

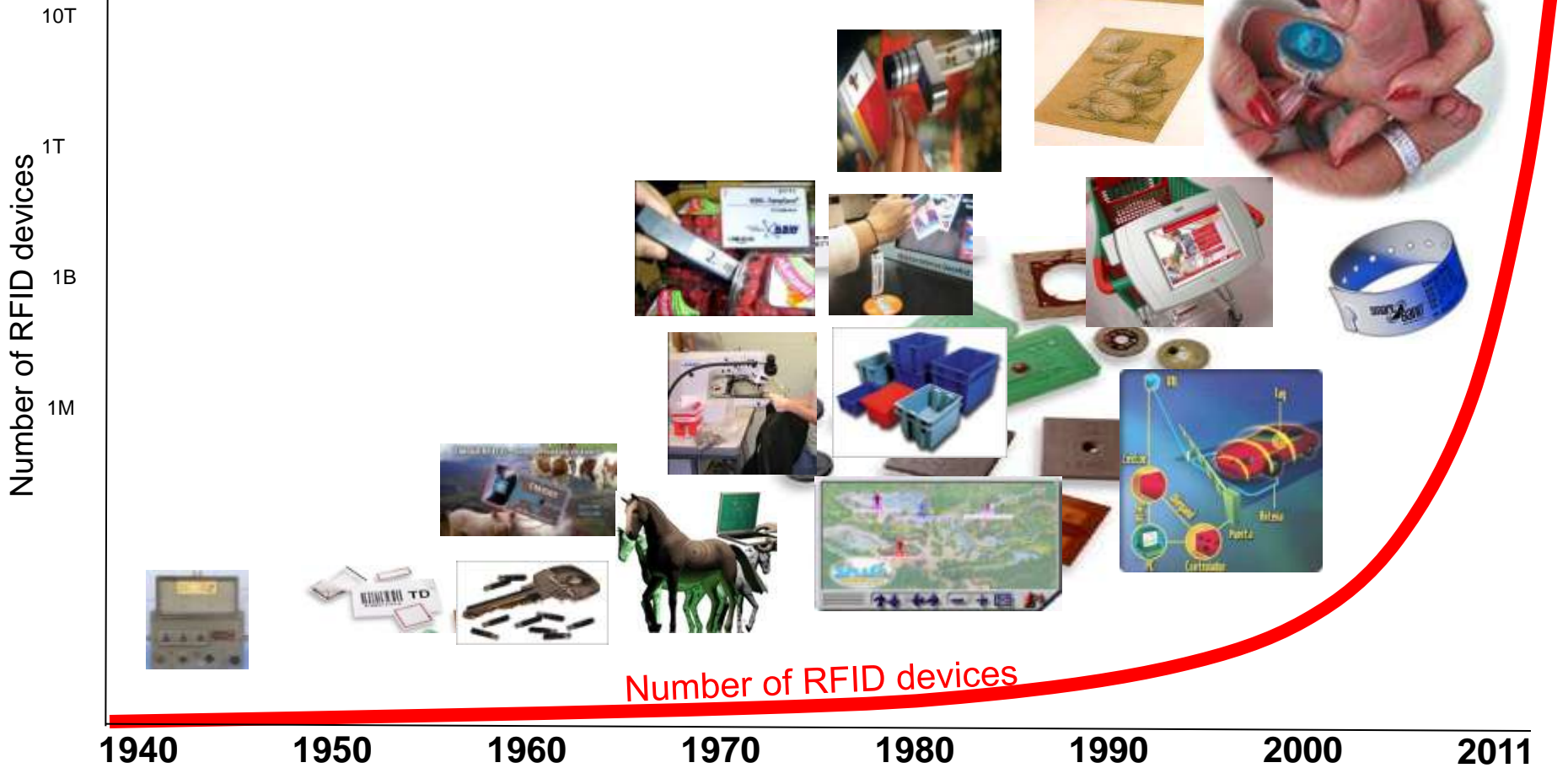


# Progress on Commercializing Radio Frequency Identification (RFID) within Aerospace & Defense

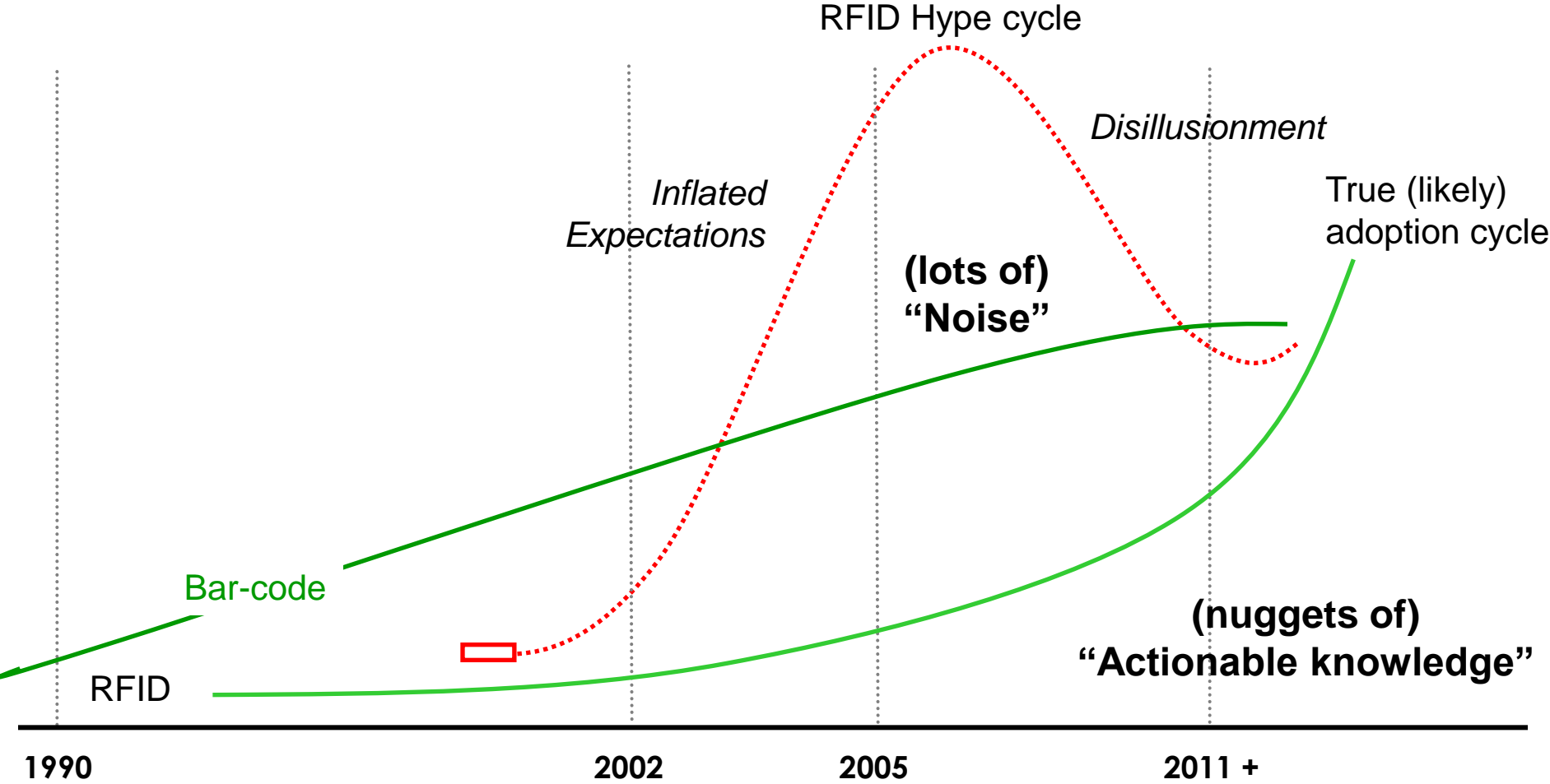
**Kenneth D. Porad**  
**Associate Technical Fellow**  
**The Boeing Company**

# Explosion of RFID Applications

## RFID Applications Exploding



# Boeing Technology Adoption Cycle (Auto-ID)



# Enterprise-wide Benefits of RFID

## 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

## Production System Benefits

- reduces parts receiving costs
- eliminates data entry errors
- provides accurate “as delivered” configuration
- improves part location tracking
- reduces risk of unapproved parts
- timely problem resolution

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.

