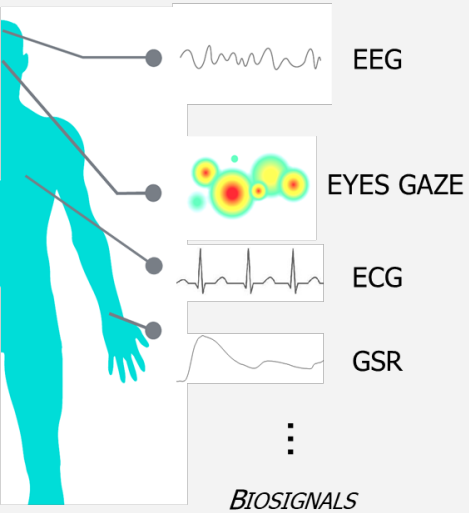
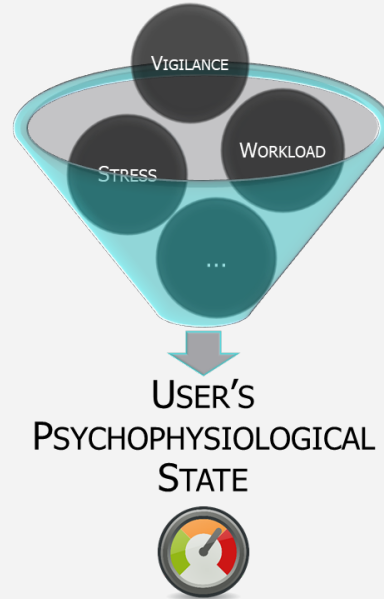


Preliminary concepts | Approach



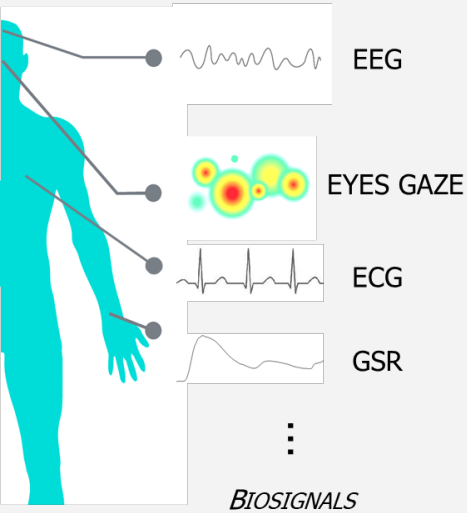
BIOSIGNAL
PROCESSING

Neurometrics
of specific mental states



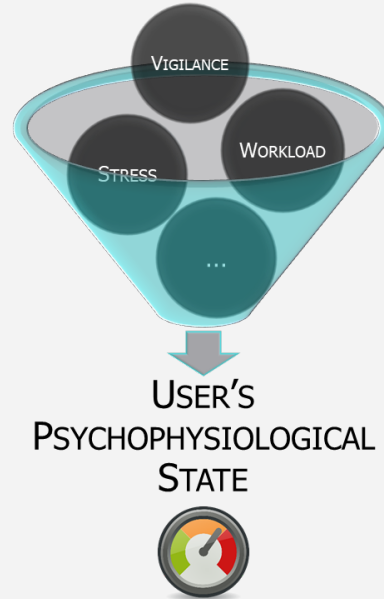
Cognitive Neuroscience applied to operational environments

Preliminary concepts | Approach



BIOSIGNAL
PROCESSING

Neurometrics
of specific mental states



In **SIMUSAFE** the following neurometrics will be estimated

- WORKLOAD
- VIGILANCE
- STRESS
- FATIGUE

Cognitive Neuroscience applied to operational environments

Why neurometrics?



Lack of objective information about the user's psychophysiological status while dealing with operative activities

- ! Self-assessed measures are subjective and cannot be collected while operating. Also, the user could be not aware of an incoming psychophysiological impairment.
- ! Supervisor assessment could have a certain subjective bias. Also, sometimes mental state degradation could be covert (i.e. not perceivable from his behaviour).
- ! System data often highlight risky behaviours “after the fact”.

Why neurometrics?



Neurophysiological measures could provide objective information about human mental states The assessment of the different mental states would allow to solve also the Human Factor issue related to the **Human Performance Envelope characterization**

(Parasuraman et al., 2008; Borghini et al., 201

Human performance degradation results from the interaction of multiple HFs and this interaction is still mostly underexplored

The concept of **Human Performance Envelope (HPE)**, a function defined by relevant HFs and associated scales, aims to **predict operator's performance** defining a region where performance will be tolerable, and where it starts to become hazardous *(H2020 Future Sky Safety program.)*



Why neurometrics?



Neurophysiological measures could provide objective information about human mental states The assessment of the different mental states would allow to solve also the Human Factor issue related to the **Human Performance Envelope characterization**

(Parasuraman et al., 2008; Borghini et al., 2011)

- ✓ **Neurometrics** are able to provide **objective measures, even online**, of the **user's psychophysical status**.
- ✓ With respect to behavioural data (e.g. vehicular data), through neurometrics **it is possible to immediately detect potentially risky conditions** (e.g. your driving behaviour is going to become dangerous once you are already fatigued and prone to drowsiness, neurometrics are able to anticipate fatigue detection).
- ✓ With respect to self-assessed measures, neurometrics **are able to point out unconscious reasons of risky behaviours** (e.g. sometimes you cannot be aware of your stress).

CASE HISTORIES

