



Progress on Developing Radio Frequency Identification within Commercial Aviation

Kenneth D. Porad

Associate Technical Fellow

RFID Program Manager



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

- 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 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.

RFID Enabled Smart Label

787
DREAMLINER



FedEx



PNR 622-5132-612



MFR 0FZB4



SER 9766

FedEx MD-10 N370FE

787
DREAMLINER



Annunciator Control Unit



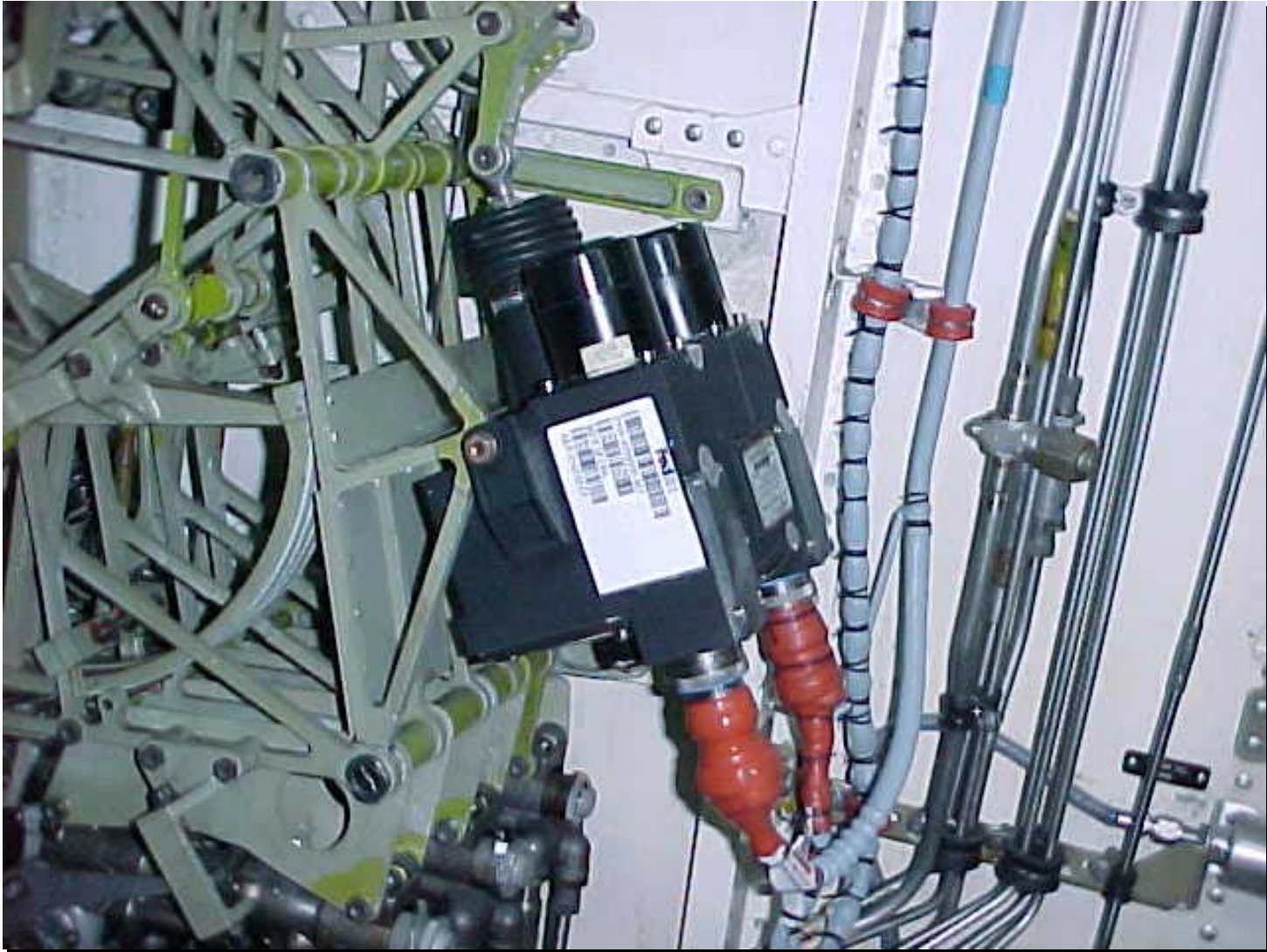
Air Data Inertial Reference Unit

787
DREAMLINER



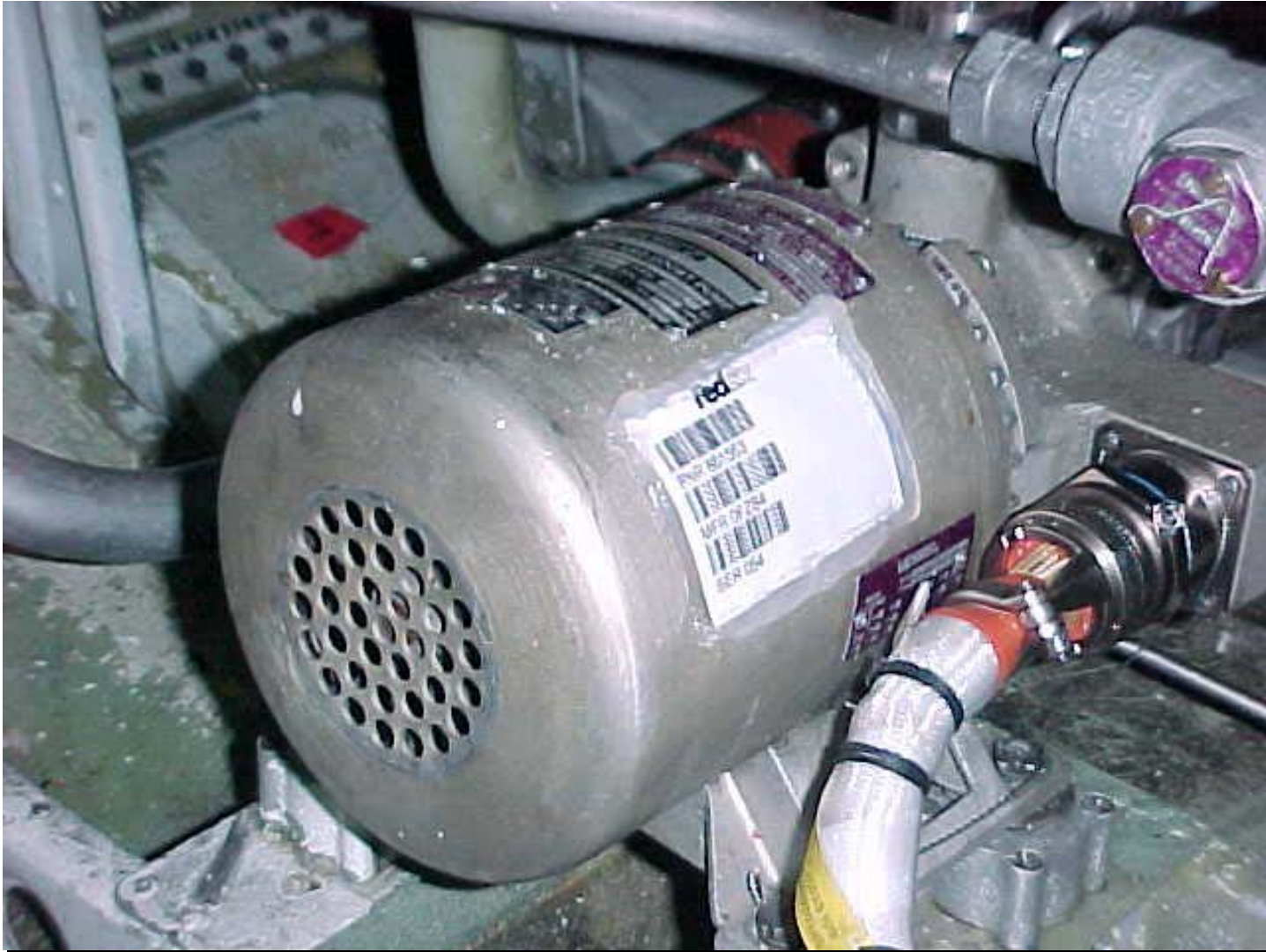
Flap Limit Duplex Actuator Unit

787
DREAMLINER



Auxiliary Hydraulic Pump

787
DREAMLINER



Hand Held Portable Data Terminal

