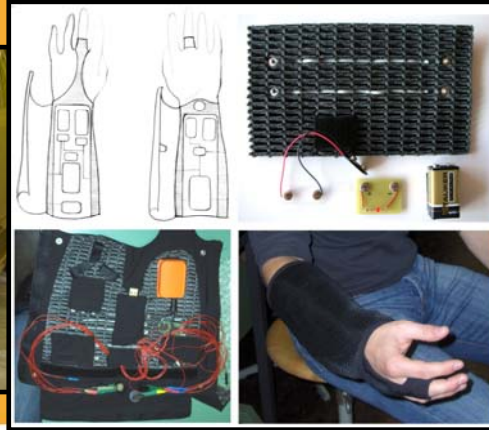


# WEARIT@WORK: Variant Production



## Introduction

Today's requirements in production process efficiency combined with their increasing complexity represent a great challenge for staff members at all levels (from the assembly worker to the plant manager). The ultimate goal is the fine-tuning of the production process to perfectly fulfill customers orders and to keep the overall efficiency at high levels.

Through scenarios based on real situations, and tested in a real industrial environment (a SKODA car manufacturing production plant), the wearIT@work project demonstrates how wearable technology can allow an efficient, successful working environment by providing ubiquitous, mobile access to production process-related information where and when necessary: at the shop floor, at the assembly line, and at the manufacturing workstations.

This allows workers at different levels to:

- Improve the training process of inexperienced workers;
- Improve availability of information;
- Speed up localization and detection of areas to be repaired or maintained;
- Improving communication and knowledge sharing;

wearIT@work has explored two use cases, that cover two different domain of a production environment:

- Apprentices, future assembly workers;
- Assembly line workers, quality control workers.

## The problem

Automotive production represents an industrial environment where variant products of high complexity and short life-cycles are manufactured. Hence, many situations exist where work is performed in a mobile context (e.g. maintenance, work at the assembly line, etc.). In order to cope with these conditions, specialized training of personnel is a very crucial issue in automotive production. Accordingly, training requirements are usually high.

On the other hand, the last step before a car is delivered to retailers consists on visual inspection and manual checking of several parts of the car, in order to control lights and bumpers misalignment, bumps and scratches, spaces between the doors and car body, etc. The workers repeat these steps for hours, and so such task is subject to human errors.

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>



## The solution

Since the beginning of 2004, a thorough analysis was carried out, involving interviews, field studies and comprehensive process analysis at the Skoda production facilities in Mlada Boleslav and Vrchlabi (Czech Republic). The aim was to implement a wearable computing solution that is capable of supporting the training procedures of Skoda blue collar assembly line workers. The wearable prototype which was derived from these field-studies, offers semi-autonomous training by mobile- and context-sensitive support of trainee personnel. The trainees are provided with all necessary (digital) information in order to successfully perform individual production tasks. At the same time the performed tasks are tracked via mobile sensors mounted on body and on the car. The wearable system supports the trainees by detecting errors when tasks were not performed correctly, and by providing appropriate help and suggestions.



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wearIT@work has also explored the Quality Assurance scenario, and has implemented a prototype of a wearable computing solution to support workers in the process of inspection. The wearable systems helps the worker, and ensures the complete fulfilment of verification procedures, allows hands free inspection, provides access to supporting information and enables the collaboration among workers and experts.

## The benefits

The benefits from the use of wearable computers are perceived as:

- Preventing mistakes
- Making the work faster and more efficient
- Improving working communication by improving information sharing.
- The possibility to employ not intensively educated Assembly Workers
- Shortening the training process.

All leading to:

- Improve the communication and knowledge sharing;
- Better product quality in shorter time.



## Technological Issues

Some of the technological challenges identified so far:

- Task tracking in working environments
- Unobtrusiveness of wearable devices with respect to assembling tasks
- Collaboration mechanism in mobile environments
- Multimodal interaction

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