



全国汽车标准化技术委员会  
National Technical Committee of Auto Standardization



# Standards facilitates Autonomous Driving

China Automotive Technology and Research Center Co. Ltd /  
China Auto Standardization Research Institute

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1

**BACKGROUND**

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# 1.1 CATARC & CASRI Profile



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## China Automotive Technology and Research Center (CATARC)

- A central enterprise directly under the State-owned Assets Supervision and Administration Commission of the State Council. A comprehensive technology enterprise group with extensive influence in the domestic and foreign automotive industry

## China Automotive Standardization & Research Institute (CASRI)

- The directly subordinate technical institution overseeing internal standardization operations and coordinated allocation of resources within CATARC

Roles	Nature	Authorized by	Responsibility
National Technical Committee of Auto Standardization (NTCAS) (SAC/TC114)			Secretariat
China WP.29 Working Committee(C-WP.29)	Official	MIIT	Secretariat
Technical Committee on ISO on Road Vehicles (ISO/TC22)	Official	SAC/MIIT	Mirror committee
IEC Committee on Sustainable Electrified Transport Systems (IEC/SYC SET)	Official	SAC/MIIT	Mirror committee
IEC Committee on Electrical Power/Energy Transfer Systems for Electrically Propelled Road Vehicles and Industrial Trucks (IEC/TC69)	Official	SAC/MIIT	Mirror committee
National Technical Standard Innovation Base of Automobile	Official	SAC/MIIT	Organizing unit
Comment Subcenter on WTO/TBT(Automobile)	Official	SAMR	Undertaking unit
International Standard Service Station	Official	SAC	Undertaking unit



PROMOTE SCIENTIFIC AND TECHNOLOGICAL PROGRESS



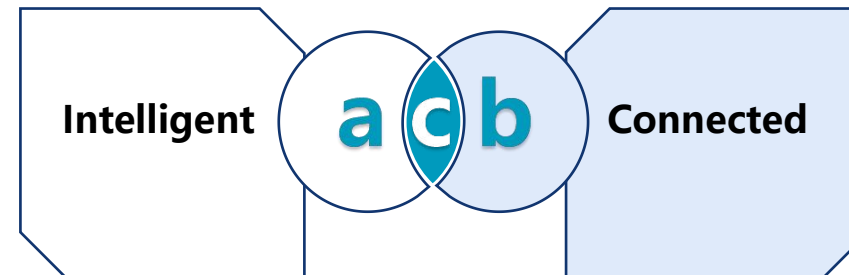
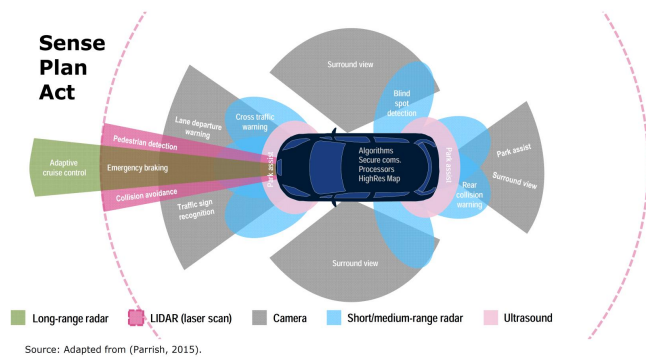
PROMOTE INDUSTRIAL DEVELOPMENT



SUPPORT GOVERNMENT MANAGEMENT

## Definition

Vehicles that are designed with advanced features including environmental perception, self-decision-making and automated control, or interaction with external information, and even collaborative control functions.



## Ultimate goal of intelligent and connected vehicle

The driver can be completely replaced, to achieve safe, efficient and energy-saving driving with zero casualties and zero congestion.



