

CSAE standards and CAICV Activities Update

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2022.09

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CAICV Activity and Research Project

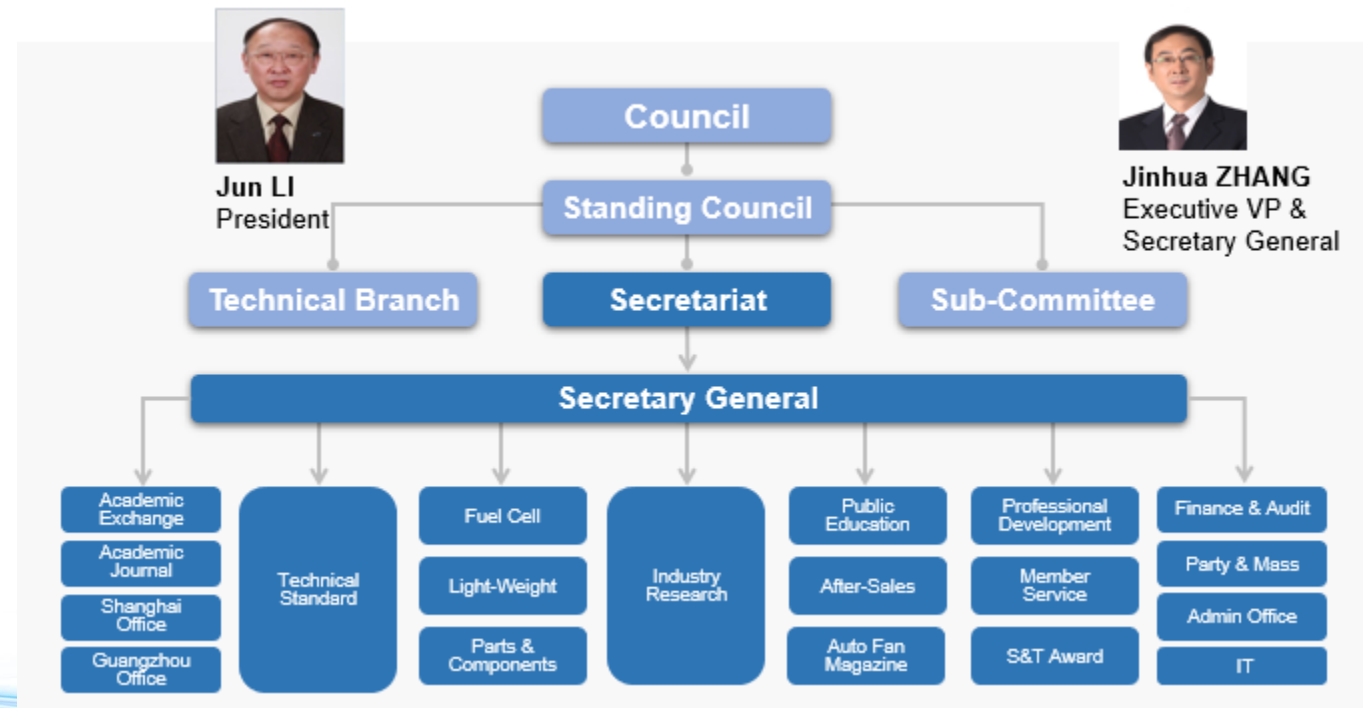
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CSAE Standards

