Submitted by the expert from OICA

Informal document GRSG-111-39
(111th GRSG, 11-14 October 2016,
Agenda item 13)

AECS
Accident Emergency Call System
1. Regulatory framework for emergency call systems

1. Russia: ERA Glonass (Accident Emergency Response system)
   Eurasian Custom Union: Russia, Belarus, Kazachstan, Armenia, Kyrgyzstan

2. EU: eCall

3. UNECE: AECS (Accident Emergency call System)

4. Help Net Japan (voluntary emergency call system)
2. Emergency call process

1. Vehicle crash happens
2. Vehicle sends emergency MSD (Minimum Set of Data) and voice call to 112
3. Mobile Network Operator (MNO) & infrastructure transmit MSD and voice to 112
4. Public Service Access Point (PSAP, call center)
5. PSAP receives MSD and voice call
6. PSAP sends emergency services
3. Basic system lay-out and test requirements

Complexity of the certification process is also determined by
- Integration of the emergency call system in the vehicle (one box system, semi integrated or fully integrated)
- Supplier responsibility

Positioning function can be:
- Dedicated AECS positioning module within AECD unit
- Take info from vehicle navigation module
- ...

Trigger detection can be:
- Dedicated AECS crash sensor
- Take signal from vehicle SRS unit
- ...

Indicator can be:
- AECS indicator integrated in AECD
- Separate indicator in instrument panel/common place
- ...

Audio can be:
- Dedicated AECS audio speaker/micro
- Integrated with vehicle audio
- ...

Can be:
- Dedicated power supply
- 12V starter battery
- traction battery
- ....

MNO antenna can be:
- External antenna dedicated to AECS
- External antenna for other Vehicle communication functions
- Antenna integrated in AECD unit
- ....

GNSS antenna can be:
- External antenna dedicated to AECS
- External antenna for navigation system
- Antenna integrated in AECD unit
- ....
# 4. UN ECE AECS lay-out

## 1. Current Regulation Proposal (2 procedures to obtain UNECE AECS certification)

<table>
<thead>
<tr>
<th>Part I</th>
<th>Part II</th>
<th>Part III</th>
</tr>
</thead>
<tbody>
<tr>
<td>AECD Device</td>
<td>AECD installation</td>
<td>Vehicle with AECS</td>
</tr>
</tbody>
</table>

**Formal Document:** ECE-TRANS-WP29-GRSG-2016-19e

**Informal Documents:**
- GRSG-111-06e (AECS secr. Justification)
- GRSG-111-07e (AECS secr. Amendment)
- GRSG-111-13e (Russia amendment for Roll over)

## 2. Additional proposal by OICA for a 1st revision of the AECS Regulation

<table>
<thead>
<tr>
<th>Part I a</th>
<th>Part I b</th>
<th>Part II</th>
<th>Part III</th>
</tr>
</thead>
<tbody>
<tr>
<td>AECC Component</td>
<td>AECD Device</td>
<td>AECD installation</td>
<td>Vehicle with AECS</td>
</tr>
</tbody>
</table>

**Informal Document:**
- GRSG-111-15e (OICA proposal for component approval)
5. UN ECE AECD details

Part I: AECD (Device)

Par. 7.1: General functioning
Par. 7.2: EMC
Par. 7.3: Positioning
Par. 7.4: Access to PLMN
Par. 7.5: Info & warning signal
Par. 7.6: Power supply
Par. 7.7: Resistance to impact

Annex 7: Test method
Annex 9: Post-crash perform.

Part II: AECD (installation)

Par. 16.1: Installation requirement
Par. 16.2: Vehicle impact & trigger
Par. 16.3: Positioning
Par. 16.4: AECS Control
Par. 16.5: Info & warning signal
Par. 16.6: Hands free audio
Par. 16.7: Power supply

Annex 8: Test method
Annex 9: Post-crash performance
6. UN ECE AECS details

**Part III: AECS (vehicle)**

- Par. 25.1: General requirements
- Par. 25.2: EMC
- Par. 25.3: Positioning
  - Annex 8: Test method
- Par. 25.4: Access to PLMN
- Par. 25.5: Vehicle impact & trigger
  - Annex 9: Post-crash performance
- Par. 25.6: AECS Control
- Par. 25.7: Info & warning signal
- Par. 25.8: Hands free audio
- Par. 25.9: Power supply
- Par. 25.10: Resistance to impact
  - Annex 7: Test method
## 7. Resistance to impact (device)

