Overview of China ICV standards development and proposals for UN/WP.29/GRVA

Sun Hang, CATARC
December, 2020
01 China ICV standards System framework

02 Progress of China ICV standards

03 Proposal for next steps of GRVA
1. ICV Standard System Framework

- Basis and fundamental terms and definitions
- Classification and symbols
- Identification and evaluation
- HMI
- Functional safety
- Cybersecurity
- Information sensing
- Pre-warning
- Driving assistant control
- Automated control
- Information interaction
- Communication protocol
- Interface

ICV standards system

- General specification
- Product and application
- Relevant standards

Standard projects
- 53 standards have been launched in total
- Final text for approval - 5
- New project registered - 13

Pre-research projects
- 23 Standard Research Project
  - Research released - 18
  - In process - 5
2. Organizational structure of SC34 on ICV

**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 and other countries.
- 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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Based on ADAS standardization roadmap, 23 standard projects have been launched, among them, publication-5, new project registered-7
2. An example for ADAS standards—DMS

**Functional requirements**

System monitoring behavior definition and warn conditions

<table>
<thead>
<tr>
<th>behavior</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>eyes closed</td>
<td>Complete closure of eyelids</td>
</tr>
<tr>
<td>yawn</td>
<td>The aspect ratio of mouth opening is greater than 0.6</td>
</tr>
<tr>
<td>Abnormal head posture</td>
<td>Head twist angle ≥ 45° left and right, ≥ 30° up and down</td>
</tr>
<tr>
<td>Receiving and Making Calls</td>
<td>The distance between the phone and the face is within 5cm</td>
</tr>
<tr>
<td>smoking</td>
<td>Hold the cigarette within 2cm to the mouth</td>
</tr>
</tbody>
</table>

**Performance requirements**

**Accuracy rate**

The ratio of the correct number of a behavior to the number of detected events

**Detection rate**

The ratio of the correct number to the number of real events of a behavior

**test method**

- Dummy driver
- Human driver

- The single test shall be repeated 10 times
- Validate the influence on the system from respective light angles and conditions (forward, backward, lateral, night)
- The simulation driver validates the real-time performance and detection rate of the system through repeated actions
- Multiple drivers are responsible for validating the detection ability of random drivers
3. Automated Driving

13 standard projects have been launched, among them, final text for approval-1, standard projects approved-2

AD standards

- OEDR
- HMI
- MRM
- Simulation
- Proving ground
- Real road
- DSSAD

Terms and definitions

Taxonomy of AD level

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

- final text for approval
- new project registered
- project proposed for registration
- idrafting stage

Vehicle positioning system
## 4. Communication Function & Application

### Terms and definitions

- Day I: Driving safety related
- Day II: Fusion with perceptual information
- Day III: For collaborative automated driving

### Classification and Coding

- Functional evaluation
- Vehicular communication system

### 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
## 5. An example for CFA standardization—LTE-V2X PC5

### Composition of Project Group

| CATARC | Qualcomm | BMW | DAIMLER | volkswagen | TOYOTA | FORD | Some Chinese Enterprises |

### System Overview

<table>
<thead>
<tr>
<th>Vehicular communication system</th>
<th>GNSS antenna</th>
<th>Positioning subsystem</th>
<th>V2X antenna</th>
<th>Wireless communication subsystem</th>
<th>Vehicular processing unit</th>
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### General requirements

- **Electrical performance**
- **Weatherability**
- **Enclosure protection**
- **Mechanical properties**
- **Durability**
- **EMC**

### System function

- **Access layer**
- **network layer**
- **application layer**
- **Security layer**

### Communication performance

- **RF performance**
- **Antenna performance**

### Timing and positioning

- **Positioning requirement**
- **Timing**

### Test methods

- **system test**
- **Vehicle test**
### 6. CS & RMIS

#### Cybersecurity

<table>
<thead>
<tr>
<th>Basic general</th>
<th>Generic Technology</th>
<th>Relevant standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms and definitions</td>
<td>risk assessment</td>
<td>Network Communications</td>
</tr>
<tr>
<td>Concept and process</td>
<td>security protection</td>
<td>Platform facilities</td>
</tr>
<tr>
<td>General specification</td>
<td>Test evaluation</td>
<td></td>
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</tbody>
</table>

#### Resource Management and Information Service

<table>
<thead>
<tr>
<th>Hardware</th>
<th>High performance AD information processing unit</th>
</tr>
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<tbody>
<tr>
<td>Software</td>
<td>Vehicle operating system</td>
</tr>
<tr>
<td>Platform</td>
<td>Vehicle and remote computing and service platform</td>
</tr>
<tr>
<td>Data</td>
<td>Vehicle data resource management and Application</td>
</tr>
<tr>
<td>Application</td>
<td>Standardization Requirement analysis and coordination of ICV</td>
</tr>
</tbody>
</table>

13 standard projects have been launched, final text for approval-4, new project registered-2

3 standard projects have been launched, project proposed for registration-2
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1. Proposal for next steps of GRVA

1. Good coordination between VMAD and FRAV needs to be established

To ensure the requirements both from overall and specific perspective are aligned, deliverables from both IWGs should have defined interface for exchange, and both IWGs need create more opportunities to work together in order to figure out how to match each other.

2. Framework for the regulation on ADS needs to be established first

A pre-designed framework for the final regulation(s) would serve as guideline for individual IWGs to work efficiently. It is recommended that the highway and urban can share the same overall framework and specific requirements for each could be varied.

3. Consideration of ADAS

ADAS has great potential in promoting road traffic. Besides ADS, ADAS should not be neglected. If needed, China volunteered to daft a preliminary list of ADAS working items for the consideration of GRVA.