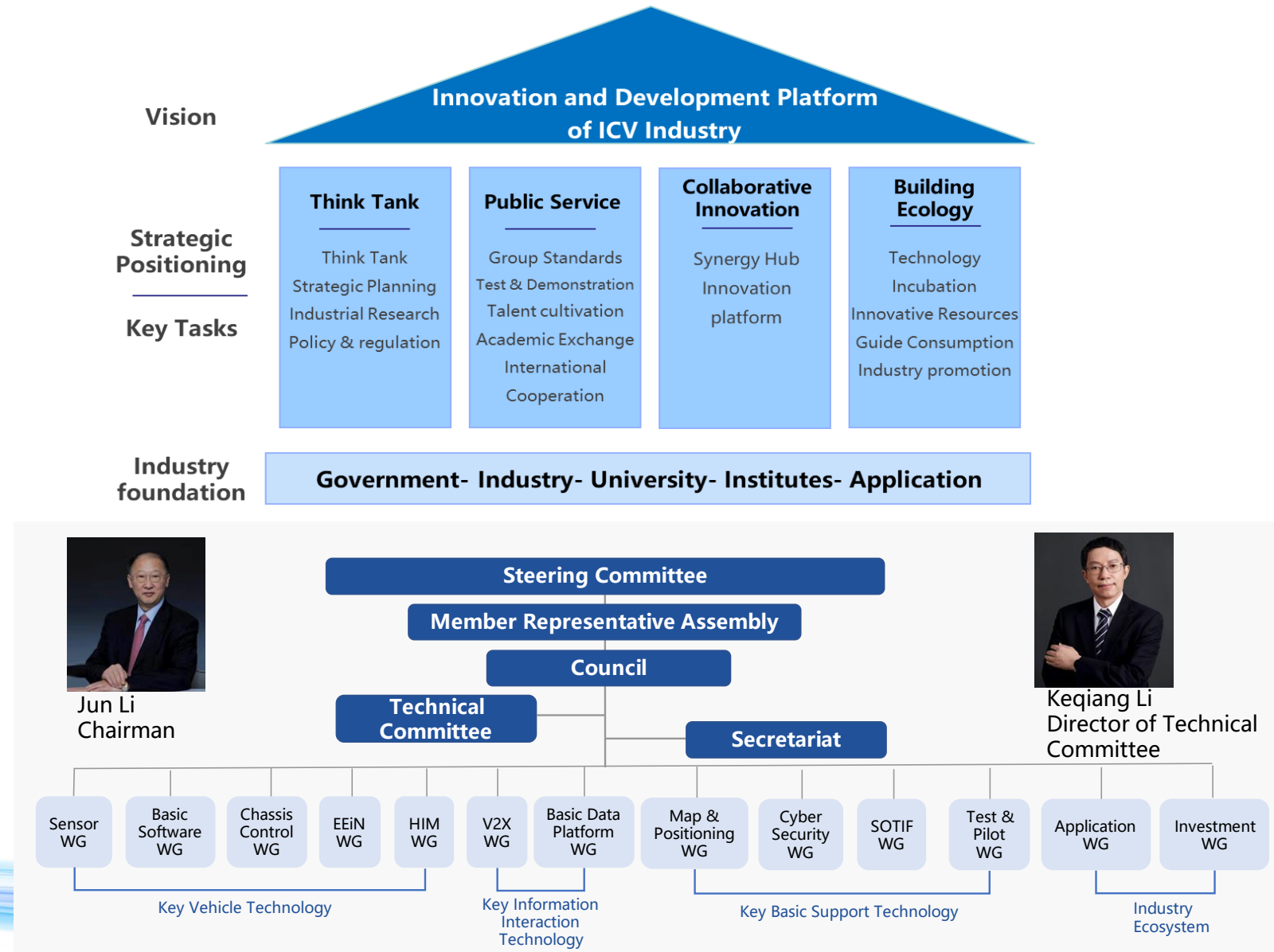
C-SAE

- **China Society of Automotive Engineers** (China-SAE or CSAE), a national academic organization, was founded in **1963**, the secretariat is set up in Beijing.
- **CSAE** main services include academic communication, automotive policy research, collaborative innovation, talent training and technical standards establishment.

Individual members: 70,000+
Registered members: 110,000+
Unit members: 1,900+



- China Industry Innovation Alliance for the Intelligent and Connected Vehicles (CAICV)** was initiated by China SAE and the China Association of Automobile Manufacturers (CAAM), with the support of MIIT on June 12, 2017.
- CAICV has more than 500 members, including companies, universities, and institutes from the automotive, telecommunication, transportation, and internet industries.
- CAICV has 13 working groups for different technical fields.



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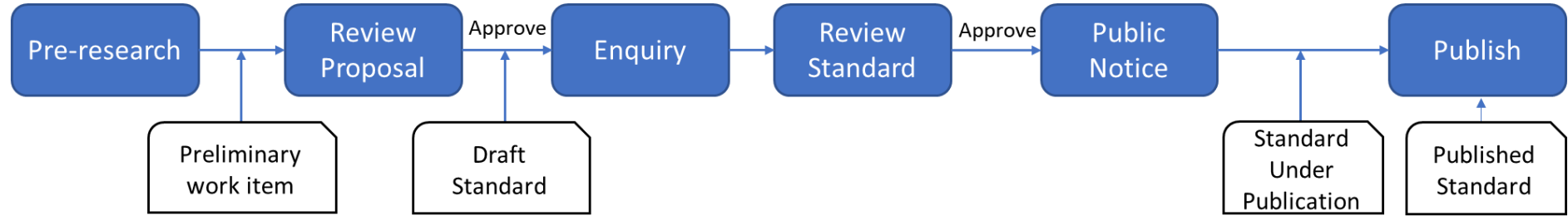
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CAICV Activity and Research Project