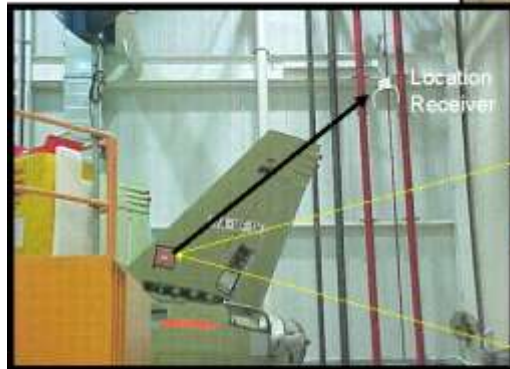
# Industry Position on Passive RFID

Because passive RFID devices:

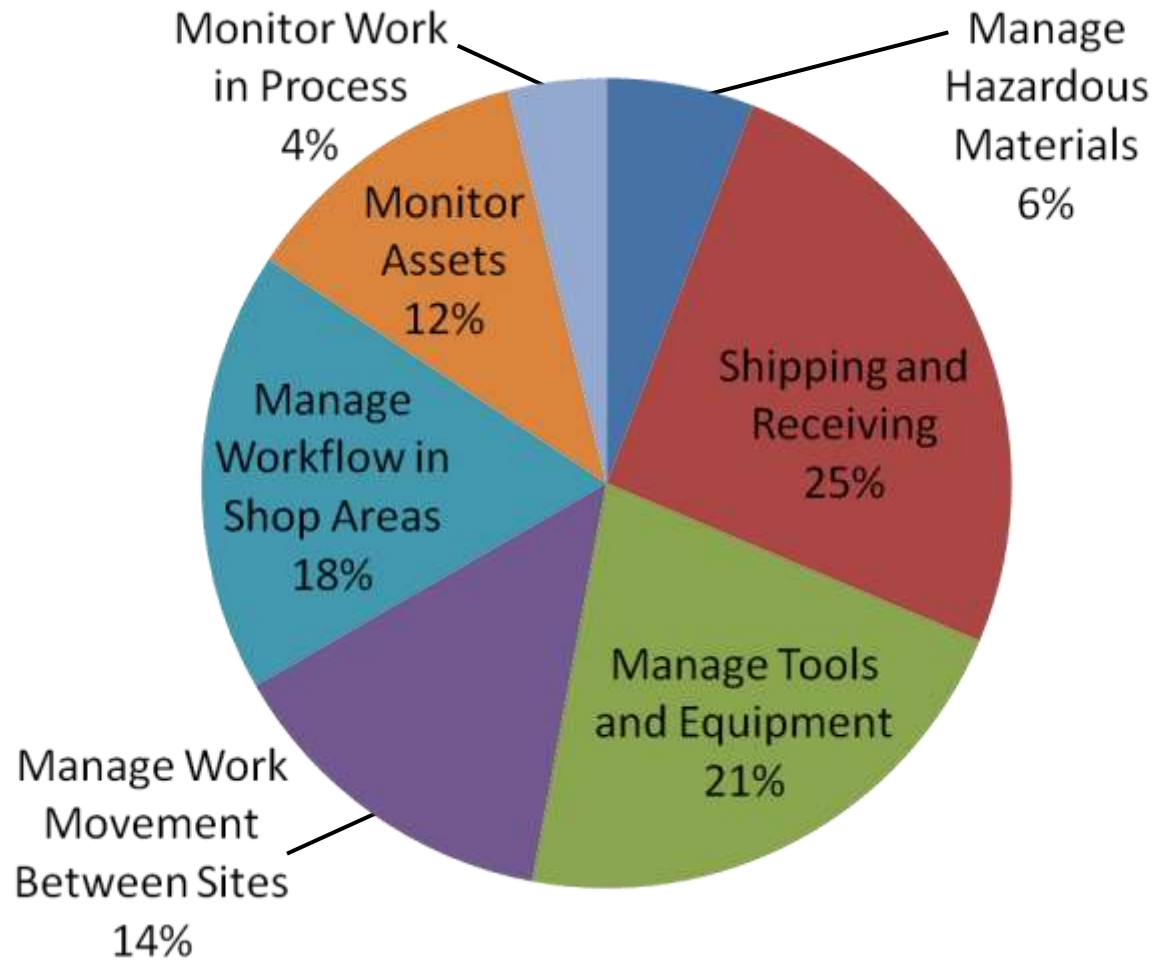
- Have no on-tag power source and no active transmitter, and
- Perform a ground operated, non-essential function, and
- Are not potential sources of interference or susceptibility and
- Are FCC-certified for unlicensed use.