### ICV enters into a new stage thus new demands are raised

#### Advanced Technology

sensor fusion and control algorithm are improved

driving-assistance systems evolves from single functions to combined

communication techs applies steadily in automobile

#### Blooming industry

application scenarios and phase gradually expand

products are promoted from demonstration to mass production

diversified industrial chain is driven to

#### New Challenges

functional scope and responsibility boundaries need to be clarified

a comprehensive security system needs to be established

requirements and cost need to be balanced

2

# **Intelligent and Connected Vehicle Standard System**

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## 2.1 Standard Coordinates Industrial Development

### Standard System of Internet of Vehicles in China



Ministry of Industry and Information  
Technology of the People's Republic of China



Ministry of Transport of the People's  
Republic of China



The Ministry of Public Security of the  
People's Republic of China



Standardization  
Administration

#### National Internet of Vehicles Standard System Construction Guidelines

Intelligent &  
Connected Vehicles

published in 2017  
updated in 2023

Information &  
Communication

published in 2018

Electronics &  
Services

published in 2018

Intelligent  
Management  
of Vehicles

published in 2020

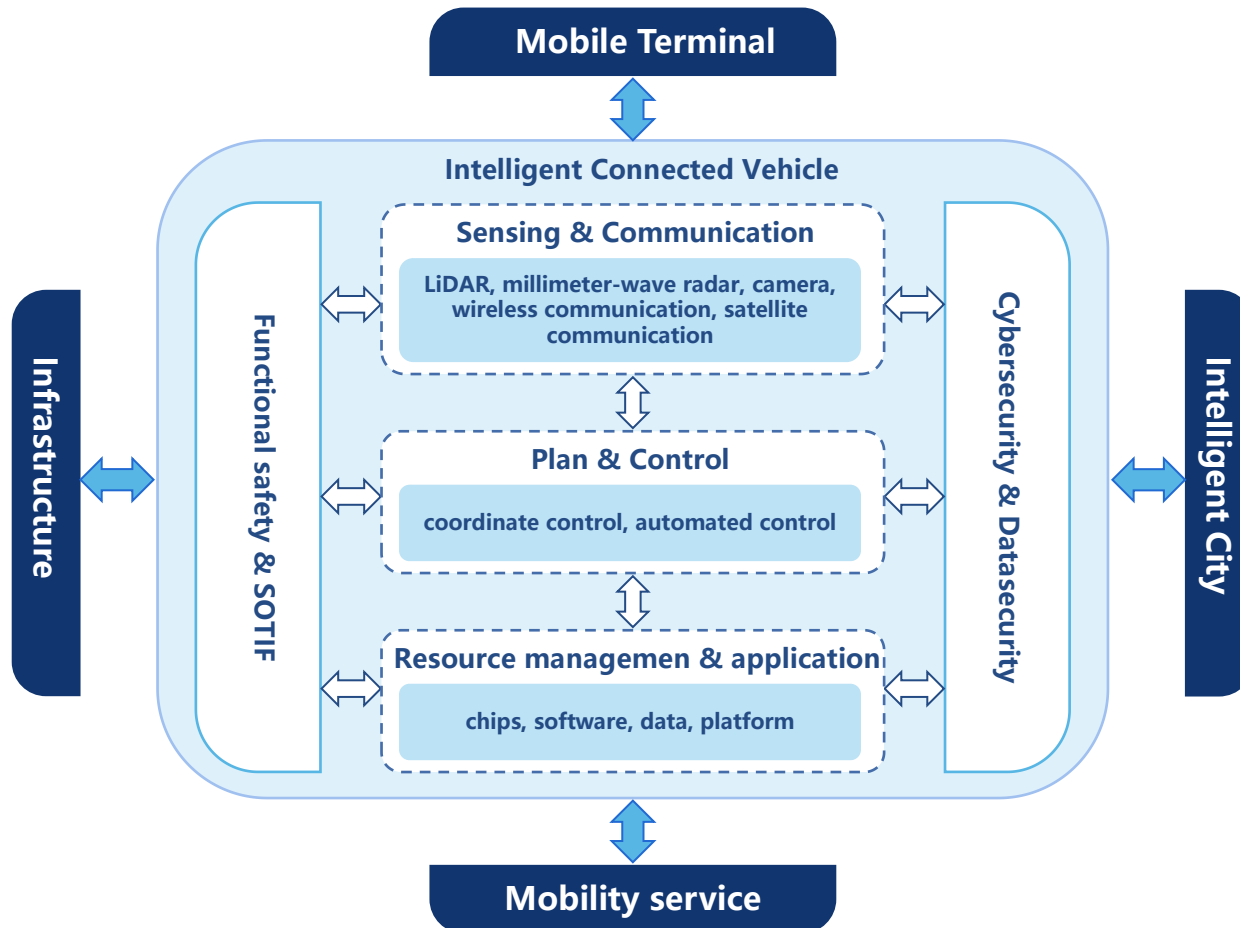
Intelligent  
Transportation

published in 2021



## 2.2 ICV standard system (2023)

### Technical logical architecture of ICV standard system



#### Technical support

- ◆ **lateral**: three layers of technical specifications to support ICV functions
- ◆ **longitudinal**: two layers of basic specifications to guarantee the safety and the security of ICV

#### Interdisciplinary collaboration

- ◆ Considering the technical correlation between ICV and transportation, communication, electronics and other fields

## 2.2 ICV standard system (2023)

### Goals and phases of ICV standard system

2025

#### Support the general functions of combined driver assistance systems and automated driving

◆It covers standards such as ADAS, general requirements of automated driving, connected functions and operating systems, high-performance computing chips and data applications.

standards 100 +



2030

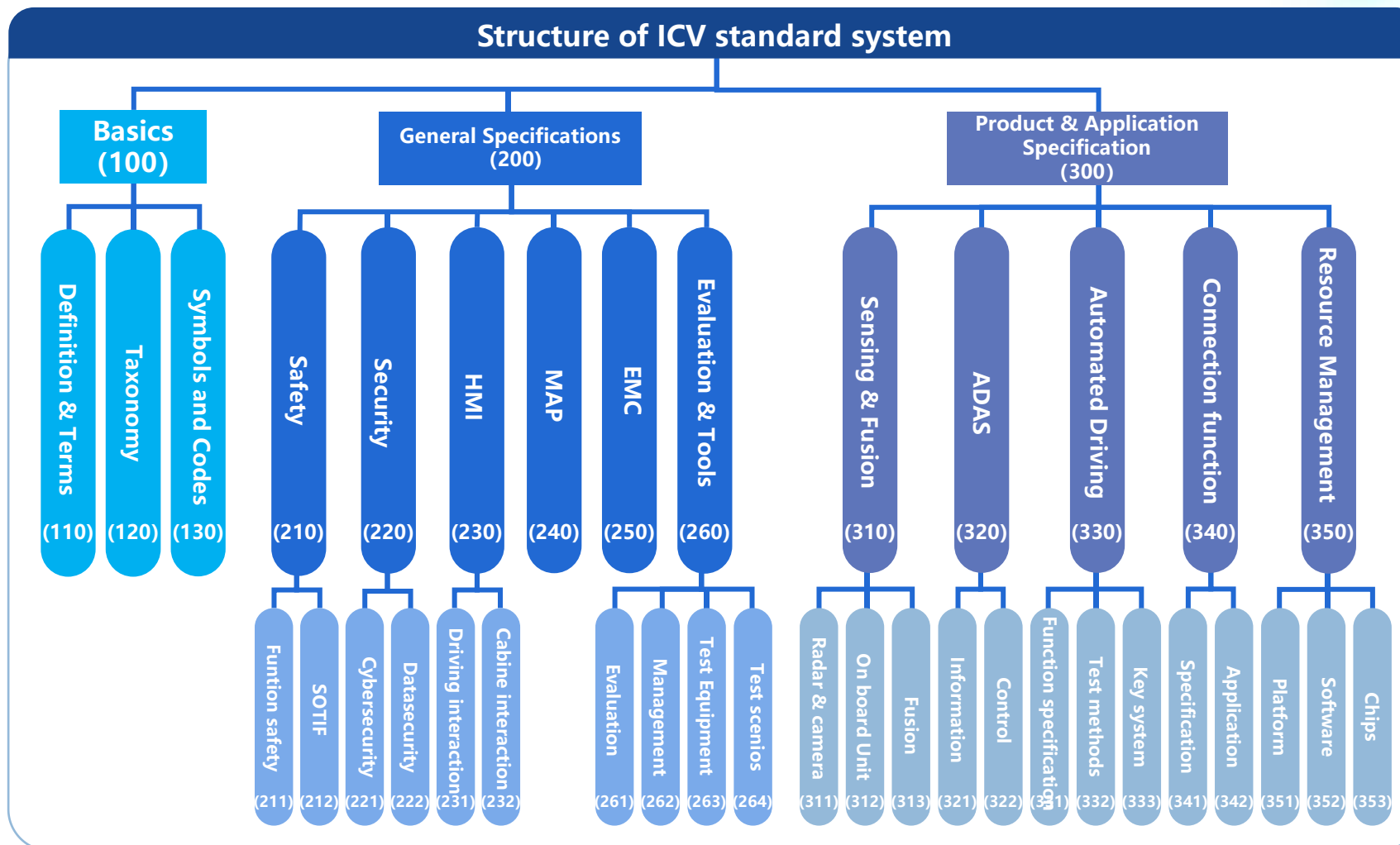
#### Support the coordinated development of individual intelligence and connected driving