CSAE Standards



CSAE Standard Research Process



No	WG	Standard Name	Current Stage	Future Stage	
				Enquiry	Publish
1	V2X	Cooperative Intelligent Transportation System—Vehicular Communication Application Layer Specification And Data Exchange Standard (Phase I)	Published	/	/
2	V2X	Cooperative Intelligent Transportation System—Vehicular Communication Application Layer Specification And Data Exchange Standard (Phase II)	Published	/	/
3	V2X	Data Exchange Standard For High Level Automated Driving Vehicle Based On Cooperative Intelligent Transportation System	Published	/	/
4	V2X	LTE-Based Vehicular Communication—Direct Communication System Roadside Unit Technical Requirements	Published	/	/
5	V2X	Test and Evaluation Methods For V2X System Warning Application Function of Intelligent And Connected Vehicles	Published	/	/
6	V2X	Collaborative Intelligent Transportation Systems—Application Layer Interaction Technical Requirements Part 1: Intention and Cooperation	Proposal Approved	2022/9	2023/01

No	WG	Standard Name	Current Stage	Future Stage	
				Enquiry	Publish
7	V2X	Technical Requirement of Scenario Database and Simulation Testing for V2X Communication Application	Proposal Approved	2022/10	2023/01
8	Basic Data Platform	T/CSAE 211-2021 Security Requirements for Data Sharing of Intelligent and Connected Vehicles	Published		
13	Basic Data Platform	Technical Requirements of Regional Cloud Application of IOV Based on Public Communications Network	Standard Reviewed		
9	Basic Data Platform	ICV Cloud Control System Part 1: System Composition and Infrastructure Platform Architecture	Proposal Approved	2022/07	2022/12
10	Basic Data Platform	ICV Cloud Control System Part 2: Vehicle-Cloud Data Exchange Specification	Proposal Approved	2022/07	2022/12
11	Basic Data Platform	ICV Cloud Control System Part 3: Road-Cloud Data Exchange Specification	Proposal Approved	2022/07	2022/12
12	Basic Data Platform	ICV Cloud Control System Part 5: Platform Service Scenario Specification	Proposal Approved	2022/07	2022/12

Standards of Test & Pilot WG, Innovation & Application WG

No	WG	Standard Name	Current Stage	Future Stage	
				Enquiry	Publish
1	Test & Pilot	Cooperative Intelligent Transportation System—Technical Specifications of C-V2X Equipments Access to Vehicle-Road Collaborative Cloud Control System	Published	/	/
2	Test & Pilot	Intelligent and Connected Vehicle — Test Field Design Technical Specification	Published	/	/
3	Test & Pilot	Technical specifications of intelligent and connected vehicles public road test supervision system	Published	/	/
4	Test & Pilot	Intelligent and Connected Vehicles— Field Test Methods and Requirements for Automated Driving Functions in Special Scenarios	Proposal Approved	2022/9	2023/01
5	Test & Pilot	Intelligent and Connected Automobile Products Evaluation Guidelines	Proposal Approved	2022/9	2022/12
6	Test & Pilot	Intelligent and Connected Vehicle— Technical Requirements and Test Methods for the Automatic Driving Systems on Highway	Proposal Approved	2022/6	2022/9
7	Test & Pilot	General Requirement of Roadside Infrastructure for Vehicle Infrastructure Cooperative System	Proposal Approved		
8	Test & Pilot	Intelligent And Connected Vehicle— Method and Requirements for Naturalistic Driving Scenario Extraction	Proposal Approved	2022/04	2022/07

No	WG	Standard Name	Current Stage	Future stage	
				Enquiry	Publish
12	Innovation & Application	Memory Parking System Technical Requirements	Proposal Approved	2022/9	2022/12
10	Innovation & Application	General Technical Requirements of Automated Valet Parking Systems	Published		
11	Innovation & Application	Automated Valet Parking —Field Test Methods and Requirements	Enquiry	2022/9	2022/12
13	Innovation & Application	Data exchange contents of communication between vehicle and parking lot of AVP system	Proposal Approved	2022/10	2023/02
14	Innovation & Application	Automated valet parking—Technical requirements of parking lots (garage)	Proposal Approved	2022/12	2023/4
15	Innovation & Application	Functional unmanned vehicle — Part 1: Terms and definitions	Proposal Approved	2022/9	2023/2
16	Innovation & Application	Functional unmanned vehicle — Part 2: General technical requirements	Proposal Approved	2022/9	2023/2
17	Innovation & Application	Functional unmanned vehicle— Technical Requirement of Autonomous Driving Function Field Test	Proposal Approved	2022/9	2023/2

Cooperative intelligent transportation system Technical requirements for application layer interaction Part 1: intention sharing and cooperation



- Purpose: Enhance the 12 scenarios listed in T/CSAE 157-2020 (Phase II).
- Scope: This document specifies the technical requirements for application layer interaction in the intention and cooperation classification, including general requirements, scenario requirements, process requirements, data interaction requirements and message sets.

