RFID JOURNAL LIVE! Europe

18-19 Oct. 2011 * Dorint Hotel, Amsterdam, The Netherlands
UHF RFID Technology on the Front Line
RFID in MRO Processes
Agenda

- Introduction
- LHT’s RFID Approach
- Permanent Parts Marking
- Current Situation & Outlook
Revenue in 2010

- **Lufthansa**: The Group’s airlines rank among the world’s leading carriers. 20.912 Million €
- **Lufthansa Technik**: Leading supplier of engineering services in the world’s airline business. 4.018 Million €
- **Lufthansa Systems**: One of the world’s leading IT service providers for airline / aviation industry. 0.595 Million €
- **Lufthansa Cargo**: One of the world’s leading cargo carrier in international air traffic. 2.795 Million €
- **LSG Sky Chefs**: World’s largest provider of airline catering and integrated in-flight solutions. 2.249 Million €
Lufthansa Technik AG

Primary focus for RFID activities:
- MRO logistics & asset management for aircraft spare parts
- Aircraft maintenance processes

- highly complex logistics systems
- high requirements on security issues
- high value of parts
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RFID in the Lufthansa Technik Group approach to using RFID technology
RFID in the Lufthansa Technik Group
Tags directly on parts promises high potential

- Supporting on-board processes
  - Aircraft Configuration Management
  - periodic checks for completeness and expiration date

- Supporting maintenance processes
  - parts identification while installed and w/o line of sight
  - simplifying handling and documentation of parts w/o serialization

- Supporting logistics processes
  - accelerated receipt at delivery points
  - proactive notification about upcoming parts

- Standardization of parts processes
  - simplification of quality & certificate checks
  - assisting & promoting paperless processes
  - liquidation of cross media transactions
Reasons for permanent RFID marking
Simplification of data collection
RFID in the Lufthansa Technik Group
Hurdles as base for a development project

- Standardization
  - Missing data standard anticipates usage in open systems
  - Missing (world-wide) frequency standard leads to multiple tagging

- Hardware
  - Different performance of reader (esp. regarding frequency)
  - No adequate tag on the market available; problem: size vs. bandwidth vs. underground material dependency

- Harsh environment in the MRO industry

- Life cycle of parts > 20 years

- Undefined regulatory situation
Permanent Parts Marking
Document tagging vs. Permanent Parts Marking

- **Document tagging**
  - Ident-Tag (LHT-proprietary)
  - Smart-label (passive)
  - Content: reference to Ident-Tag ID
  - Customized bought and applied on document printing in LHT workshops or on goods receiving

- **Permanent parts marking**
  - LRU, pool parts only
  - permanent tag (passive)
  - Content: master data, e.g. SNR, PNR, MFR (corresponding to ATA SPEC 2000)
  - Applied on parts in the LHT workshops and for new parts at MFR
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RFID on Parts
LHT Component Pool

- The Lufthansa Technik component pool consists of:
  - Ca. 120,000 aircraft parts on stock
  - 20,000 different Part numbers
  - Worth: ca. 1.2 Bill. EUR (ca. 1.7 Bill. USD)

The size of the tag was determined the highest possible amount of parts of the pool could be equipped retroactively. Base: Wide analysis of construction forms / design
Requirement from the MRO Industry
Extreme chemical resistance of Housings

- Flight Operation
  - Kerosene
  - De-Icing Fluid
  - Hydraulic Oil
  - ...

- Maintenance
  - Skydrol
  - Acetone
  - Solvents
  - ...
Requirement from the MRO Industry
Mechanical & climatically conditions

• Vibratory resistance
• Impact- and Shock ruggedness
• Weatherproof (Humidity)
• Altitude-/ Pressure differences: 220hPa
• Temperature differences -65°C to 160°C
• No flammability respectively fire support
Requirement from the MRO Industry
Technical requirements

- approx. 300,000 supplies p. a.
- Goals:
  - High level of standardization (RFID & Aviation as well)
  - High flexibility
  - High process accelerations

- Consequence:
  - Independent of surface and usage area
  - \textit{„Devil’s Triangle“}
  - Read Range
  - Size

- Result:
  - avio.tag™
Permanent Parts Marking
Tag Development and Qualification

Dimensions
- 11 x 41 x 5.2 mm
- beveled sides to reduce the risk of shearing tag off the component

Standard Interoperability
- FAA AC No. 20-162
- EASA Policy on passive RFID Devices
- SAE AS5678
- ATA Spec 2000 Chap. 9-5
- ISO 18000-6c / EPC Class1 Gen2

Technical Characteristics
- Operability on metal
- 512 Bit user memory
- No battery = passive
- Frequency band UHF (860-960 MHz)

Airworthiness and MRO-Capability
- Thermal resistance
- Mechanical resistance
- Chemical resistance
- Electromagnetic compatibility (EMC)
Permanent Parts Marking with avio.tag
Alternative Mounting Methods
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RFID-Tagging of Consumables
Handling and challenges

Facing challenges...

- lack of standardization
- greasy
- Authority requirements
- searching
- dirty
- soiled
- sticky

- Shelf life monitoring
- tracking & tracing
- lubricious
- localization

- Data quality
- time & effort
- dispose
- data layout

- Product diversity
- investigation
- storage diversity
- audits

- Expiration date
- Identification

- Single Labeling
- Storage diversity

- Authority requirements
- Audits

- lubricious
- Soiled

- Product diversity
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- disposal
- data layout

- Shelf life monitoring
- Time & Effort

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RFID-Tagging of Consumables
Automatic control of expiration dates

**Selection and proof of RFID-technology**
Testing of various Smart Label and Handheld Hardware

- Tagging of all items in designated department
- Partial tailoring of Smart Labels for metal and extremely small surfaces

**Proof of Concept within a testpilot**
Initializing of product data and shelf life control application

- Transfer of required data and verification of successful storage on Smart Label
- Weekly check with RFID-Handheld Application
- Dispose products with Exp. <7 days (red)
- Use products with Exp. 7-21 days (yellow) before
- Usage of products with exp. >21 days (green)
Auto-ID in Maintenance Processes
Localization technology for a transparent Supply Chain
Auto-ID in Maintenance Processes
Localization technology for a transparent Supply Chain

Engine Transport HAM - JFK

Attention!
Flight LH400 delayed!

G-Force Monitor

posIDon
Positioning & Identification online

Time stamps
Phone calls
question search
investigate
online manuell

Where is AOG # 3675?

HAM
FRA
NUE

posIDon
Positioning & Identification online

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Summary
Questions???
Thank you

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