Overview of China ICV standards development and automated driving road test/demonstration

CATARC
November, 2021
01 China ICV standards System framework

02 Progress of China ICV standards

03 Recent activities in China
1. Internet of Vehicles Standard System Framework

- **ICV standards system**
  - Relevant standards
  - Basis and fundamental
  - General specification
  - Product and application
  - Resource management and information services
  - Relevant standards

- **Information and communication standard system**
  - Communication protocol and equipment
  - Communication service and technology

- **Cybersecurity and data security**
  - Vehicle electronics
  - Network equipment

- **Vehicle electronic and cybersecurity**
  - Electronic product and service standard

- **ITS standards**
  - Basis standards
  - Vehicle intelligent management standard

- **Technology standards**
  - Product standards
  - Relevant standards

- **Safety standards**
  - Safety operation test and specification management
2. ICV Standard System Framework

ICV standards system

- Basis and fundamental
- General specification
- Product and application
- Resource management and information services
- Relevant standards

- Terms and definitions
- Classification and symbols
- Identification and evaluation
- Functional HMI
- Functional safety
- Cybersecurity
- Information sensing
- Pre-warning
- Automated control
- Information interaction
- Information platform
- Functional software
- Operating system
- Functional application
- Communication protocol
- Data application
- Interface

Standard projects

- 56 standards have been launched in total
- Standard publication-11
- Final text for approval-10
- New project registered-29

Pre-research projects

- 29 Standard Research Project
- Research released-23
- In research-6
3. Organizational structure of SC34 on ICV

Organizational structure

**SAC/TC 114**

- SC 34 on ICV
- Established in December 2017

**HEAG**

- Cyber security
- Resource management and Information service

**FEAG**

- Automated Driving
- Communication function

Members:
- OEMs, Parts supplier, Testing organization etc from Europe, America, Japan, China and other countries.

**Scope:**
- vehicle driving environment perception and pre-warning, driving assistance, automated driving and vehicle information service etc

Foreign Experts Advisory Group established in June 2018 composed by authoritative technical experts, scholars or officials from the United Nations, ISO, SAE, Europe, America, Japan, China etc. Provide consulting for Chinese ICV standardization.

Harmonization Experts Advisory Group established in August 2018 composed by OEMs, testing institutions and Internet companies etc, all of them from China. harmonization of international standards and regulations of China ICV in the field of WP.29/ISO/IEC.
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1. Advanced Driver Assistance System

Based on ADAS standardization roadmap, 23 standard projects have been launched, among them, publication-6, final text for approval-8

### ADAS Roadmap

<table>
<thead>
<tr>
<th>Project</th>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>AEBS of passenger car</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>LKA of passenger car</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>ESC commercial vehicle</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>BSD</td>
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<tr>
<td>5</td>
<td></td>
<td>LKA of commercial vehicles</td>
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<tr>
<td>6</td>
<td></td>
<td>RCTA</td>
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<tr>
<td>7</td>
<td></td>
<td>Night vision</td>
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<td>8</td>
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<td>9</td>
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<td>DOW</td>
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<td>10</td>
<td></td>
<td>DMS</td>
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<tr>
<td>11</td>
<td></td>
<td>Intelligent speed limit</td>
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<tr>
<td>12</td>
<td></td>
<td>full speed range ACC</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>combined driver assistance system: 2 parts</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>AVM</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Test device for ADAS and AD: 4 parts</td>
</tr>
</tbody>
</table>

- **Publication**: Green
- **Final Text for Approval**: Blue
- **Project Proposed for Registration**: Gray
- **Drafting Stage**: Black

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7/15
13 standard projects have been launched, among them, publication 1. final text for approval-2

Principle: follow the same logic for urban roads and highways, but carry out standardization work independently

Taxonomy of AD level
Proving ground test
terms and definitions of ICV
Evaluation Guidelines for AD Functions
DSSAD
Real road test

General functional requirements for AD
Operational design condition
AD applications in constrained areas
Auto-parking

Vehicle positioning system

- publication
- final text for approval
- project proposed for registration
- idrafting stage
3. Communication Function & Application

6 standard projects have been launched, among them, 2 automobile industry standards, new project registered-2

- **CFA standard subSystems**
  - Basic
    - Terms and definitions
    - Classification and Coding
  - General specification
    - Vehicular communication system
    - Functional evaluation
  - Specific application
    - DAY I: Driving safety related
    - DAY II: Fusion with perceptual information
    - DAY III: For collaborative automated driving

- **Extended vehicle (ExVe) methodology**
- **LTE-V2X PC5**
- **On board short range wireless communication**
- **Vehicular cable**

- new project registered
- project proposed for registration
- drafting stage
4. CS & RMIS

Cybersecurity

- Terms and definitions
- Concept and process
- General specification
- risk assessment
- security protection
- Test evaluation

Resource Management and Information Service

- Hardware: High performance AD information processing unit
- Software: Vehicle operating system
- Platform: Vehicle and remote computing and service platform
- Data: Vehicle data resource management and Application
- Application: Standardization Requirement analysis and coordination of ICV

10 standard projects have been launched, publication-4, final text for approval-1, new project registered-3

3 standard projects have been launched, project proposed for registration-2
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03 Recent activities in China
1. China actively strives for the construction of ICV demonstration area/pilot area

- At present, Wuxi in Jiangsu, Xiqing in Tianjin, Changsha in Hunan, Liangjiang New Area in Chongqing and other places are actively striving for the construction of national pilot areas of Internet of vehicles, and jointly promoting the cross industry integration of IoV, AI and ITS.
2. Demonstration Application of ICV is Booming in China

- Actual road test is the only way for the commercial implementation of ICV. Actual road test has been carried out on a large scale nationwide. In order to meet the needs of technology R&D and business model exploration, the test scenarios are more diversified and the test contents are more open.

- Automated driving test areas have sprung up all over the country in recent years. According to incomplete statistics, up to now, nearly 30 provinces, cities and regions have issued detailed rules for the implementation of road test for ICV.

### Actual Test Road License Plate and Road Situation in China

- **Number of licensed cities**: 27
- **Cumulative number of ICV road test licenses issued**: 750+
- **Accumulated open road mileage**: 2800km
- **Open road cumulative test mileage**: 3.21 million km
- **Attracting financing amount in 2020**: $20 billion
- **Proportion of new energy vehicles participating in the test**: 80%

#### Notes:
- As of January 2021, the relevant data of the open road are sorted out according to the data published on the Internet.
3. Expressway Test Scene Gradually available

- Urban roads and expressways are considered to be the most easily scenarios to implementation the IoV. In addition to the above demonstration areas, the demonstration applications of ICV are also gradually carried out in the expressway scenarios.