12 scenarios (T/CSAE 157-2020)

No	Application name
1	Sensor Data Sharing
2	Cooperative Lane Change
3	Cooperative Vehicle Merge
4	Cooperative Intersection Passing
5	Differential Data Service
6	Dynamic Lane Management
7	Cooperative High Priority Vehicle Passing
	7.1 Lane Reservation Scenario
	7.2 Lane Prohibition/Closure Scenario
	7.3 Cooperative Signal High Priority Passing Scenario
8	Guidance Service in Parking Area
9	Probe Data Collection
10	Vulnerable Road User
11	Cooperative Platooning Management
12	Road Tolling Service

Scenario classification based on functional purpose (It is also the name of series standards)

- Part 1: Intention and cooperation
- Part 2: Perception data sharing
- Part 3: Management
- Part 4: Advanced information services
- Part 5: Vulnerable road user

2 ways of cooperation

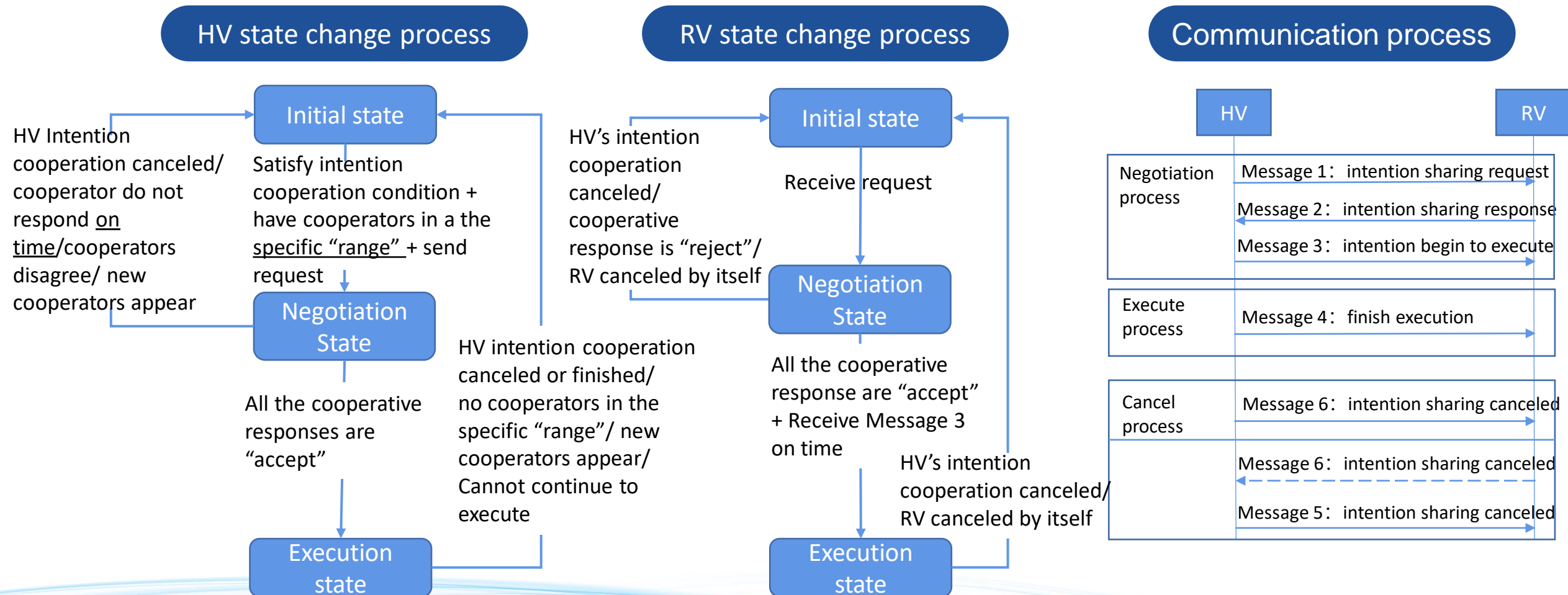
- HV who sending the intention cooperation request can achieve **vehicle-vehicle cooperation** by interacting with the collaborator RVs;
- HV can achieve **vehicle-road cooperation** by interacting with the roadside device.
- This standard does not prescribe which kind of interaction should be triggered in the scenario.

