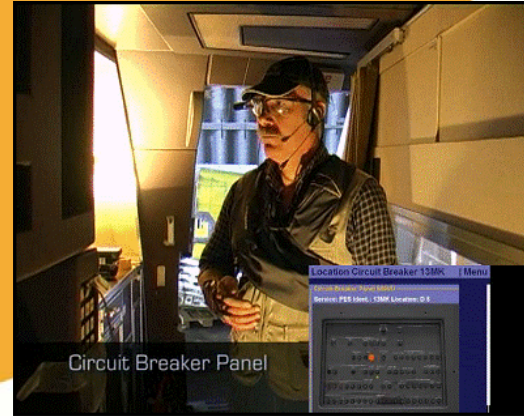


# WEARIT@WORK: Mobile Maintenance EADS CCR



## Introduction

In the industrial maintenance sector the organization of productive plants requires work teams that are geographically dispersed. In order to improve productivity goals these groups are expected to pool their knowledge in order to quickly solve problems. New ways of improving operators tasks are needed in order to complement the activity of experts. Within this context, one of the key application scenarios considered by the wearIT@work project focuses, under the joint supervision of EADS and GIUNTI Labs, on the support of maintenance activities in the aeronautic industry.

Maintenance effectiveness is one of the most scrutinized areas of airline operations. The aeronautic industry takes maintenance aspects into account from the very beginning of the aircraft design in order to make maintenance tasks easier and faster. Starting from real case studies at Airbus and EADS facilities, the aim is to demonstrate how wearable technologies can improve operators job and maintenance competitiveness by:

- Increasing mobility of workers
- Improving availability of task- and context-dependent information
- Speed up localization and detection of areas to be repaired or maintained
- Improving communication and knowledge sharing within and outside the team
- Allowing multimodal interaction, through voice and gestures
- Supporting continuous maintenance operators training

## The context

The selected case study related to aeronautic maintenance is articulated through three specific scenarios, corresponding to some typical maintenance situations:

- removal and installation of equipment on the aircraft
- inspection of the aircraft
- trouble-shooting.

These scenarios represent the background from which the activities of analysis, design and implementation of a suitable wearable application for maintenance support began. Inspection, removal, installation and troubleshooting are all information-intensive processes. In order to perform them, the maintenance operators need to plan all the information/documentation in advance, together with all the tools and consumables they need to use. Nowadays the operators are normally overloaded with all the information support (usually in paper form) and with all the tools and materials needed for their work.

In addition, all these processes involve communication with experts in case of uncertainty or with other team members. In all the cases the maintenance operators have to perform proper job reporting regarding all actions performed.

wearIT@work was set up by the European Commission as an Integrated Project to investigate "Wearable Computing" as a technology dealing with computer systems integrated in clothing.

The project has 42 partners with a project volume of about 23.7 million € and a funding of about 14.6 million €

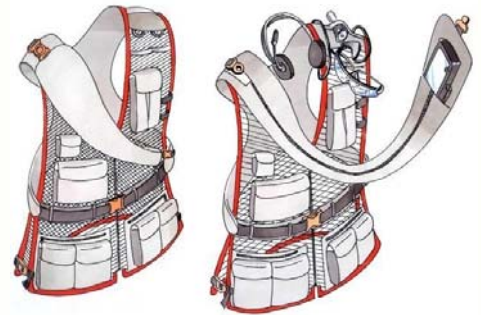
It is the largest project world-wide in wearable computing.

<http://www.wearitatwork.com>



From this perspective, the main aspects that are expected to be improved by the introduction of the wearable maintenance support integrated application are:

- Mobility of maintenance operators, offered through wirelessly connected, comfortable and unobtrusive wearable components.
- Seamless access to relevant, task-dependent and contextualised information. Multimedia contents need to be considered, as well as suitable structures and standards for their productions.
- Remote expertise projection and communication/cooperation within the team members. Also features for exchanging multimedia information need to be provided.
- Robust and secure reporting system, including automated task tracking and privacy preservation features.
- Advanced field training and life-long learning in such a rapidly evolving and complex environment.



## The solution

The maintenance operators will be equipped with a Maintenance Vest, integrated with carefully selected and properly configured wearable technologies. This complex and innovative multidevice, flexible and reconfigurable aggregation of hardware components, including cutting edge input and output devices, will enhance the working activities in the previously outlined scenarios by making available the following features:

- operator's mobility and free-hand working enabled by wearable components and multimodal, voice- and gesture-based, interaction
- advanced content and knowledge management functionalities, through the use of widely accepted standards and specification for technical information representation and visualization (e.g. S1000D)
- on-the-job access to needed information through connections to the documentation server and increased usability of the documentation through both audio and visual presentation
- ready for integration with available information systems to check the availability of tools and materials, to verify the ranges of important task-dependent measurements, to give access to troubleshooting databases and on-board systems
- automatic adaptation of the information provided to the operator to both current task and user profile, in order to obtain a personalized support
- increased quality of communication and cooperation amongst team members and with remote experts, through audio-visual tools, thus providing simultaneous decision support in critical situations
- enhanced work quality thanks to adaptive advice in critical phases and the possibility of real time exchange of key task-related information (e.g. pictures of aircraft parts directly from the work site)
- Open, flexible, extensible and reconfigurable solution based on modular wearable platform and software framework developed by the project.

The ensemble of the aforementioned hardware and software features represent what has been called the Wearable Maintenance Integrated Solution (WMIS).



## The benefits

The major benefits expected after the introduction and adoption of the WMIS within the overall aircraft maintenance process – from the early training phases up to the expert support - are:

- Improvement of the worker's skills and abilities, thanks also to the reduction of the learning curve slope during initial training phases
- Better management of and access to company know-how and information pools. Decreased wasting of process-implicit, workers-owned, knowledge
- Enhancement of workers' capabilities in handling complex, not planned, unusual tasks
- Improvement of the communication level and real time exchange of information within the company
- Significant time reduction for executing complex maintenance tasks
- Improvement of quality level, reduction of errors and increase of security of aircrafts

In one sentence: **Maintenance cost reduction and increase of competitiveness.**

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