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.

# Early Adoption of RFID in Aerospace



# Enterprise RFID Projects by Use Case



# Considerations for Deploying RFID on Parts

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

# RFID Proof of Concept with FedEx



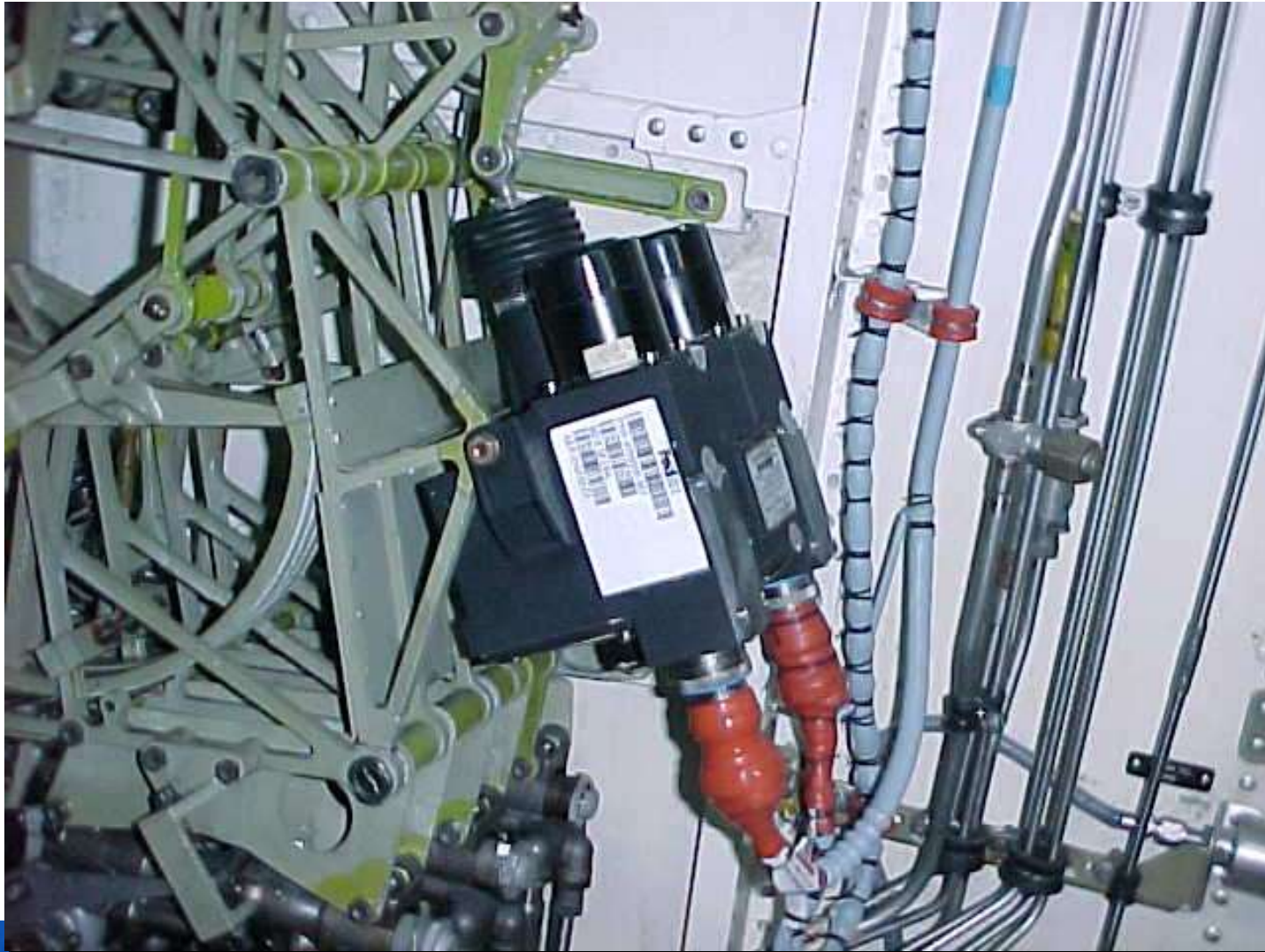