Scenarios	Road	V-V	V-I
Cooperative lane change	Highway, suburban area, closed park	√	√
Cooperative Vehicle Merge	Highway/city expressway entrance, service area exits, merging lanes	√	√
Cooperative Intersection Passing without signal	Intersection of urban road, suburban area, closed park	√	√
Cooperative Intersection Passing with signal	Intersection of urban road, suburban area, closed park		√

Cooperative intelligent transportation system Technical requirements for application layer interaction Part 1: intention sharing and cooperation



Example: vehicle-vehicle collaboration

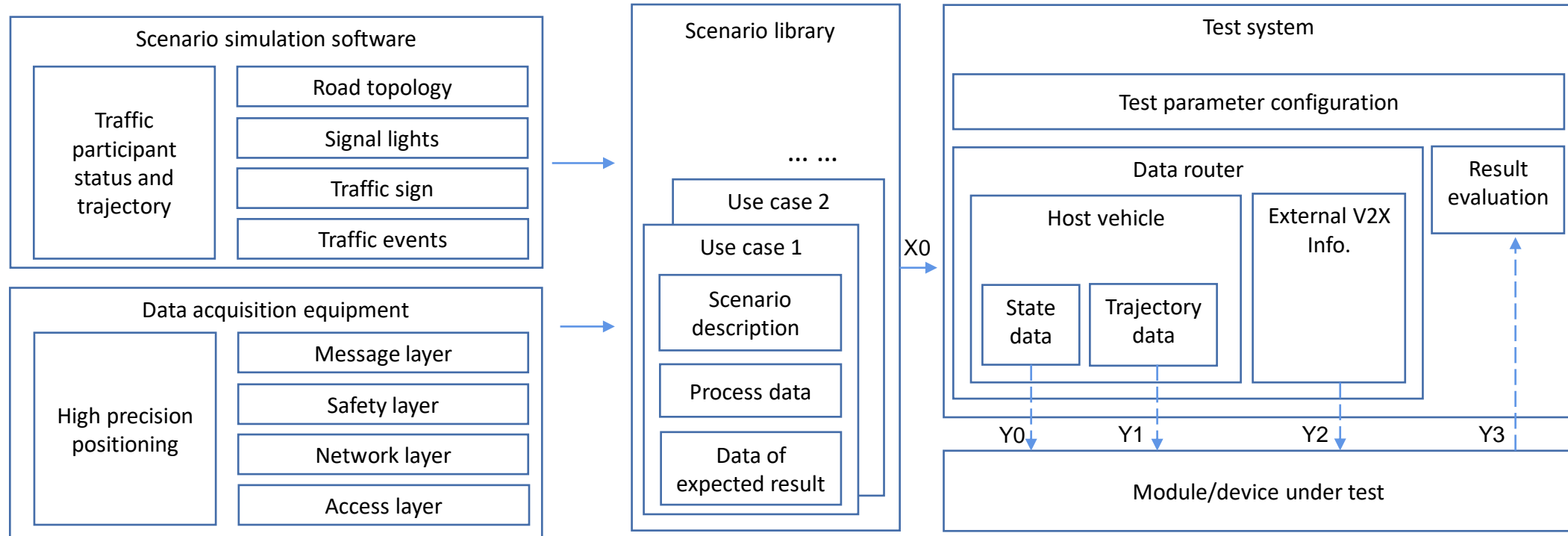


*Did not specify the detection range of communication RVs at present

*Did not specify the time range at present

Technical requirement of scenario database and simulation testing for V2X communication application

□ Scope: This document specifies the V2X-based scenario library's data requirements, the architecture of the scenario data collection system, X-in-the-loop process and relevant interface requirements.



Element	Description
Scenario description	Scenario type, road type, with/without map, stack protocol, DUT details
Process data	A group of data frame based on time sequence, each frame includes current status of host vehicle and all the external V2X messages
Data of expected result	including the warning type, begin/end time of warning, priority etc. (Refer to T/CSAE 246-2022)