### Component set → High g test → Function check

<table>
<thead>
<tr>
<th>Component set</th>
<th>High g test</th>
<th>Function check</th>
</tr>
</thead>
</table>
| 1. AECO control unit | 60g (or 65g for EU) | - Data transmission check  
- Position data check |
| 2. Mobile Network antenna | GRSG discussion | 3 possible methods |
| 3. Main power supply | | |

### Methods for Function check

1. “Over the air” transmission
   - Real network and PSAP

2. “Over the air” transmission
   - Mobile network & PSAP simulator

3. “wired” transmission
   - Mobile network simulator  
   - Antenna VSWR measurement

- Wired test can be used for test facility in regions that have MNO frequency restrictions
- For EU it can also be performed as a component test by supplier -> OICA has also prepared a AECC (Accident Emergency call Component) certification proposal as a first revision of the AECS Regulation
8. Optional GNSS Positioning test (device or vehicle)

If we use a 3 GNSS compatible GNSS module we can use UNECE Regulation to replace Regional positioning requirement in EU and Russia:
- EU: GPS + Galileo & EGNOS
- Russia: Glonass
- UNECE (optional): GPS + Glonass + Galileo & EGNOS optional

If not covered by UNECE certification it needs to be covered at national or Regional level.
9. Full scale impact test (vehicle)

<table>
<thead>
<tr>
<th>Impact test</th>
<th>Function check</th>
</tr>
</thead>
<tbody>
<tr>
<td>- UNECE R94</td>
<td>- Voice communication</td>
</tr>
<tr>
<td>- UNECE R95</td>
<td>- Data transmission</td>
</tr>
<tr>
<td></td>
<td>- Position check</td>
</tr>
<tr>
<td></td>
<td>4 possible methods:</td>
</tr>
<tr>
<td></td>
<td>1. “Over the air” transmission</td>
</tr>
<tr>
<td></td>
<td>- Real network and PSAP</td>
</tr>
<tr>
<td></td>
<td>2. “Over the air” transmission</td>
</tr>
<tr>
<td></td>
<td>- Mobile network simulator &amp; PSAP simulator</td>
</tr>
<tr>
<td></td>
<td>3. “wired” transmission” (not for ERA Glonass)</td>
</tr>
<tr>
<td></td>
<td>- Mobile network simulator</td>
</tr>
<tr>
<td></td>
<td>- Antenna VSWR measurement</td>
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<td>4. Transport vehicle to shielded room (not allowed for ERA Glonass)</td>
</tr>
<tr>
<td></td>
<td>“over the air” transmission</td>
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<td></td>
<td>- Mobile network &amp; PSAP simulator</td>
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</table>

- OICA is also preparing a post-crash verification method using HMI (as part of 1st revision of AECS Regulation)
- Internal Impact testing protocols need to be updated to incorporate post crash emergency call functional tests
10. In vehicle-self test (device or vehicle)

<table>
<thead>
<tr>
<th>Induce malfunction</th>
<th>Check malfunction signal</th>
</tr>
</thead>
</table>

- **ECU is in working order (e.g. no internal hardware failure, processor/memory is ready, logic function in expected default state)**
- **External mobile network antenna is connected**
- **Mobile network communication device is in working order (no internal hardware failure, responsive)**
- **External GNSS antenna is connected**
- **GNSS receiver is in working order (no internal hardware failure, output within expected range)**
- **Crash control unit is connected**
- **No communication failures (bus connection failures) of relevant components in this table**
- **SIM is present (this item only applies if a removable SIM is used)**
- **Power source is connected**
- **Power supply state of charge (UNECE only)**
11. Audio tests (Vehicle)

Applicable standard

Vehicle test

Validation

1. Pre-crash audio test (Optional)
   Based on ITU P1140 (Hands Free audio systems for emergency call)

If UNECE AECS is adopted it can replace the national requirement of a signatory Contracting Party.
12. Power supply capacity

**Requirement**

- 5-60-5 power supply requirement
- The emergency call system should have the capability for
  - 5 min talking
  - 60 min stand by
  - 5 min. Talking

**Device test**

- If power supply is part of device (e.g. back-up battery)
  - Demonstrate

**Vehicle**

- If AECS power supply comes from vehicle power supply (e.g. starter battery)
  - Demonstrate or calculate
1. AECS proposal for discussion (and adoption?) at UNECE GRSG-111 in Oct. 2016
2. UNECE WP.29 in March 2017?

4. In parallel discuss
   - AECC component certification proposal
   - post-crash verification method using HMI

   -> Not clear how further discussion can be done (new IG mandate, ad hoc expert group, ... ?)