# FedEx MD-10 N370FE



# Annunciator Control Unit



# Flap Limit Duplex Actuator Unit



# Smoke Detector



# Hand Held Portable Data Terminal



# JAL: Current State of Emergency Equipment Checks

JAL maintenance technicians access oxygen generators in PSUs, ceiling panels, seats and crew rests.



PSUs



Ceiling Panels



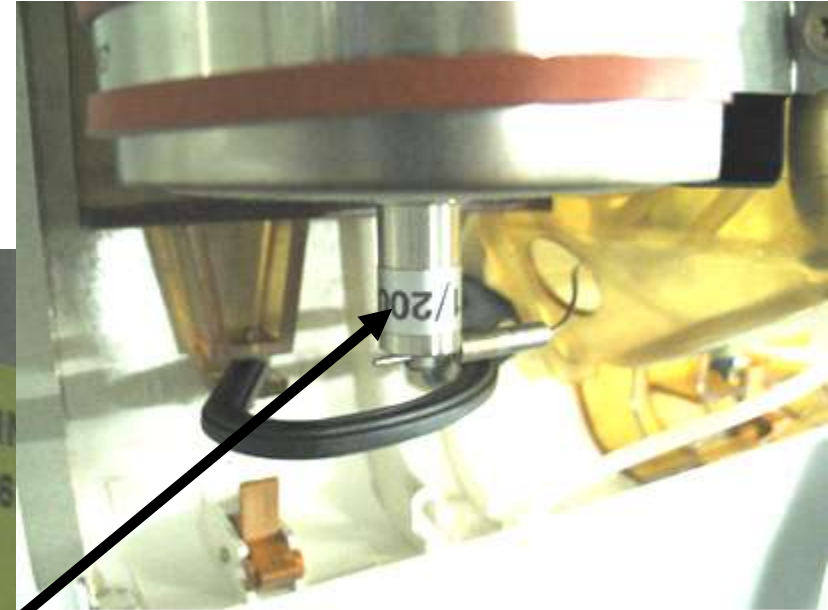
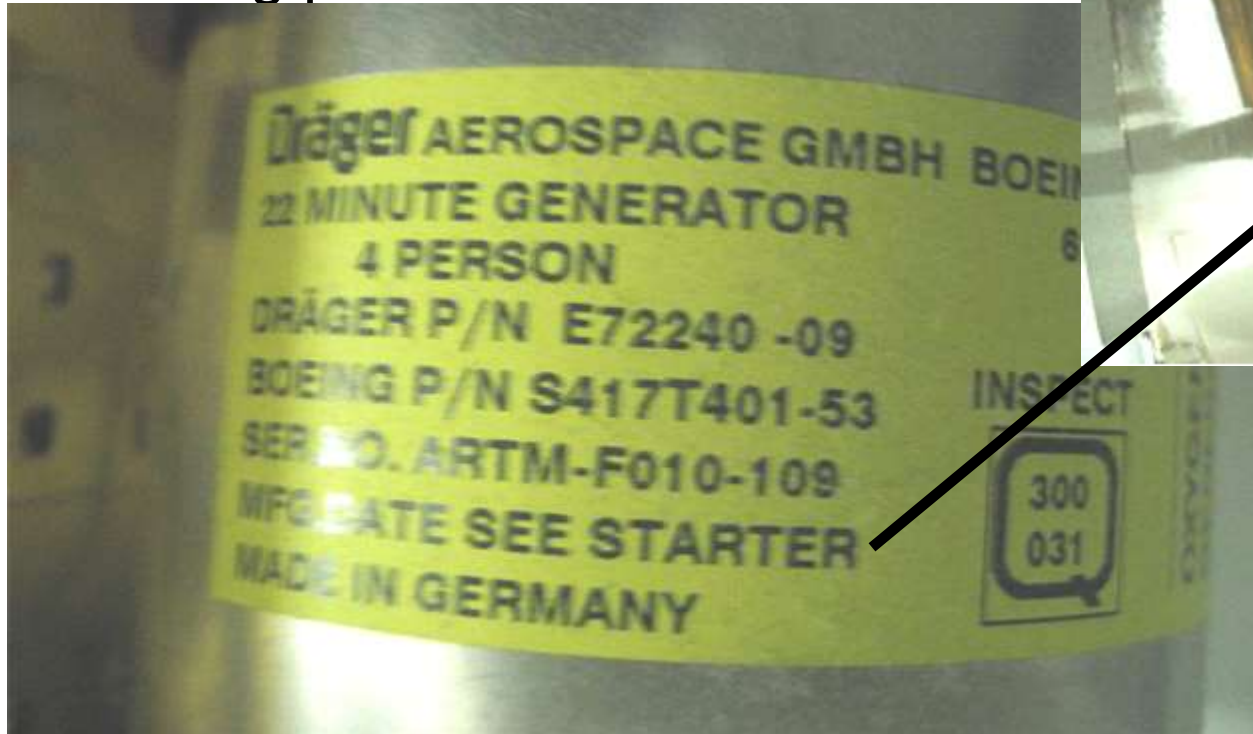
Seats



