



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

**GB/T 41901.1-2022**

---

**Road vehicles - Extended vehicle (ExVe) methodology - Part 1:  
General information**

**Issued on: October 12, 2022**

**Implemented on: May 1, 2023**

---

**Issued by: SAMR; SAC**

## Table of Contents

|                                                                                                             |    |
|-------------------------------------------------------------------------------------------------------------|----|
| Foreword .....                                                                                              | 3  |
| Introduction .....                                                                                          | 6  |
| 1 Scope .....                                                                                               | 7  |
| 2 Normative References .....                                                                                | 7  |
| 3 Terms and Definitions .....                                                                               | 7  |
| 4 Abbreviations .....                                                                                       | 9  |
| 5 General Information of Extended Vehicle .....                                                             | 9  |
| 5.1 Concept of Extended Vehicle .....                                                                       | 9  |
| 5.2 Design Constraints for Extended Vehicle .....                                                           | 11 |
| Appendix A (informative) A Comparison of Structural No. Between This Document and<br>ISO 20077-1:2017 ..... | 12 |
| Appendix B (informative) Intended Application Fields of Extended Vehicle .....                              | 13 |
| Appendix C (informative) Methodological Standards of Extended Vehicle .....                                 | 15 |

### 1 Scope

This document specifies the general information of extended vehicles.

This document is applicable to Category-M and Category-N vehicles.

### 2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in this text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 41901.2 Road Vehicles - Extended Vehicle (ExVe) Methodology - Part 2: Methodology for Designing the Extended Vehicle (GB/T 41901.2-2022, ISO 20077-2:2018, MOD)

### 3 Terms and Definitions

What is defined in GB/T 41901.2, and the following terms and definitions are applicable to this document.

### 3.1 Extended Vehicle

Extended vehicle refers to a vehicle system that satisfies the specification requirements of the vehicle manufacturer, but exceeds the physical scope of road vehicle, and is composed of road vehicle, external interfaces, extended accessories and data communications generated through the external interfaces.

NOTE 1: extended vehicles can be without extended accessories.

NOTE 2: when the communication object is a non-extended accessory (for example, road infrastructure or other traffic participants), the extended vehicle is composed of road vehicle, external interfaces and data communications generated through the external interfaces, and the road infrastructure and other traffic participants do not belong to the extended vehicle.

NOTE 3: see Appendix B for common application fields of extended vehicle; see Appendix C for the methodological standards for extended vehicle.

### 3.2 Off-board System

Off-board system refers to off-vehicle software and hardware used to realize the required functions for road vehicles through defining, designing, developing and / or manufacturing.

### 3.3 Extended Accessory

Extended accessory refers to an off-board system provided by the extended vehicle manufacturer and used to realize the extended function.

### 3.4 Manufacturer

Manufacturer refers to a manufacturer or corporation that issues the motor vehicle exit-factory certificate or product consistency certificate, and undertakes the responsibility for vehicle product and the uniqueness of the vehicle identification number (VIN), and is irrelevant to the location of the assembly plant.

### 3.5 ExVe Manufacturer

ExVe manufacturer refers to the manufacturer that manufactures extended vehicles.

### 3.6 Functional Requirement

Functional requirement refers to a description provided by the vehicle manufacturer to ensure necessary actions and / or results.

NOTE: functional requirement is provided by the institution responsible for product or process design.

### 3.7 Function

Function refers to a task, behavior or activity performed to satisfy a functional requirement.

EXAMPLE: turn on-off the engine.

NOTE: the same function can be used for many different use cases.

### 3.8 Use Case

Use case refers to a sequence of interactions between one or multiple participants and a related system. This sequence of interactions has specific objectives and quantifiable results.

EXAMPLE: read all active DTCs.

NOTE 1: "read all active DTCs" can consist of the following interactions: communication initialization, vehicle identification, sending a request to obtain DTC information, receiving DTC information and communication termination.

NOTE 2: the operator can be human or machines.

NOTE 3: in order to implement the design of extended vehicles, use case needs to be determined by appropriate scenarios and functional requirements.

### 3.9 Use Case Cluster

Use case cluster refers to a set of use cases with the same objective and quantifiable result.

EXAMPLE: remote diagnostics and fleet management.

NOTE 1: use case cluster can itself be re-divided into different domains, in which, different types of technical solutions may arise, and some solutions are applicable to multiple domains.

NOTE 2: extended vehicles can be used in all vehicle-connected use case cluster domains, such as:

cooperative ITS, fleet management, remote diagnostics and vehicle sharing, etc.

### 3.10 Web Service

Web service refers to a software system for equipment interaction over the network with an interface in a machine-processable format.

## 4 Abbreviations

ExVe: Extended Vehicle FMS: Fleet Management System ITS: Intelligent Transportation

System RSI: Roadside Inspection V2I: Vehicle-to-Infrastructure V2V: Vehicle-to-Vehicle

### **5.1.1 Extended vehicle refers to all technical components that can realize vehicle functions, and**

external interfaces are also included, as it is shown in Figure 1 and Figure 2. Figure 1 represents the overall concept; Figure 2 represents representative interfaces, including:

---physical connection interface;

---web service interface;

---wireless real-time communication interface;

---other interfaces: there is no standardization requirement for such interfaces.

## **Appendix B (informative) Intended Application Fields of Extended Vehicle**

B.1 Extended vehicle is not a special technical solution created to solve specific requests (for example, remote diagnosis). This technology, which extends conventional road vehicles to include off-board systems, can be applied to all fields, in which, vehicle connectivity is needed.

B.2 There are six main intended application fields (see Figure B.1) for extended vehicles.

---Vehicle maintenance and upgrade field. The typical use case cluster of this field is remote diagnostics, prognostics, repairs and online software upgrades. This field is characterized by a strong influence of national or local regulations.

---Vehicle inspection field. The typical use case cluster of this field is remote RSI, which is characterized by inspection operators regulated by local managing institutions.

---Driving task support field. The typical use case cluster of this field includes V2V, V2I and communication supporting driving assistance and automatic driving, etc. This field is characterized by the request for low-latency communication.

---Transportation management field. The typical use case cluster of this field is remote FMS, which is characterized by the fleet as a whole.

---Manufacturing and sales field. The typical use case cluster of this field is remote diagnostics of vehicles during the manufacturing process, which is characterized by the fact that the vehicle owner is still the vehicle manufacturer.

---Non-vehicle field. The typical use case cluster of this field is infotainment, vehicle insurance, remote driver and driving survey, which is characterized by a wide variety of use cases, often originating outside the vehicle industry.