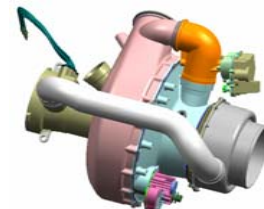
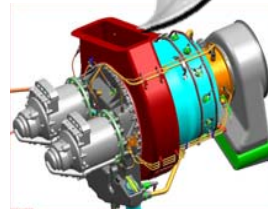
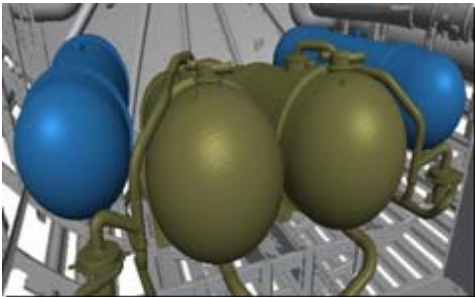
787
DREAMLINER



- 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.
- Installation of the smart labels took place in Memphis, TN on October 6, 2004. Final report-out meeting with FedEx, Intermec and POSData in Everett on February 15, 2005

787 Applications

787
DREAMLINER



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 Intellex
- Finalize certification plan for RFID on 787

Thank you for your attention

Contact: Kenneth D. Porad

Boeing Commercial Airplanes

Telephone 206-662-6160

Fax 206-662-7168

kenneth.d.porad@boeing.com

 **BOEING**



787
DREAMLINER™

BOEING COMMERCIAL AIRPLANES