indicators and tell-tales

GB/T 44373-2024, Intelligent and connected vehicle - Terms and definitions

GB/T 44719, Intelligent and connected vehicle - Methods and requirements of road test for automated driving functions

4.7 In active state, ADS shall perform all dynamic driving tasks (DDT) and shall not cause unreasonable safety risks.

4.8 In active state, when ADS performs dynamic driving tasks (DDT), it shall comply with road traffic regulations.

4.9 In active state, when ADS performs dynamic driving tasks (DDT), it shall comply with reasonable expectations of other road users.

4.10 When ADS is in active state, for any device or system required to support the driver in

resuming manual driving, it shall be confirmed whether the device or system is in an operational state suitable for manual driving. If the relevant device or system is in an inappropriate operational state, ADS shall implement reasonable control strategies.

Note: Required devices or systems include defogger, windshield wipers, lighting devices, etc.

5 Dynamic driving task execution

5.1 ADS shall be able to continuously identify whether its operational design conditions (ODC) are met.

5.2 The perception system of ADS shall have a detection range that is compatible with the ODC of ADS.

5.3 ADS shall be able to determine the vehicle's position and detect objects and events in the surrounding environment.

Note: Common objects include roads (including road type, road surface conditions, road geometry, lane characteristics, road edges, etc.), road facilities (including traffic signs, traffic lights, etc.), targets (including motor vehicles, non-motor vehicles, pedestrians, obstacles, etc.), weather environment (including weather, lighting conditions, etc.), and digital information environment (including wireless communication, location signals, etc.).

5.4 ADS shall be able to detect the position of targets and the moving speed of dynamic targets.

5.5 ADS shall perform reasonable control strategies to deal with the performance degradation of the perception system.

Note: Performance degradation generally refers to the performance degradation caused by aging of the sensor itself.

5.6 ADS shall perform reasonable control strategies to deal with targets that are detected but cannot be identified.

5.7 ADS shall perform reasonable control strategies to deal with safety risks in undetectable areas.

Note: Undetectable areas include blind spots caused by sensor layout and perception range, blind spots caused by other road users or obstacles, and blind spots caused by road topology or shape.

6.1.3 Monitoring of driver's capability to perform dynamic driving tasks (DDT)

6.1.3.1 For ADS that requires a conventional driver to take over, at least two effective indicators shall be used to determine whether the driver has the capability to perform the

dynamic driving task (DDT), and the determination cycle shall be reasonable.

Note: Indicators include specific human-machine interaction actions, eye states, head movements, or body movements.

6.1.3.2 For ADS that requires a conventional driver to take over, when ADS is in active state and the driver is judged to be incapable of performing a dynamic driving task (DDT), ADS shall immediately issue a clear takeover capability deficiency warning signal. Each issued takeover capability deficiency warning signal shall be turned off when any of the following conditions are met:

- a) The driver is detected to have recovered the capability to perform the dynamic driving task (DDT);
- b) ADS issues an intervention request;
- c) ADS implements the Minimum Risk Manoeuvre (MRM);

6.2 Takeover

6.2.1 General requirements For ADS that requires a conventional driver to take over, the control strategy for issuing intervention requests and responding to driver takeover shall be safe, reliable and effective, and shall be able to detect in a timely manner whether the driver has taken over.

6.2.2 Issuing an intervention request

6.2.2.1 For ADS that requires a conventional driver to take over, there shall be clear intervention request triggering conditions, and ADS shall be able to identify all situations where an intervention request is required. Except for the special circumstances in

6.2.2.2 c) and 6.2.2.3, when any of the conditions in

7.1.2.1 is not met or the takeover capability is insufficient when the prompt signal reaches the set duration, ADS shall issue an intervention request.

6.2.2.2 The issuing timing of the intervention request shall ensure that the driver has sufficient time to safely take over the vehicle, at least meeting the following requirements.

- a) For planned takeover events, ADS shall initiate an intervention request at an appropriate moment to ensure that the Minimum Risk Manoeuvre (MRM) can bring the vehicle to a standstill before the planned takeover event occurs, even if the driver does not take over.
- b) For unplanned takeover events, ADS shall issue an intervention request in a timely manner when the event is detected.

Note: Unplanned takeover events refer to events where ADS is not aware of in advance but is required to issue an intervention request, such as temporary road construction,