Crew Rests

# JAL: Current State of Emergency Equipment Checks, cont.

Mechanics required to check the expiration date located on the firing pin.



# JAL: Future State of Emergency Equipment Checks With RFID

## Dramatic results were achieved.

### Before

- 13 labors hours.
- 6.5 hour cycle time.
- Full ship-set of inventory managed as “just-in-case” and located in Haneda.
- No as-flying configuration management. Checked as “OK” or “NG”. Generators replaced 19 months prior to expiration.
- 20% loss of product life-cycle yield and greater consumption of product.

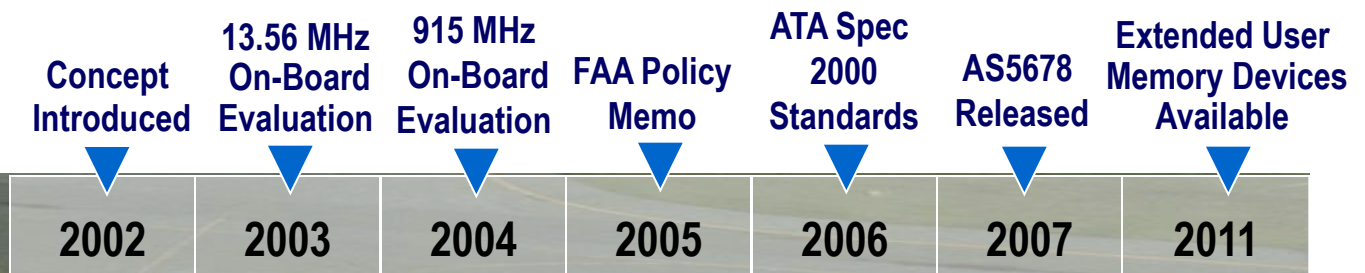
### After

- 8.5 labor minutes – 99% reduction
- 8.5 minutes – 98% reduction
- 80% reduction, forward deployed to line stations and managed as “just-in time.”
- All transactions captured in front-end database. As-flying configuration management allows for generator replacement in weeks or days before expiration.
- 20% recovery of product life-cycle yield, decrease in product consumption.

