SAFESPOT INTEGRATED PROJECT - IST-4-026963-IP

DELIVERABLE 4.3.1

SP4 – SCOVA – Cooperative Systems Applications Vehicle Based

Safety Margin Application Parameters Analysis and Characterization

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Workpackage No.	**WP4.3**	**Workpackage Title**	**Specification**
Task No.	**T4.3.1**	**Task Title**	**Driving Safety Margin parameters analysis.**
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Executive summary

Deliverable D4.3.1 “Safety Margin Application Parameters Analysis and Characterisation” describes the work performed in Task 4.3.1 – Driving Safety Margin parameters analysis. The content of this deliverable gives a direct input to D4.3.2 - SP4 Applications Functional Specifications, and D4.3.3 - Application communication for co-operative vehicles and infrastructure.

This task is in charge for the analysis of the in-vehicle parameters that should be considered for the future implementation of the Safety Margin Assistance in the applications of the SAFESPOT project. The major discussions and the analyses are focused on the vehicle based applications (the ones developed within the SCOVA subproject). However parameters coming from the roadside infrastructure have also been considered in order to keep the consistency among all of the SAFESPOT applications, and to properly report the performed efforts of integration with all of the involved SAFESPOT subprojects. In particular specific common progresses and integration have been obtained in the joined work with SP5 – COSSIB, where infrastructure based applications have been developed, and with SP1 – SAFEPROBE, where relevant analysis of the in-vehicle parameters related to the environment sensing have been carried out.

During the previous activities of SP4 (see D4.2.3 - Use case and typical accident situation), twenty-eight use cases, showing how vehicle based co-operative applications should behave in some significant real road traffic situations, have been collected. In this deliverable the approach adopted to analyse and describe the use cases of the vehicle based application is described, and the method adopted to calculate the physical parameters of the driving safety margin is presented. SAFESPOT use cases are grouped in four clusters of applications:

- ***Lateral Collision – LATC***
- Road Intersection Safety
- Lane Change Manœuvre
- Safe Overtaking
- ***Longitudinal Collision - LONC***
- Head On Collision
- Rear End Collision
- Speed Limitation and Safety Distance
- Frontal Collision
- ***Road Departure – RODP***
- Road Condition Status – Slippery Road
- Curve Warning
- ***Vulnerable Road User – VRU***
- Vulnerable Road User Detection and Accident Avoidance

In D4.2.2 – Safety Margin Concept, the focus has been on the definition of the Safety Margin Application for the different scenarios as well as for the different vehicle typologies (cars, trucks and powered two-wheelers) in the domain of the SAFESPOT project.
In the present deliverable the activities and the studies, covering the vehicle dynamics parameters that will be used for the implementation of the SAFESPOT safety margin assistance applications, are reported. Inputs have been collected and elaborated from the activities described in D4.2.2 and more in general, from the requirements defined in the WP4.2, taking into account the typical accident situations that should be addressed for the in-vehicle implementation (WP4.4).

Relevant reported achievements concern some important features of driving and are related to the description of the models adopted for the conceptualisation of these features. An extended use of the key term “Safety Margin Assistance” has been also exploited; this term has been deeply elaborated and expressed in formal terms, in an effort to enhance its usefulness as a horizontal concept for the whole SAFESPOT project.

In synthesis, the safety margin can be defined in term of threshold values that can be used to inform the driver about modalities and timings of the actions to take in order to minimise the risk of an accident. Depending on the different applications and use cases, the physical dimensions of these thresholds can be expressed in terms of distances (e.g. a safety distance), times (e.g. the TTC – Time To Collision), speeds or accelerations (typically negative, in order to represent braking decelerations) or pure numbers, describing the ratio between two homogeneous quantities.

The overall findings of the present document suggest the method to detect in advance potentially dangerous situation and extend in “space and time” drivers’ awareness of the surrounding environment with a direct functional dependence from the thresholds controlling the safety margins, for all use cases of the SP4 applications.