WP 3 – Focusing on the Driver
Key Findings and Results

THE PARTNERS CONDUCTED A TOTAL OF 33 EMPIRICAL STUDIES, WITH 1723 PARTICIPANTS, IN OVER 1750 HOURS RESULTING IN 30 PUBLICATIONS.

METHODOLOGY
The developed systematics and metrics were evaluated on the basis of prototype conditionally automated driving systems and generic user-interface-designs.

In order to evaluate the influence of relevant parameters of the driver’s state (sensoric state, motoric state, cognitive state, arousal and motivation) on take-over performance, we focused on average driver reactions. However, if the controllability of take-overs needs to be assessed, a wider range of human performance should be considered as well.

We defined a common methodology and metrics to allow for a better comparison between the experiments and the results.

The experiments in driving simulators and Wizard of Oz vehicles on unplanned, unexpected or time-critical take-over situations were conducted with time budgets between five and ten seconds.

DROWSINESS AND FATIGUE
During automated driving, drowsiness and fatigue can develop or be induced quickly and might be subject to volatile changes.

Drivers show strong inter- and intraindividual differences in the development of drowsiness and fatigue.

An increase of drowsiness and fatigue under monotonous conditions could already be detected during shorter, uninterrupted automated drives (20 to 30 minutes). Under these conditions no significant influence on take-over time and quality could be detected. Also, in longer, uninterrupted automated drives (up to 90 minutes) clear and consistent effects on take-over behavior could not be found.

RECOMMENDATIONS
While driving with conditional automation, extreme levels of drowsiness and fatigue (drivers close to falling asleep) must be avoided.

Based on the detection of high levels of drowsiness and fatigue, countermeasures (e.g. a specific offer of NDRTs) can be initiated to avoid or to postpone such extreme driver states. This can help to increase the safety and acceptance of such systems.