

**DRAFT REPORT**  
**2nd meeting of the Informal Working Group (IWG)**  
**on Advanced Emergency Braking Systems (AEBS) for light vehicles**

**Dates:** 20-21 November 2017  
**Venue:** Bergisch Gladbach, Germany, Federal Highway Research Institute  
**Chairman:** Mr. Antony Lagrange (EC) and Mr. Toshiya Hirose (Japan)  
**Secretariat:** Mr. Yukihiro Shiomi (Toyota – OICA); Mr. Olivier Fontaine (OICA)

**1. Welcome and Introduction**

**2. Approval of the agenda**

Document: AEBS-02-01 (Chair)

The agenda was approved with no change.

**3. Debrief September GRRF /state of play of AEBS in Contracting Parties**

Document: GRRF-84-03 (Secretary)

The chair informed that the terms of reference, as revised by the informal group at its first session in March 2017, had been tabled at GRRF-84 and endorsed by GRRF, as reproduced in Annex 2 of the final report.

**4. Review of existing technologies/future technologies**

*What is already done, what is in the pipeline, what are the limitations of technologies (Industry)*

Documents: AEBS-02-05 (OICA)  
AEBS-02-06 (OICA)  
AEBS-02-07 to 10 (J)  
AEBS-02-11 (D)  
AEBS-02-12 (European Commission)  
AEBS-02-13 to 16 (OICA)

OICA presented the document AEBS-02-05 presenting the state of play with regard to the existing AEBS test protocols and system functionalities.

- The group questioned the reason of the 2 performance requirements/levels in the ISO standard. OICA presented document AEBS-02-16 which provides in its slide 1 an explanation that the aim of the two levels of performance is the flexibility for the manufacturer in their system development.
- There was a debate on the graph of slide 13: OICA sought the consent of Contracting Parties on the approach proposed by the graph, before discussing values used for the regulation.

EuroNCAP presented the document AEBS-02-12. Work of EuroNCAP was in collaboration with Thatcham and Loughborough University and determined, on the basis of accident data, what test procedures could be implemented through EuroNCAP to cover the most common types of accidents.

**Noted:**

- At low speed, very few people attempt to evade by steering, they mostly brake. Yet the avoidances by steering are not reflected in the data.
- The data analysis does not take into account AEBS false positives. This was challenged by CLEPA who clarified that the group must take into account when regulating AEBS that the system may not work perfectly in all conditions.
- The group was informed that the test protocols were developed for challenging the current system performances. Industry supported the concept behind test protocols presented in document AEBS-02-12.
- CLEPA raised the point that the difference of philosophy between EuroNCAP and regulations should be considered, where
  - o EuroNCAP test the most common variant of vehicle that is already approved vehicles with the aim of differentiating the performance between the safest vehicles on the market in ideal conditions.
  - o A regulation tests the worst-case pre-production vehicle with the aim of ensuring a certain minimum level of safety in traffic. So the performance is designed with a safety margin to take into account real world conditions (wet conditions / cold brakes) and variability in results.
- EuroNCAP informed that they also issue bonus points for implementing certain HMI features i.e. Forward Collision Warning, seat belt pre-tensioners and AEB deactivation methods.

The group had the opportunity to review some of the existing test targets currently used by BASt for their testing (walking pedestrian dummy, soft passenger car target for rear collision detection, passenger car target for side collision).

OICA presented the data of AEBS-02-06, coming from a study from the Loughborough University. The expert clarified that OTS ("on-the-spot database – 2000-2009) is there to complement the STATS 19 database. The study, if focusing on C2P, shows that the mean vehicle impact speed is 44 km/h.

**Noted:**

- Seems GIDAS and EuroNCAP do not focus on the same criterion: injuries vs. collisions
- AEB is interesting for some parties mainly for the purposes of reducing CO2 and congestion
- Some vehicles are equipped with Brake Assist Systems, because most drivers brake too late and not hard enough.
- Expected ISO pedestrian detection standards: June 2018; for cyclist detection: Nov 2020
- AEB ISO, 2 different types: info to come soon (see also document AEBS-02-16, slide 01)

D presented a PPT presentation (AEBS-02-11) on a proposal for the required speed reduction of AEBS. CLEPA stressed the difference between obstacle detection and obstacle recognition.

