RFID JOURNAL LIVE!

WORLD’S LARGEST RFID EVENT

11TH ANNUAL CONFERENCE AND EXHIBITION

APR. 30-MAY 2, 2013 • ORANGE COUNTY CONVENTION CENTER • ORLANDO, FLA.
RFID Integrated Solutions

RFID-Based Centrally Managed Aircraft Maintenance Program

Rebecca Shore, Solution Architect
May 1, 2013
Operational “Inefficiency”

- Preparation for maintenance: ~ 20% - 30% of total duration
- Documenting activities: ~ 10% of total duration

Source: Skills, rules and knowledge in aircraft maintenance: errors in context
ALAN HOBBS and ANN WILLIAMSON
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General Problem Statement

• High Maintenance Cost

• Long Process Lead Times

• High Number of Non-Value Added Processes

• Configuration Management

• Supply Chain Visibility and Asset Management

• Excessive Inventory

• Regulatory Compliance

• Remote Maintenance History
Abstract

A comprehensive solution including:

• Centrally managed RFID-based maintenance program
• Maintenance procedures
• Training
• Hardware
• Software
• Retrofit guidance
• Technical oversight
• Continued support and post-retrofit services
# Current Airborne Applications

<table>
<thead>
<tr>
<th>-Interior Lifecycle Management</th>
<th>-Component Lifecycle Management</th>
<th>-Airframe Lifecycle Management</th>
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<tbody>
<tr>
<td>-Emergency Equipment Management</td>
<td>- Rotables Management</td>
<td>- Repairables Management</td>
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<tr>
<td>Interiors Management</td>
<td></td>
<td>- Airframe Degradation Management</td>
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Five FAA accepted maintenance efficiency applications
A Comprehensive Hardware & Software Solution

• Boeing’s One-stop-shop technology solution provided by Fujitsu and world-class industry partners
Alaska Airlines Validation

- Developmental partner since program inception
- Co-developed, tested and validated first five applications
- Results of operational testing have exceeded expectations
- Alaska contributed ~4000 hours of technical evaluation and validation support
System Performance Testing

- Multiple system interference checks
- Confirmed no EMI / EMC interference between RFID and airplane systems in any ground-based configuration
Operational Survivability Testing

- Electromagnetic Dent Removal
- Airframe Degaussing
- Chemical Exposure
- Liquid Nitrogen Soak
- Alkaline Heated Tank

- G8 Rivet Gun
- Direct Impact
- Degradation from Exposure
- 450F heated surface
- Adhesive Integrity
- Ice and Moisture
- Corrosion Inhibitors and Paint
- Glass Beat Blast
- X-Ray

No tag failures, all continued to operate normally
End User Acceptance

- Demonstrated usability and effectiveness:
  - 440 tags acquired in <3.5 minutes
  - End-user acceptance; AMTs performed all UAT procedures
  - No tag failures in trial
- Over 90% lead time reduction demonstrated in trial
737-800 Performance

Life vest inspection

~1 hour

< 2.5 minutes: all life vests acquired and statused

Begin Scan

End Scan

Before

After
777-200 Performance

Life vest inspection

Before ~10 hours

After

Begin Scan

< 6 minutes, all life vests acquired and statused

End Scan
737-800 Performance

O2 Generator Inspection

Before

~4 hour

After

Begin Scan

< 1.5 minutes: all O2 generators acquired and statused

End Scan (2/3 length of cabin)
A solution?

RFID proving to be a highly effective method of aircraft emergency equipment configuration management but…
Limitations Exist

Ref. FAA AC 20-162

• RFID data cannot be used as authoritative source for maintenance tasks

Boeing’s RFID-based maintenance program

• Enables certain aspects of maintenance to be accomplished through use of RFID and RFID-like technologies.
Not Just Inventory Management

- Knowing what it is and where it is, is good…

- Consequences of failure can be serious in the aerospace industry
Traceability of Compliance

Boeing D6-84838 (the what)

Regulatory Acceptance

GPM (the how)

FAA Operational Suitability Report

Boeing General Procedures Manual (GPM)

Boeing GPM Interface Document

Operator GPM
Acquiring the Data
Recording Data for Compliance

- As-flying configuration reports reflect RFID data
- Efficient identification of emergency equipment expired or approaching allowable thresholds
- Searchable by aircraft identification number
Impact on Operations

Results – over 90% lead time reduction demonstrated on trial

Source: Skills, rules and knowledge in aircraft maintenance: errors in context
ALAN HOBBS and ANN WILLIAMSON
Results from China Airlines Operational Trial

CHI B744
9 minutes – all life vests, presence & serviceability
Thank You