◆With standards implementation effect evaluation and dynamic improvement mechanism, a vehicle-road-cloud coordinated development will be strengthened with full full scenario application.

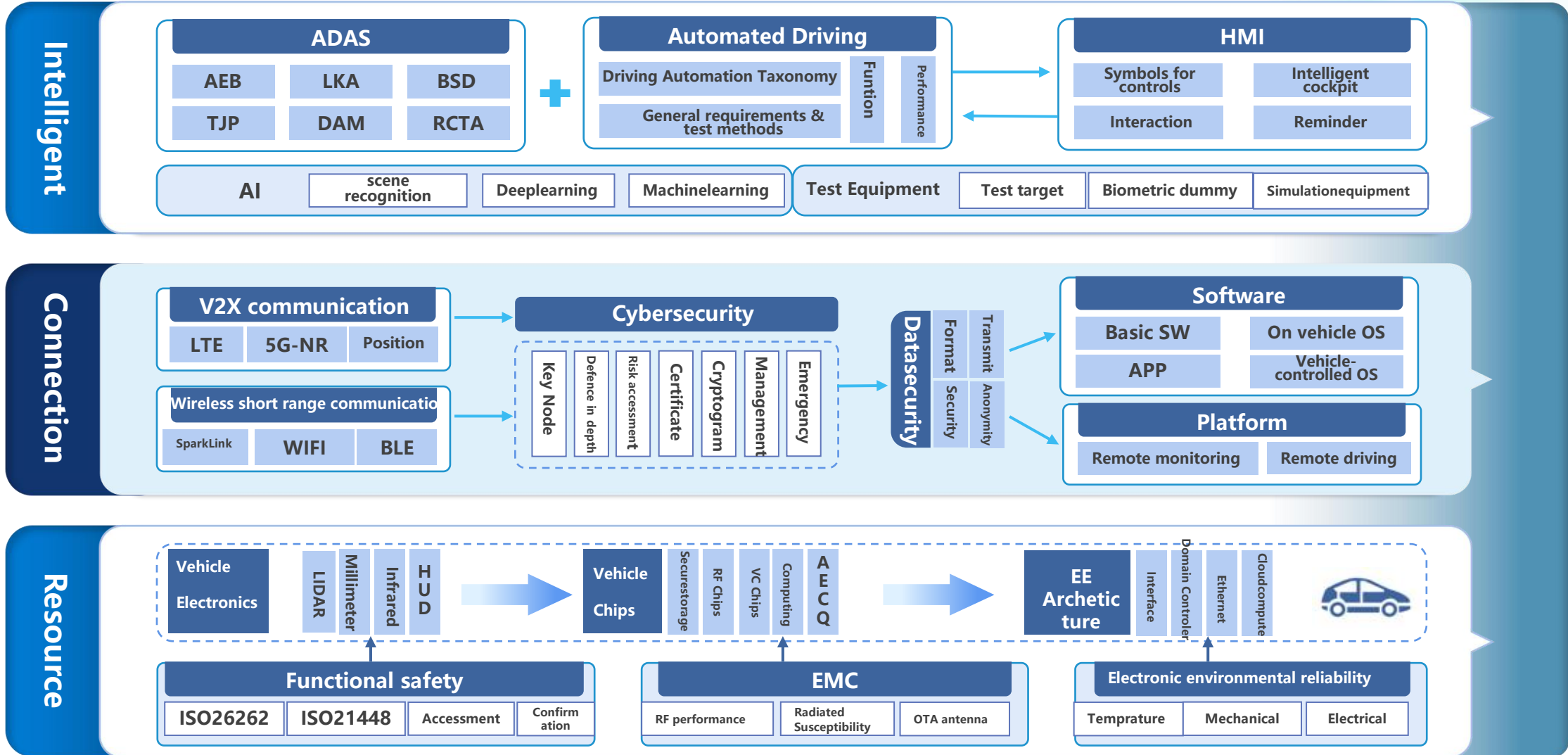
standards 140 +



## 2.2 ICV standard system (2023)



# 2.2 ICV standard system (2023)



3

# **Standards of Connected Function and Application**

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## 3.1 Overall planning of CFA

- The working group of connected function and application (CFA) of ICV has been established in 2018. It is mainly responsible for the formulation of standards related to automotive connected functions and applications. It has built a roadmap according to the ICV standard system.

### Roadmap for formulation connected functions and application standards

#### Basic standards

Taxonomy and Grading

Symbols and Encoding

#### Product and Technology Application

Vehicle Information-Exchange Terminal

Application of Connection Technology

Functional Specifications

Platform



## 3.2 Status of Standards

### Taxonomy

#### Taxonomy of Connected Vehicles

- **Project Status:** In progress
- **Type:** Standardization research project
- **The main content :** The principle or the basis for unifying the taxonomy of connected vehicles, the definitions and the related terms

### Functional Specifications

#### Intelligent and Connected Vehicle Technical specification for information assistance systems based on connected technology

- **Standard status:** Submit the application
- **Standard Type:** Recommendation
- **Scope of application:** M、 N
- **The main content:** Intersection collision warning function, vehicle safety status reminder function, roadside information reminder function and other requirements.

#### Research on standard system of remote control vehicles

- **Standard status:** Launched
