Summary
Deliverable 3.2 – Methodologies for a holistic fitness to drive assessment – an update
WP3
Lead authors - Selpi (CHALMERS), Christer Ahlström (VTI), Bernhard Hametner (AIT), Javier Aranda (SENSEAIR), Emma Jonforsen (SENSEAIR), Elena Guerrero San Vicente (LEITAT)

Deliverable 3.2 is an update of Deliverable 3.1 and is the final deliverable of WP3. This document has two goals. The first goal is to outline the necessary measures and sensors for detecting/estimating impairment due to alcohol, drugs, fatigue, stress, cognitive load, and cognitive distraction. The measures are relevant in many scenarios and phases, including when drivers are off-duty, on-duty, on-site or during roadside assessments. The second goal is to provide insights on how the measures can be used in conjunction to establish criteria, thresholds, and an algorithm for assessing drivers' fitness to drive.

Overall, the achievements of WP3 can be summarised as follows.

1. Specification of the required measurements: the measurements needed from the selected sensors, the agreed definitions of all six impairment types, and which sensor/system can measure each of the impairment types have all been specified.
2. Proposal for harmonising sensor outputs: a proposal has been agreed for harmonising the sensors' outputs into impairment categories and scores. For each impairment type, a mapping from these categories and scores to the possible outputs/decisions indicating different levels from "fit to drive" to "not fit to drive" has also been proposed. A mapping from the internal outputs of each sensor to the impairment categories and scores has been detailed where pilot data is available.
3. Algorithm for fitness-to-drive assessment: an algorithm for assessing the final fitness to drive has been established, taking a holistic approach that goes beyond assessing only alcohol and drugs, but also fatigue, stress, cognitive load, and cognitive distraction.
4. Analysis of roadside assessment pilot results: results from the roadside assessment pilots have been analysed and lessons learned have been summarised and fed back for sensor development.

The holistic approach taken by PANACEA in assessing fitness to drive, based on six impairment types, represents an advancement beyond the state-of-the-art approaches. The integration of different sensor measurements into a holistic assessment system connected to the counter measures allows for a deeper understanding of the impact of sensor measurements on drivers' health and driving safety. This collaborative approach has the potential to drive further improvement and innovation in the field of fitness-to-drive assessment.

The holistic assessment system in PANACEA comprises selected systems that are either state-of-the-art or beyond state-of-the-art. Alcohol and drugs detectors give a quantification of detected substances, not just presence/absence of the substances. Multiple systems with different assessment approaches for the same measure have been used, which can potentially support and complement each other. Having sensors for the different phases of assessment enables a more comprehensive fitness-to-drive assessment, as opposed to just using any one type of sensor. The varying levels of maturity of the sensors allows the more mature sensors to be used as primary or reference sensors for the less mature ones.