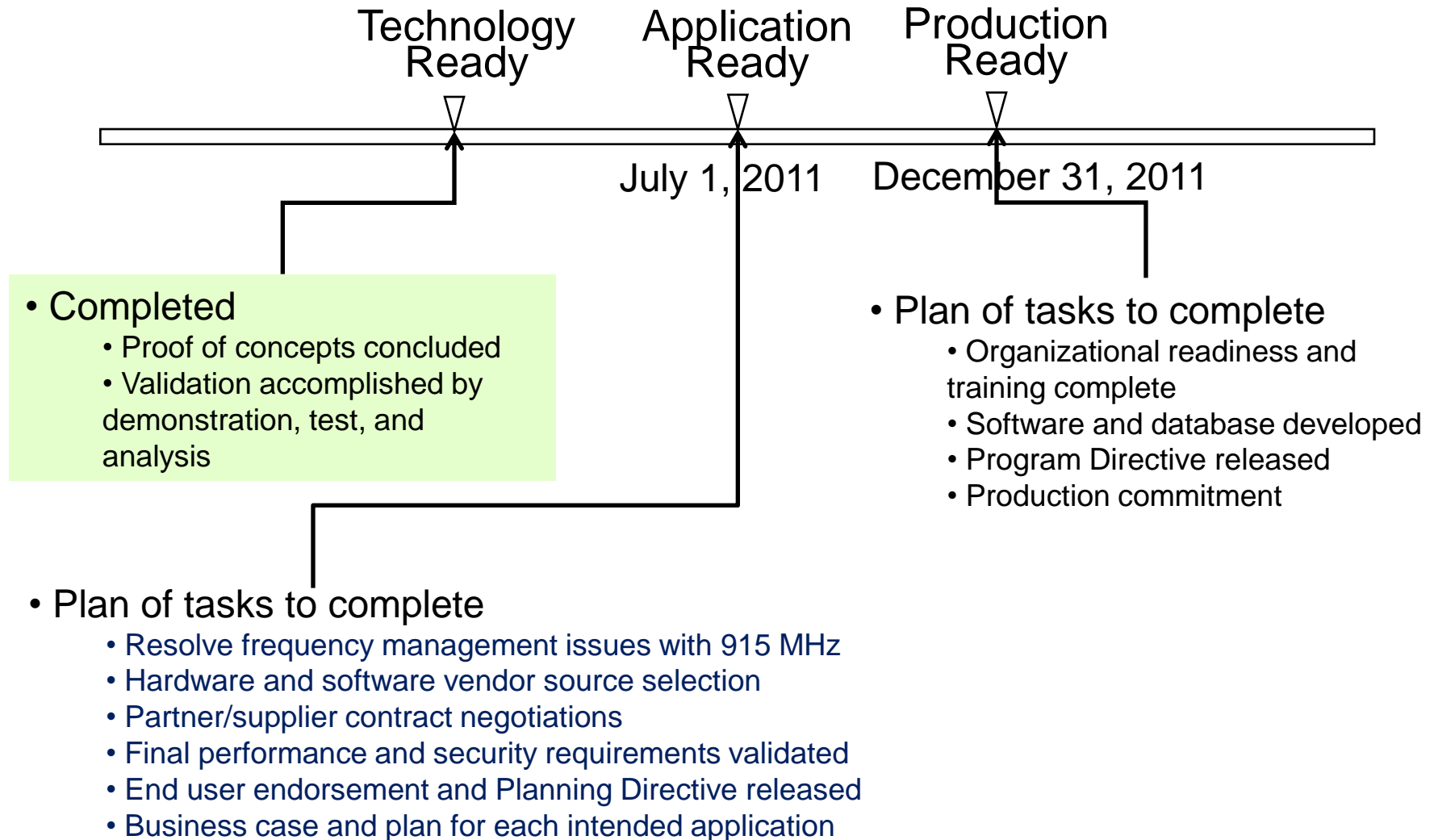
# Examples of ATA Data Elements

- 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

# RFID Technology Development



# Boeing RFID Technology Readiness Plan



# Future RFID Outlook for Aerospace and Defense

- Purely passive integrated circuit designs will provide extended user memory beyond 64 kilobits.
- Data transfer rates will increase dramatically and reach Megabytes per second.
- Innovative antenna designs will increase range and performance.
- Active tags incorporating onboard wireless sensor networks will proliferate aerospace products.
- Prices for commercially available off-the-shelf readers will decrease due to economies of scale.

Thank you for your attention!