- **Standard Type:** Standardization research project
- **The main content:** Study the remote parking function and remote driving function realized by communication technology, and give standardized suggestions.

## 3.2 Status of Standards

### Application of Connected technologies

#### Technical requirements and test methods for in-vehicle information interaction system based on LTE-V2X direct communication

- **Standard status :** Complete the project defense  
**Standard Type :** Recommendation
- **Scope of application :** M、 N
- **The main content:** Vehicle environment requirements, access layer and network layer configuration requirements, data consistency requirements, communication performance requirements, etc.

#### Pilot project for standardization of vehicle network functions and applications based on advanced communication technology

- **Standard status :** Launched
- **Standard Type :** Standardized pilot projects
- **The main content:** The application or potential application of advanced communication technologies such as 5G and quantum communication in the field of connected functions

### Platforms

#### Research on the standardization of ICV cloud control platform

- **Project status:** Launched
- **Type:** Standardized pilot projects
- **The main content:** It focuses on analyzing the standardization objects and specific standardization requirements for the cloud control platform, and provides suggestions for the development of specific standard projects.
- **Work plan:** The research report will be released in the third quarter of 2023

## 3.2 Overall planning of CFA

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### Roadmap for formulation connected functions and application standards

#### Basic standards

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#### Product and Technology Application

