

## Measuring drivers' physical and mental condition

Inadequate performance constitutes the major cause of the majority of the accidents in the air, on the road, and on waterways, grossly because of imperfect perception, insufficient attention and inadequate information processing. Common factor in this field is the operator's mental condition, i.e. (high or low) mental workload, (inadequate) mental activation or arousal, externally driven mental conditions such as by psycho-active substances, and, emotion and motivation. De Waard and Brookhuis (1997) discriminated between underload and overload, the former leading to reduced activation, and lowered alertness and attention, the latter to stress, distraction, diverted attention and insufficient time for adequate information processing. Both factors have been studied in relationship to driver impairment, however, the coupling to accident causation has not been established via a direct link, mainly because of ethical concern, although simulators provide a perfect opportunity in that respect. Criteria for when impairment is below a certain threshold, leading to accidents, have to be established. Only then accidents and mental activation and/or workload (high or low) can be related to each other, in conjunction with their origins such as information overload, stress, underload, boredom, fatigue or external factors such as alcohol, medicines and drugs. Physiological measures are a natural type of index for mental activity and/or workload, since any work or activity, including mental work and mental activation, demand physiological activity by definition. The measurement of physiological parameters in simulators profits from the laboratory circumstances on the one hand while gaining in validity depending on the degree of reality of the type of simulator used on the other hand.