Introduction

The research presented in this poster was carried out under the activity 5.2 of SPIA project – Strutture Portanti Innovative Aerocartiche – or, in English, Aeronautical Innovative Bearing Structures (funded by the Italian government grant: Pon 2007-2013 “Ricerca e competitività” PON03PE_000067_3). This activity pursued an improvement of manufacturing data distribution and the analysis of related issues.

Focus on the improvement of the process of collecting product data across the whole life cycle and then properly re-distribute them, in order to speed up new product development and improve product quality. The project has been developed in collaboration with Avio Aero Brindisi Plant where MRO activities are performed on aircraft engines. When an engine enters the plant for overhaul undergoes disassembly and then a complex repair process. Each single MRO task takes place in a specific area of the plant. Each part of the engine is now tracked with paper tag. The main issue of this environment is the massive presence of metallic components which may interfere with electromagnetic fields of real time positioning technologies.

Objectives

- Real time monitoring of the manufacturing process
- Data gathering on items positioning and on manufacturing process status
- Concurrent update of information stored in company’s IT systems
- Real time data collection to ensure the quality of the final product
- Choose the right technology to work with metals and possible overlaps

Materials and Methods

1. Context Mapping and Analysis
   Factory assessment, detailed analysis of manufacturing processes, interviews with key actors involved

2. Issues and Problem recognition
   Process assessment and recognition of bottlenecks, wasted time. Correct definition of issues arisen by the metallic environment.

3. Requirements elicitation
   Requirement formalization of a part tracking solution.

4. Literature Review
   Review of scientific publications, technology journals and specialized websites on localization technologies

5. Benchmark of Positioning Technologies
   QFD analysis and cost-benefit consideration, with particular attention to the ability of working with metals.

6. Selection of the most suitable positioning technologies
   Taking in consideration the results of the previous phase, the UHF RFID technology has been chosen.

7. FEM numerical analysis of a system with features required by the pilot CAD solid modelling of the system [gate] and electromagnetic FEM numerical analysis with ANSYS HFSS

8. Technology test
   On-site reliability test of UHF RFID technology under simulated normal operating conditions

9. Assessment of changes to the MRO process due to introduction of the RFID technology into the plant

10. Software development
   Development of a mobile app and an associated web interface on GE Predix environment

Results

- BPMN detailed mapping of factory processes and sub-processes
- Technology benchmarking
- Electromagnetic simulation
- On-site test
- Agile Software development

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<th>LIVR</th>
<th>Season</th>
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From paper tags

To RFID tags