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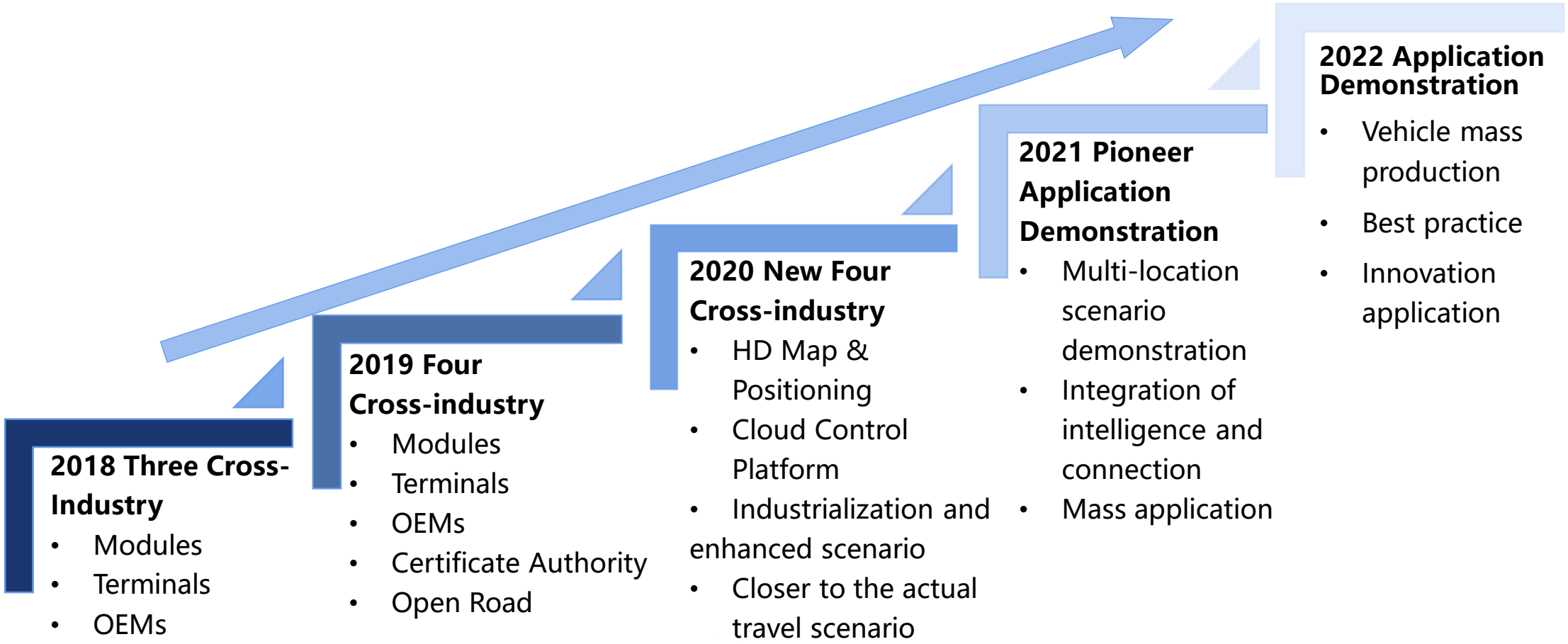
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CAICV Activity and Research Project

Series of C-V2X Demonstration Activities



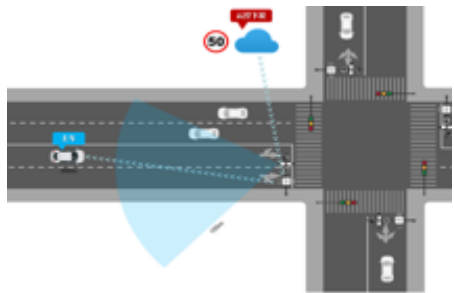
□ CAICV and IMT2020 build a **cross-industry** collaborative testing and verification platform



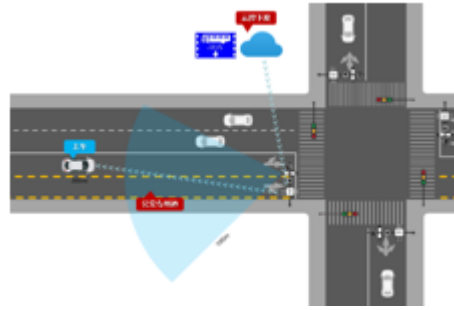
□ Fully verify LTE-V2X technology and related standards and further promote the industrialization of C-V2X in China.