D stressed that the speed reduction capabilities decrease with speed. Best evasive manoeuvre of 2m 0,77s, with a limitation in the drift.

Conclusion: D could support the J proposal to regulate AEBS up to 50km/h, but this should take into account relative speed not absolute speed. BASt was ready to provide info on the ADAC study. There was a debate about false positive for sporty drivers. The group well captured that the EuroNCAP has other perspectives when compared to regulations.

OICA presented their position about the regulatory approach per document AEBS-02-13.

The expert pointed out the difference of approach compared to the provisions of the existing UN R131 text: different driving conditions, test scenarios, introduction dates for different categories, driving speeds according to the categories.

UK voiced having made the exercise of assessing how UN R131 would be adapted, and supported OICA on this approach. The D representative committed to check internally and come with a position (D subsequently supported a new regulation approach).

Concerning the regulatory approach, the European Commission, recalled the terms of reference requiring to work on an amendment to UN R131. Yet the European Commission representative was flexible, and stressed that the final decision should be taken at GRRF, even if the informal group recommends a particular approach. Conclusion: for the February 2018 GRRF session, the informal group might propose a draft regulatory text.

OICA presented a slide on a possible structure for the possible new regulation per document AEBS-02-14.

If fitted requirements

- Test methods and targets to be inspired from EuroNCAP
- General requirements and HMI to be inspired by UN R131.,
- The system should be default ON but with the ability for the driver to deactivate.
- No activation if Last Point to Steer is before Last Point to Brake. (BAST challenged this as it is a matter of fractions of seconds – need to agree on a consistent approach/graph).

FCW and BAS might be more effective at high speed (about experience on high speeds, manufacturers see more effectiveness of AEBS at low speed).

Proposal from the chair:

- Combine J and OICA wish list for preparing a preliminary list of content
- Overnight Industry homework
- Exchange of view around the contracting parties and Industry

OICA then tabled their overnight homework presentation

The group reviewed the existing technologies per document AEBS-02-16:

- LIDAR – fixed beam: proximity detection, subject to weather conditions
- RADAR – pros and cons (longitudinal measurement, movement detection), not much subject to weather, relative speed detection
- Camera – subject to weather conditions, mono vs. stereo camera
- Choice: pure technical justifications, experience, synergies with other technologies, historic links with some suppliers, manufacturer's specifications

**Scenario:**

- City: Low speed LPS/LPB enters in consideration
- Inter-urban: high speed LPS is before LPB
- VRU detection: dynamic situation, lateral offset, robustness, wider field of vision requires higher processing capabilities, night vision (depends on external temperature, lighting system of the vehicle, OK as a complement)

NCAP vs. Type Approval: debate on the 6.4 m/s<sup>2</sup> in UN R13H: need for regulatory consistency. Selection criteria of the vehicle

Conclusion: presentation will be shared within the group.

## 5. Review existing studies/standards/guidelines

Documents: AEBS-02-08 (Japan)  
*Japan will introduce a guideline of AEBS for vehicle (not include pedestrian and cyclist)*  
 AEBS-02-04 (Activity of NCAP, US, etc.)  
*Cost/benefit analysis done by the European Commission*

J presented J-NCAP AEBS-02-09 that focused on emergency braking in case of a moving pedestrian in daytime (night time expected in 2018), and AEBS-02-10 that focused on emergency braking in case of a rear –end approach. Protocols are basically the similar to EuroNCAP.

J presented AEBS-02-07. Slide 3 data relates to year 2009, which rated the benefits of the feature and scenario. The expert informed that the data are similar to those from Europe.

J then presented the document AEBS-02-08 on Japanese guidelines for AEBS.

“Steering: TTC = 0.6 (s) fixed value is used for all ~~large trucks~~ cars” (Slide 10)

OICA questioned the difference between “advanced” and “automatic” braking, i.e. warning vs. braking. OICA suggested that the 2 functions should be combined, hence mixed in the regulation. The question was whether the warning and/or the braking is mandated.