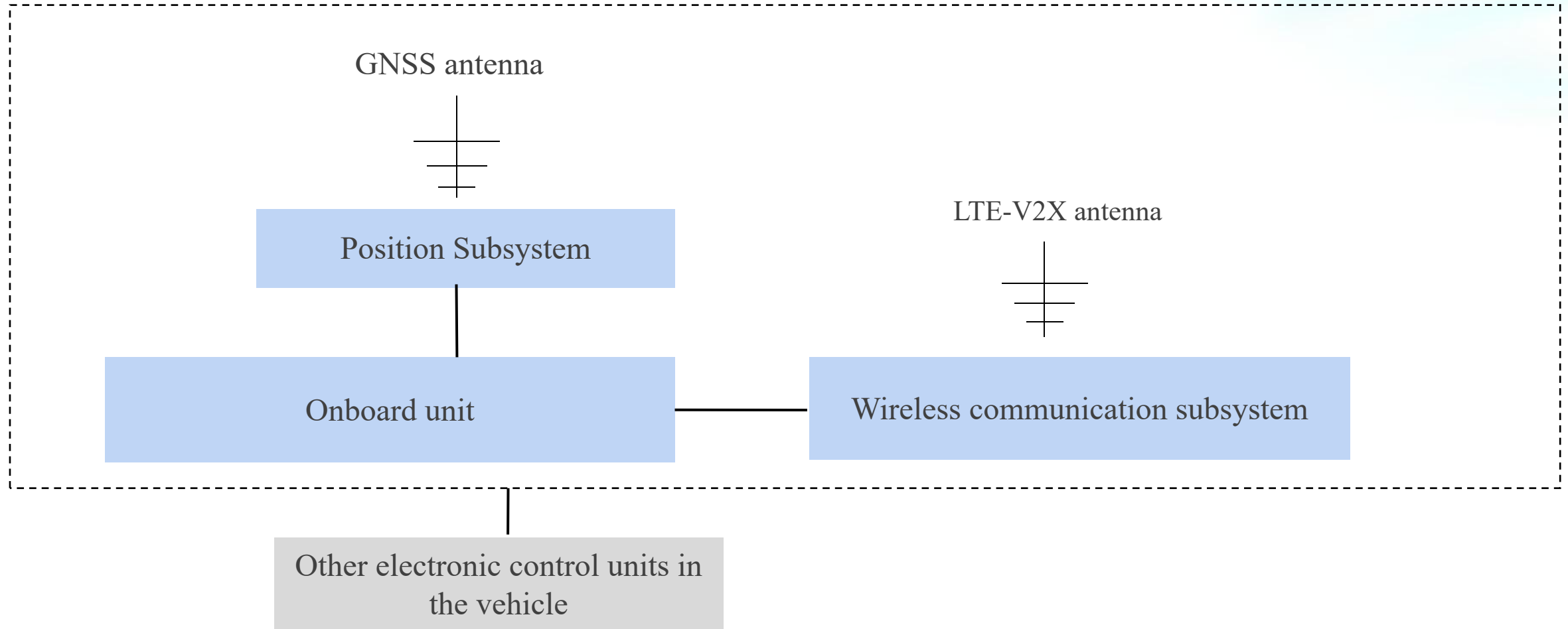
Vehicle Information-Exchange Terminal

Application of Connection Technology

Functional Specifications

Platform

### 3.3 LTE-V2X direct communication Introduction



Schematic diagram of on-board information interaction system

### 3.3 LTE-V2X direct communication Introduction

#### Environmental conditions requirements

- Electrical performance requirements
- Environmental weather resistance requirements
- Shell protection performance requirements
- Mechanical performance requirements
- Durability requirements
- Electromagnetic compatibility performance requirements

#### Functional requirements

- Application layer
- Network layer
- Access layer
- Communication security

Radio Frequency performance requirements

Antenna performance requirements

Timing positioning requirements

#### Test requirements corresponding to each technical requirement

- Electrical performance test
- Environmental weather resistance test
- Shell protection performance test
- Mechanical performance test
- Durability test
- Electromagnetic compatibility performance test

components

- Data consistency test
- Communication security test
- Electromagnetic compatibility performance test

vehicle

Radio Frequency performance test

Antenna performance test

positioning test

components and vehicle



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