

Proposal for **new paragraphs replacing the current paragraphs 5.6.1.1.8, 5.6.1.1.8.i and 5.6.1.1.10** in document ACSF-06-28 based on the discussions of the 6th meeting and based on informal document ACSF-06-18 by OICA and CLEPA

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- 5.6.1.1.8.** The vehicle shall be equipped with means to monitor the driving environment, recognizing other road users and detecting obstacles in the desired path of driving. For the calculation of an appropriate range to the front, to the side and to the rear which has to be covered when monitoring the driving environment the formulae of annex **xy** may be used as reference material.
- 5.6.1.1.8.1.** The system has to ensure, that under normal operating conditions neither the vehicle itself nor other road users will be negatively affected by the ACSF operation. In this regard, safety distances to other road users have to be respected.
- 5.6.1.1.8.2.** In case the system is not capable of recognizing other road users in the entire range of normal driving conditions, the system shall by itself adapt and restrict the boundaries for the selection of speed, accelerations and the execution of certain manoeuvres (e. g. lane change) depending on the presently prevailing conditions for operation (like e. g. weather conditions, actual range for monitoring the driving environment and the detection of obstacles, estimated adhesion, speed of other traffic, speed difference to other traffic).
- 5.6.1.1.8.3.** In emergency cases, i.e. cases in which the time for a safe transition procedure is too short, e.g. pedestrians stepping on the road, deer crossings or obstacles on the driving lane, the system shall be able to initiate adequate measures with the purpose to avoid or mitigate collisions according to 5.6.1.6. Such measures shall include issuing a transition demand according to 5.6.1.4.2.2. and may include the initiation of a minimal risk manoeuvre according to 5.6.1.5.
- 5.6.1.1.10.** The vehicle shall fulfill the tests for Category E as specified in Annex 7. In addition, in order to comply with 5.6.1.1.8.1., 5.6.1.1.8.2. and 5.6.1.1.8.3., for the driving situations not covered by the tests of Annex 7, the safe operation of the ACSF shall be demonstrated by the vehicle manufacturer on the base of Annex 6.

Annex xy

Reference material for the calculation of ranges for monitoring the driving environment

1. Monitoring range to the front (s_{Front}), to the right side (s_{side}), to the left side (s_{side}) and to the rear (s_{Rear}) of the vehicle can be calculated using the following formulae.

1.1. Range to the front (s_{Front})

$$s_{Front} = v_{ACSF}^2 / (2 \cdot a_{ACSF})$$

where:

s_{Front} = relative distance between the vehicle equipped with ACSF and the vehicle in front, measured from the front edge of the vehicle equipped with ACSF to the rear end of the vehicle in front

v_{ACSF} = speed of the vehicle equipped with ACSF

a_{ACSF} = feasible deceleration of the vehicle equipped with ACSF.

1.2. Range to the rear (s_{Rear})

$$s_{Rear} = d_{reaction, rear} + d_{brake, rear} + d_{safety, rear}$$

with:

$$d_{reaction, rear} = (v_{rear} - v_{ACSF}) * t_{reaction}$$

$$d_{brake, rear} = (v_{rear} - v_{ACSF})^2 / (2 * a_{brake})$$

$$d_{safety, rear} = v_{ACSF} * t_d$$

where:

s_{Rear} = relative distance between the vehicle equipped with ACSF and the vehicle behind, measured from the rear edge of the vehicle equipped with ACSF to the front end of the vehicle behind

$d_{reaction, rear}$ = relative distance covered by the vehicle driving behind the vehicle equipped with ACSF caused by the reaction of the driver to brake

$t_{reaction}$ = reaction time of the driver driving the vehicle behind the vehicle equipped with ACSF needed to execute the braking and to built up the full braking force

$d_{brake, rear}$ = relative braking distance of the vehicle driving behind the vehicle equipped with ACSF

$d_{safety, rear}$ = safety distance between the vehicle equipped with ACSF and the vehicle driving behind

t_d = safety time gap to vehicle equipped with ACSF after braking

v_{rear} = speed of the vehicle driving behind the vehicle equipped with ACSF

v_{ACSF} = speed of the vehicle equipped with ACSF

a_{brake} = admissible deceleration of the vehicle driving behind the vehicle equipped with ACSF.

1.3. Range to the left and to the right side

$2 * lane\ width$

measured from the medium longitudinal centerline of the vehicle equipped with ACSF.