



Technologies and Techniques for New Maintenance Concepts

Reporting

Project Information

TATEM

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GE AVIATIONS SYSTEMS LTD

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Final Report Summary - TATEM (Technologies and Techniques for New Maintenance Concepts)

The TATEM project has investigated technologies to increase aircraft operability by reducing the occurrence of unscheduled maintenance and the time/cost of scheduled maintenance. The aim of the TATEM project was demonstrate the means to achieving a 20 % reduction in airline operating costs within 10 years and a 50 % reduction over 20 years.

In terms of operational the project focused on the techniques and technologies that enable the following strong supporting concepts:

- aircraft health monitoring, including enhanced diagnostics and prognostics;
- aircraft health management, including aircraft missions risk assessment.

While performing a maintenance action one technician can get an instant access to the digital technical data that are required in his process and he can interact with the maintenance information system (MIS) at

the point of his job.

Mobile maintenance

This concept means maintenance actions can be performed in TATEM mobile conditions.

Process-oriented maintenance

The access to the right piece of technical data is critical in most maintenance situations; however, today's structure and content of technical data cannot be considered optimised with regard to maintenance processes.

Integrated data management system

This concept may be seen as the future of the current MIS. It would enable all maintenance data to be accessed, shared and managed in an integrated way with regard to all maintenance functions using these data.

A new on-board maintenance architecture has been proposed with new maintenance concepts for avionics maintainability. It is based on a distributed diagnostic approach allowing getting a better localisation as close as possible to the defect source. In addition, generic built-in test equipment (BITE) elements were defined, based on a common and efficient core motor for BITE mechanisms, configurable according to the target system.

To support the TATEM technical developments a global information system simulator called a data management platform (DMP) has been developed this has been a backbone for the new technologies and techniques investigated by the project. Granting access to state of the art on-board and on-ground IT capabilities opens new possibilities of data transformation and presentation, such as adopting the ISO 13374 based 'Open system architecture for condition-based maintenance' (OSA-CBM) standard, as well as opportunities to share maintenance data on standardised formats which in turn opens the door to collaborative maintenance.

TATEM has taken important steps in demonstrating the key technical, cultural, commercial and infrastructure capabilities that will underpin service provision in a future health managed enterprise is ongoing. The TATEM project has shown that it is technically feasible and the challenge going forward is to build upon this and others successes to realise the promise of new enterprise and operational solutions.

1. New services and products are emerging to satisfy the growing demand of both military and commercial customers. Customers are keen to embrace more sophisticated contracting regimes for larger and more complex systems.
2. Developing open standards and protocols for support functions will be essential for market penetration and customer acceptance. Successful solutions will offer integration across the value chain.
3. Gaining an understanding of the interactions (intended or otherwise) of complex systems can be as important as monitoring individual equipment or sub-systems. This is an area of work that requires serious attention if the full capability of aircraft health management is to be unlocked.
4. Managing the technical complexity of the interactions of people, organisations, technology, policy and economics remains one of the biggest challenges in deploying a future health managed enterprise.

5. The key to success is the acquisition, exploitation and management of data.
6. The first part of the TATEM project analysed current maintenance practices and identify major weaknesses and strengths. In parallel, the project developed a shared understanding of operators and MROs operational needs.
7. Based on these investigations the project is confident that the TATEM concepts are strong enablers to achievement of these operational needs.

Ground crew support potential technologies have proven to be at the forefront of increasing efficiencies in the maintenance environment. To be able to move around and have the necessary information or instructions at hand, based on health monitoring and management capability, when carrying out a task, has revealed a considerable potential for automising fleet processes and reduction of work load. Furthermore, integrated health monitoring and management has the potential for direct operating cost savings and the deployment of a condition-based maintenance strategy. Condition-based maintenance will be efficiently performed when supported by integrated enterprise management. A further important part is the fleet support processes, which are strongly dependent upon human factors.

TATEM provided the first opportunity to highlight the importance of a wider understanding of human factors in order to develop and successfully introduce technological innovations. However, as the sample analysis have shown, not all issues arising out of new technological developments, both problems in implementing them as well as opportunities to improve process within an sector of the industry, can be covered at the technology level alone. Some of these issues require structural changes in the organisational set up of companies or even a whole industry. Some of these aspects are currently being taken up by Sixth Framework Programme (FP6) projects such as HILAS. Others will hopefully become the topic of new projects that are currently in the proposal phase of the Seventh Framework Programme (FP7).

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