Introduction of Chinese Mandatory National Standard GB "Automobile Event Data Recorder"
DEVELOPMENT PROCESS & STANDARD FRAMEWORK

STANDARD CONTENT

STANDARD IMPLEMENTATION
BACKGROUND
BACKGROUND

Current EDR Regulations & Standards Around the World

Main Concern

1. There are many traffic accidents and complicated situations in China.

2. With the rapid development of intelligent connected vehicles and new energy vehicles, higher requirements are put forward for vehicle safety protection measures. We want to propose requirements for EDR systems that are in line with China’s current and future developments.

3. Support an implementation independent of the airbag system.

4. EDR system should be suitable for the status quo of domestic enterprises.

5. Unified data reading scheme is required.
DEVELOPMENT PROCESS & STANDARD FRAMEWORK
DEVELOPMENT PROCESS

- **Begin**: 2016.03
- **Draft**: 2016.09
- **Project approval**: 2017.09
- **Solicit comment**: 2018.06
- **Submit for review**: 2019.03
- **Submit for approval**: 2019.06
STANDARD CONTENT
STRUCTURE OF EDR STANDARD

- Technical Requirements
- Test Methods and Requirements
- Appearance and Identification
- Type Inspection
- Manual
- Standard Implementation (TBD)

C-EDR
TECHNICAL REQUIREMENTS

- Impact Event Requirements
- Data Record Requirements
- Data Function Requirements
- Data Retrieval Requirements
IMPACT EVENT REQUIREMENTS

Trigger Threshold

Locking Condition

Beginning of Event

End of Impact Event
DATA RECORD REQUIREMENTS

**Level A (17)**
Data that shall be recorded when vehicles are equipped with EDR system.

**Level B (43)**
Relevant data that should be recorded when vehicles with EDR system are equipped with relevant devices or have relevant functions.

<table>
<thead>
<tr>
<th>Level A Data Element</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral delta-V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Recorded Lateral delta-V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clipping Flag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Velocity</td>
<td></td>
<td></td>
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<tr>
<td>Acceleration pedal position%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revolution per minute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power-on cycle at event</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power-on cycle at retrieving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time interval from this event to the last event</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECU hardware number that records EDR data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECU software number that records EDR data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECU serial number that records EDR data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Service brake, on or off
Driver seatbelt status
Complete status of event data record
### DATA RECORD REQUIREMENTS

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral acceleration</td>
<td></td>
</tr>
<tr>
<td>Lateral delta-V</td>
<td></td>
</tr>
<tr>
<td>Maximum Recorded Lateral delta-V</td>
<td></td>
</tr>
<tr>
<td>Square of Maximum Recorded Resultant delta-V lateral</td>
<td></td>
</tr>
<tr>
<td>Time to Maximum Recorded delta-V, Resultant</td>
<td></td>
</tr>
<tr>
<td>Pre-event synchronization timing time</td>
<td></td>
</tr>
<tr>
<td>Yaw Angle Velocity</td>
<td></td>
</tr>
<tr>
<td>Steering Angle</td>
<td></td>
</tr>
<tr>
<td>Steering Lamp Status</td>
<td></td>
</tr>
<tr>
<td>Gear Position</td>
<td></td>
</tr>
<tr>
<td>Engine Throttle Position</td>
<td></td>
</tr>
<tr>
<td>Brake Pedal Position</td>
<td></td>
</tr>
<tr>
<td>Parking System Status</td>
<td></td>
</tr>
<tr>
<td>Resultant Yaw Angle</td>
<td></td>
</tr>
<tr>
<td>Velocity</td>
<td></td>
</tr>
<tr>
<td>Steering Angle</td>
<td></td>
</tr>
<tr>
<td>Tire Pressure Monitoring System Warning Status</td>
<td></td>
</tr>
<tr>
<td>Braking System Warning Status</td>
<td></td>
</tr>
<tr>
<td>Occupant Protection System Warning Status</td>
<td></td>
</tr>
</tbody>
</table>

- **Data Element**: B
- **Working status and event status**: (not shown)
- **Level 2**: (not shown)
- **Restraint system**: (not shown)
- **Active system**: (not shown)
- **Time**: (not shown)

- **Driver’s seat belt pretensioner Deployment time**
- **Driver’s front airbag Deployment time (phase I)**
- **Driver’s front airbag Deployment time (phase II)**
- **Driver’s side airbag Deployment time**
- **Driver’s side air curtain Deployment time**
- **Front-row passenger seat belt pretensioner Deployment time**
- **Front-row passenger’s front airbag suppression status**
- **Front-row passenger’s front airbag Deployment time (phase I)**
- **Front-row passenger’s front airbag Deployment time (phase II)**
- **Front-row passenger’s side airbag Deployment time**
- **Front-row passenger’s side air curtain Deployment time**

#### Anti-brake system status

- **AEB status**
- **Electronic stability control system status**
- **Traction control system status**

#### Cruise Control system status

- **Adaptive Cruise Control system status**

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<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>Minute</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

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**Note**: The table above is designed to illustrate the data record requirements and includes placeholders for specific data elements and statuses.
DATA RECORD FUNCTION REQUIREMENTS

Storage media and storage frequency requirements

- Non-volatile storage medium
- At least 3 times of impact event data.

Storage coverage mechanism requirements

- **Unlocked event** data should be overwritten by subsequent un-locked event data, in chronological order.
- **Locked event** data should not be overwritten by data from subsequent events.
- **For unlocked events**, the manufacturer is allowed to set other storage coverage mechanisms.

Power-off storage requirements

- Data **before** $T_0$ **and after** $T_0$ to $(150\pm10)$ ms should be recorded.
DATA RETRIEVAL REQUIREMENTS

1 Unified data retrieval connector

GB/T 34589-2017 “Road Vehicles diagnostic connector”

2 Unified data retrieval protocol

- Use diagnostic service 0x22 “ReadDataByIdentifier” in ISO 14229 “Road Vehicles unified diagnostic service” to retrieve EDR data.
- Compatible with CAN bus and k-line.
- Compatible with functional addressing and physical addressing.
- Compatible with 11-bit and 29-bit CANID.

3 Unified data retrieval ID

0xFA13, 0xFA14 and 0xFA15

Where,
- 0xFA13 for the most recent event,
- 0xFA14 for the second event from the bottom,
- 0xFA15 for the third event from the bottom.

4 Unified data arrangement

Unified data range, accuracy, resolution and data arrangement order
Test Methods

- Impact Test
- Driver Operation Data Test
- Bench Test
Add acceleration and airbag deployment time measurement to the existing mandatory impact test, and compare the results measured in the laboratory and recorded by to verify the accuracy of dynamic data after collision.

Driving Operation Data Test

Enable the vehicle to reach the trigger in any way:
-- hit the vehicle
-- fix the vehicle with the pallet, and hit the pallet
-- physically trigger the EDR
-- input trigger signal to the EDR
The impulse waveform of acceleration is applied to the EDR controller by the shock testing machine to verify the EDR trigger, storage times, coverage mechanism and power off storage requirements.
1. This standard is expected to enter into force gradually in China.

2. China would like to contribute our EDR standard development experience to the WP.29 for future development of EDR regulation if it will be developed under 1958 agreement.

3. And China also suggests to adopt this standard into the Compendium of Candidate GTR, if a GTR for EDR is going to be developed by WP.29.

4. China is looking forward to participating the working group for EDR issues. And Chinese delegates would like to further elaborate the details in the IWG level.

For specific discussion please contact Ms. Wu Hanbing by email: wuhanbing@catarc.ac.cn
THANK YOU!