Progress on Developing Radio Frequency Identification within Commercial Aviation

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Sample Bar Coded Nameplate

FLIGHT CONTROL COMPUTER

TYPE NO. FCC-702
BOEING SCD S241T100__

COLLINS PNR 622-8757__

Collins Air Transport Division/Rockwell International
Order Number, Iowa 51458-5001 USA

MFR 4V792

SER 9999999 MFR DATE 9501

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### Benefits of Automated Identification

#### Customer and Supplier Benefits
- reduces inventory control and provisioning costs
- accurate configuration control and repair history
- reduces warranty claim processing costs
- regulatory agency compliance monitoring
- part installation and removal time tracking
- accurate and efficient spare parts pooling
- identification of rogue parts
- accurate flight hours tracking by part

#### Boeing and Airbus Benefits
- reduces parts receiving costs
- eliminates data entry errors
- provides accurate “as delivered” configuration
- improves parts traceability
- reduces risk of unapproved parts
- timely in-service problem resolution
- accurate and efficient spare parts pooling
- improves customer satisfaction

By working together on these non-competitive standards initiatives, both Boeing and Airbus benefit by avoiding conflicting requirements with mutual suppliers and customers and delivering products and services which create best value.
Considerations for Deploying RFID on the 787

- Line replaceable
- Repairable
- Recommended as a spare
- Frequency of removal
- Spares price
- Dispatch criticality
- Life-limited or time-controlled part
- Emergency equipment
Radio Frequency Identification (RFID)

- RFID is an automated identification and data collection technology that uses radio frequency waves to transfer data between a reader (interrogator) and items that have tags (transponders) affixed.

- Similar to bar code
  - RFID tag stores data ~ bar code label
  - RFID reader ~ bar code reader
  - Radio waves ~ light waves

- RFID advantages compared for commercial aviation
  - No line of sight required
  - Dynamic read/write capability
  - Simultaneous reading and identification of multiple tags
  - Tolerant of harsh environments
Because passive RFID devices:

- Have no on-tag power source and no active transmitter, and
- Perform a ground operated, non-essential function, and
- Are not potential sources of interference or susceptibility and
- Are FCC-certified for unlicensed use.

The FAA and EASA have agreed that passive RFID devices comply with applicable regulations and do not impact form, fit, or function of installed systems and equipment.
Agreement reached on simplified certification strategy based on cross FAR application, applicable to all aircraft types (airplanes, rotorcraft, general aviation, etc.).

FAA has published Passive RFID Policy Memorandum, dated May 13, 2005.
RFID Proof of Concept with FedEx

- RFID tag installation completed October 3, 2003 during freighter conversion by Aeronavali (Venice, Italy).
- Test aircraft, MD-10 (N370FE), returned to revenue service on November 12, 2003.
- Infineon 13.56 MHz passive tags were tested – scope was 40 installations covering all major aircraft zones.
- Duration of RFID test was 90 days in-service.
- FedEx Engineering Authorization 8-1130-67451 indicated minor alteration does not alter form, fit or function of components.
FedEx MD-10 N370FE
Annunciator Control Unit
Air Data Inertial Reference Unit
Flap Limit Duplex Actuator Unit
Smoke Detector
Auxiliary Hydraulic Pump
Hand Held Portable Data Terminal
A similar 90-day in-service evaluation with 915 MHz smart labels on the same 40 components on the same airframe (N370FE) is now complete. Findings are similar to 13.56 MHz evaluation.

FedEx, Boeing and the FAA have approved this additional evaluation using a revised FedEx Engineering Authorization.

787 Applications
Examples of ATA Data Elements

- Part number
- Serial number
- Manufacturer
- Fabricator
- Date of manufacture
- Country of origin
- Modification level
- Warranty expiration date
- Weight
- Part description/nomenclature
- Lot number
- Hazardous material code
- Electrostatic sensitive device indication
- Shelf life expiration date
- Software part number
- Airworthiness certificate tracking number
Passive, reader talk first protocol

860 - 960 MHz frequency range
Read/write secure memory

Complies with ATA SPEC 2000 Chapter 9

Environmental tests per DO 160E requirements

Metal mount, surface insensitive packaging

20 year service life

Complies with FAA policy dated May 13, 2005

Air interface in accordance with EPCglobal (ISO 18000-6C)
Accomplishments to Date

- RFID in-service evaluations with FedEx completed
- Global Aviation RFID Forums (six events completed)
- FAA Policy authorizing passive RFID usage issued May 13, 2005
- UHF smart label requirements defined for on-airplane use
- Airplane Level Study 781 completed (weight, cost, etc.)
- United States Patent Number 7,064,668 issued
- Began EPC Global standards activities
Planned Next Steps

- Global Aviation RFID Forums in 2007
- Component supplier technical requirements forums
- 787 launch customer education workshops
- RFID smart label development with Intelleflex
- Finalize certification plan for RFID on 787
Thank you for your attention

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