UK questioned why waiting for the LPS or LPB if we can detect earlier. Yet CLEPA clarified that too early warnings/interventions could be distracting/cause disruption for other drivers. This is a question of monitoring the driving environment to act appropriately.

OICA added that knowing from experience; users dislike false warnings, but really hate false interventions because it is not that easy to override in such conditions.

Some experts questioned the meaning of “any malfunction”: Does this prevent the system from meeting the requirements? J clarified that this aims only those items related to the scope of the regulation. EuroNCAP proposes a warning at the time the function is deactivated.

UK recommended to be cautious with regard to the disablement of the function: since there are mainly four reasons for the switch-off capabilities: use on tracks, false positive, off-road use, rolling roads (test dynamometers). EuroNCAP informed about deactivation when e.g. off-road is activated, and also recommended that the means should not be a single press of a button, as required in the EuroNCAP test protocol.

The European Commission informed of the outcomes of the cost / benefit analysis performed in the EU for enhancing vehicle safety per document AEBS-02-04.

## 6. Consideration of issues to be tackled/a first draft

- *Before making a draft, make a list of items to be discussed (table based on Japanese guidelines/R131 for trucks/EuroNCAP).*
- *Starting point is an amendment of the existing UN R131. Discussion on possible new regulation will come later. Focus first on the requirements*

The group started an attempt to capture the main points to include into the regulation, starting from document AEBS-02-17. Debates in *italic characters*

### 1. Definition of AEBS

- a) Car2car
- b) Car2VRU
- c) *Warning? Inspired from R131?*
- d) *Not BAS*

### 2. Operating range

- a) Speed range
  - i. *Optional activation < 10kph; optional activation > 50kph (must operate between these boundaries.). Question as to whether addressing the definitions of OFF/SB/Active: probably not as complex as in other groups.*
  - ii. *FCW and BAS more effective at high speed: need for justifications (false interventions at high speed will lead to driver switching off the system)*
- b) *Relative speed must be debated as well: Debate on the scenario to be addressed: stationary vs. moving, decelerating target. Conclusion: decision to be made at a later stage.*

### 3. General performances, HMI (R131)

- a) Warning strategy. *Attention, R131 is relevant for high speed.*
- b) Emergency event preparation. *0,8/1,4 sec of R131 must be reviewed. Conclusion: CLEPA to explain the background, informal group to assess whether the reasons are still relevant.*
- c) Default ON - OFF switch: *D reluctant with deactivation possibilities.*
- d) Malfunction
- e) *Combination with other systems (HMI, braking, etc.)*

#### f) Test scenarii (C2C, C2Pedestrian/cyclist)

1) Stationary target, moving target, braking target

2) Test methods and targets inspired from NCAP.

- i. *TRL: these will cover the real-world scenarii. Bicycle target is now well defined, experience with it is increasing.*
- ii. *Hence limiting to "crossing pedestrian" since there is no experience yet on other scenarii. EuroNCAP will develop longitudinal moving pedestrian for [2018].*
- iii. *Cyclist: scenarii can differ according to the country (J, London, CDN, USA, etc.).*
  - 1. *I believe C2Cyclist is a second step, C2Pedestrian is 1<sup>st</sup> priority*
  - 2. *JNCAP did not define the C2Cyclist*
- iv. *D: OK with the ISO target, not with their test protocols.*

### 4. False warning

- a) Industry: LPS/LPB: must activate when LPB is after LPS
- b) Japan:
  - i. Timing of braking control
  - ii. Collision judgment line
  - iii. Requirement of braking deceleration
  - iv. Enhanced damage reducing effect
  - v. Collision risk judgement

## 7. Next meeting

Next meeting (AEBS-03): 19-20 February in EU (pooled with GRRF). First discussion on the main points of the regulation (based on the list above).

OICA recommended not starting the drafting at the next meeting, but to discuss first the main items of the regulations before considering the drafting.

## 8. Other business

No point was considered under this agenda item

## 9. List of action items and next meetings (date and place)

-Frequency of meetings: next meeting to be held end January, then every 2 months in average.

-Informal group to report back at February 2018 GRRF (86th session) especially to endorse the development of the requirements as a new Regulation.