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# Healthy mobile working with digital assistance systems in technical service [ArdiAS]

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**Project description**

In modern society, high demands are placed on the willingness of companies and their employees to adapt changing work conditions. Digital developments, which are described by the buzzword Industry 4.0, become important for success and innovative ability of companies. Demographic change also requires adequate concepts for work structuring as well as personnel an organisational development. The interplay of digital development and demographic challenges faces the society with the question of how the innovative ability of companies can be maintained and strengthened under these conditions.

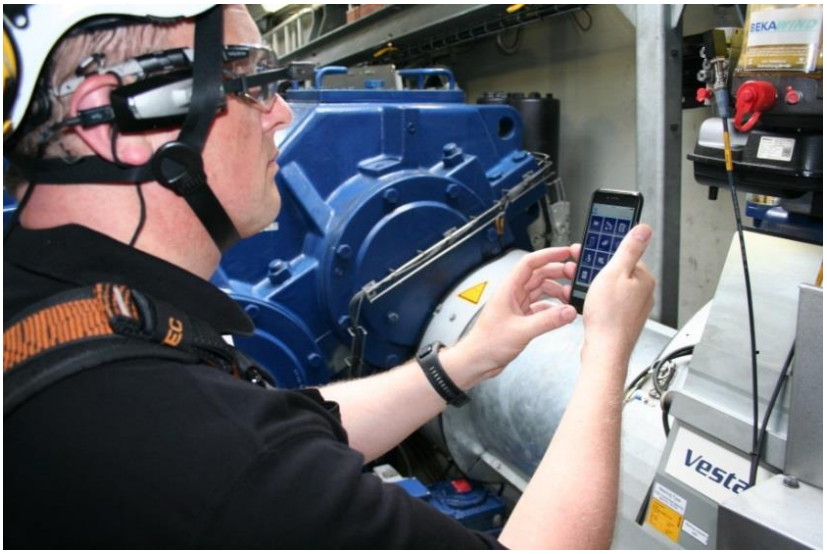


*Foto: Fraunhofer IFF Magdeburg*

**Work with assistance systems: Relief or burden for users?**

Service personnel maintaining technical systems have increasingly be supported by digital assistance systems (AS). These change the established work conditions as compared to working with conventional tools. The use of AS leads to re-structuring of basic psychological processes such as visual perception, attention, memory, and sensorimotor coordination. Previously, a checklist for the maintenance of a wind turbine was filled in paper and pencil. Now, the information can be gathered with mobile devices (e.g. by smartphones or smartglasses). On the one hand, this may considerably reduce memory demands as the relevant data has been saved, structured and transmitted online to end users. On the other hand, the requirements for visual functions and divided attention (between the work object and information on an AS display) have become increasingly complex. Performing the dual task – dealing with the work object and gathering the relevant information from an AS – may complicate the work process. In addition, there are specific restrictions by AS that can affect information processing. For example, smartglasses cover a part of the visual field and require regular changing the accommodation distance between the near and far visual points. Using AS based on smartphones on sunny days may hamper information perception due to low contrast and glare on AS display. Finally, connection problems between the AS and the server may cause failure of the AS support during the ongoing work process. All these factors can impose psychological stress on AS users.

**Project Goals**

- Studies on psychophysiological indicators of work stress when using mobile devices;
- Elaboration of recommendation for healthy work in the field of technical service (focus: occupational medicine, occupational safety) as a basis for the transfer of results to science and practice;
- Development of a guideline for the evaluation of assistance systems and risk assessment during working with mobile AS.

**Method**

- Specification of the AS user requirements from an psychological and medical point of view on the basis of the preliminary examination of target groups (service personnel);
- Analysis of the boundary conditions fort the real application scenarios with regard to mobility, safety, and health during working with mobile AS;
- Selection of survey tools to assess the usability and acceptance of essential functionalities of an AS which should be developed fort the target groups;
- Laboratory studies on psychological indicators of cognitive load and work stress on the basis of subjective (e.g. health and mood states) and objective (performance, heart rate variability and electroencephalogram) data;
- Selection of meaningful psychophysiological indicators for assessing usability of mobile AS;
- Selection and adaption of medical status examinations with regard to visual and acoustic aspects when using mobile divices;
- Studies an psychophysiological indicators of cognitive load and work stress on experimental workplaces;
- Consulting in the development of AS with regard to occupational safety and health.

**Target groups**

- Mobile service personnel in the regional industry

**Project partner**

Fraunhofer Institute for Factory Operation and Automation IFF, Magdeburg (project coordination)
METOP GmbH, Magdeburg
Terrawatt GmbH, Leipzig
Dr. Weigel Anlagenbau GmbH, Magdeburg

**Project timeframe**

- April 2017 - März 2020