2022 Application Demonstration Details

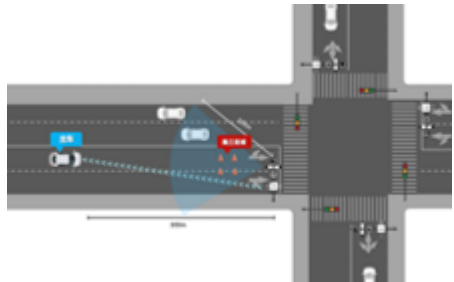
Test scenarios



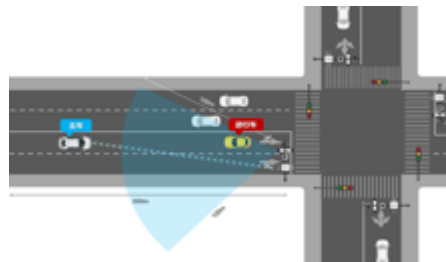
Speed limit warning



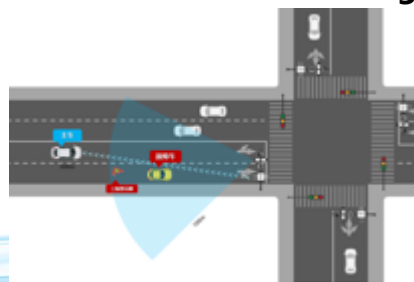
Bus lane warning



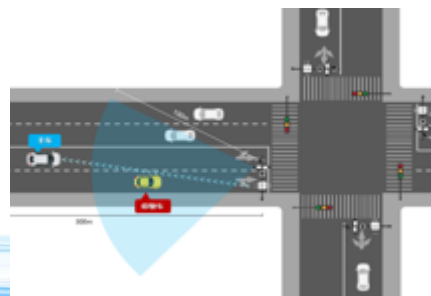
Road occupation for construction warning



Vehicle reversing warning

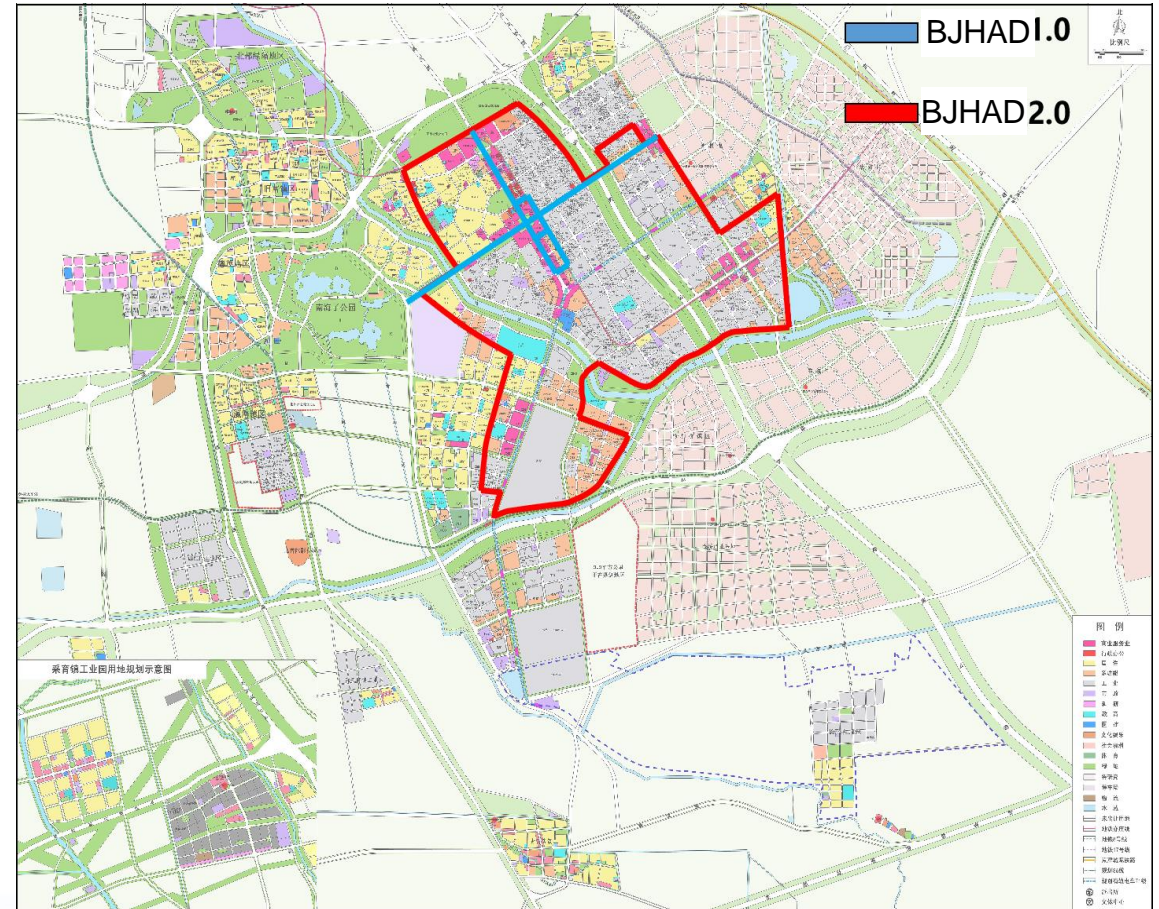


Vehicle malfunction warning



Abnormal parking warning

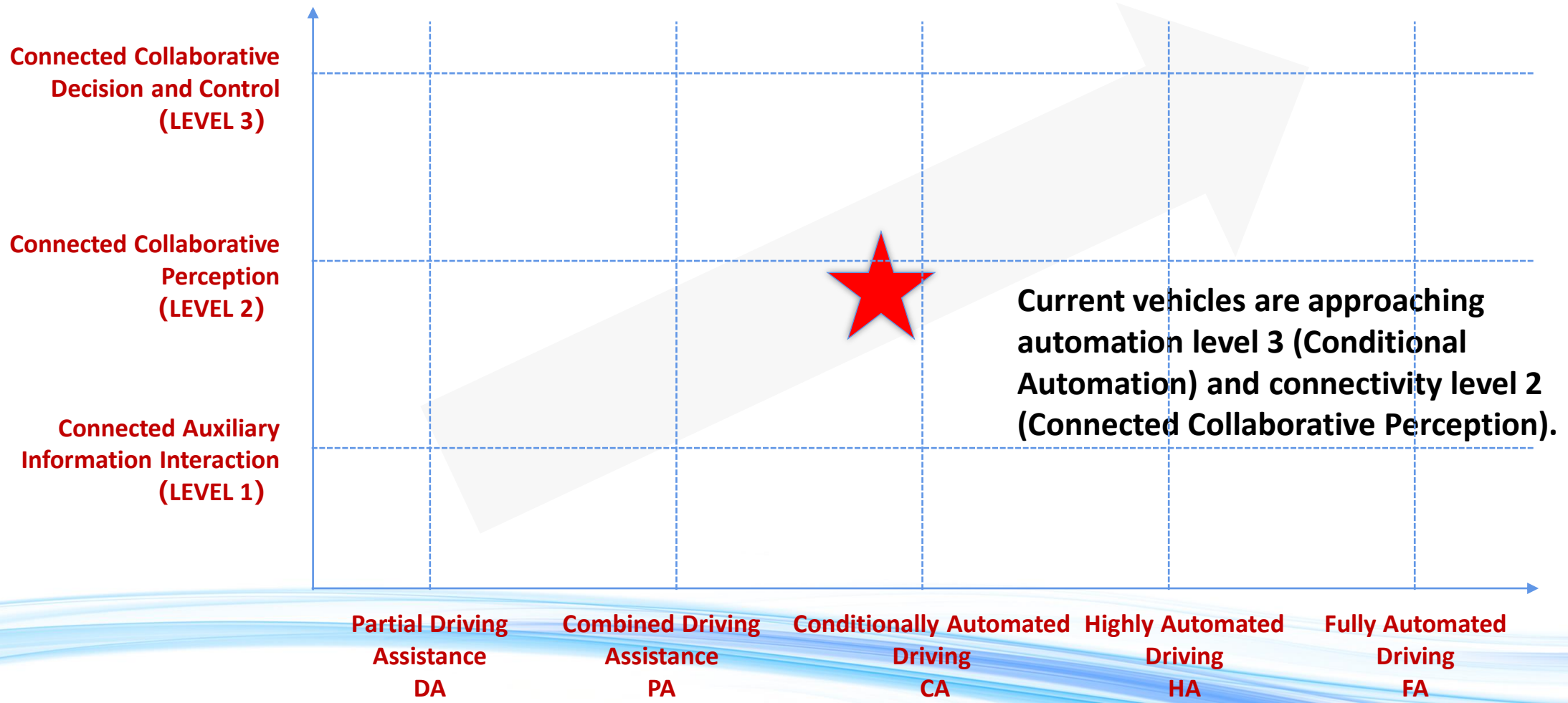
Beijing High-Level Autonomous Driving Demonstration Area (BJHAD) Construction Outcome



Technology Roadmap for Intelligent & Connected Vehicles (Version 1 & 2)



- In 2019, the Roadmap proposed a classification method of integrating automation and connectivity, with 5 levels of automation and 3 levels of connectivity.
- The fully autonomous Driving will realize by the convergence of automation and connectivity.



Roadmap for the convergence development of automation and connection based on C-V2X technology



- Provide guidelines of function development and application scenarios to enterprises.
- Promote cross-industry collaboration and facilitate policy implementation.

Chapter 1 Current status

Chapter 2 Industrial development problems

Chapter 3 Objective and timeline of convergence development

3.1 Long-term objectives

3.2 Medium-term objectives

3.3 Objectives for 2025

Chapter 4 Convergence scenarios

Chapter 5 Main Task

5.1 Direction for technology development

5.2 Test and evaluation

Chapter 6 Recommendation for policy and regulation development

Fieldwork on:

- The long tail problem of automation vehicle
- The current mass production application of connection function

Research on:

- The connection use case which is suitable for industrialization
- The classification of connection functions



中国智能网联汽车产业创新联盟

China Industry Innovation Alliance for the Intelligent and Connected Vehicles

Thanks



CSAE

<http://www.sae-china.org/>



CICV

<http://www.china-icv.cn/>



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