Boeing Flyaway RFID strategy

Supplier
• Supplier production visibility & parts management

Airlines
• Accurate “As flying” configuration
• Inventory management
• Regulatory compliance of life-limited parts

OEM (Airframers)
• Simplified ARL process with better accuracy of the “As Delivered” configuration

To benefit all stakeholders in the aerospace industry

* Aircraft Readiness Log
### Specs align with industry best practices

Boeing specifications has adopted industry standards

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Tag</th>
<th>Reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational frequency range</td>
<td>UHF (860-960 MHz)</td>
<td>Comply with local regulations</td>
</tr>
<tr>
<td>Read range</td>
<td>Minimum of 0.5 m along with tag sensitivity requirement</td>
<td></td>
</tr>
<tr>
<td>Environmental specifications &amp; performance</td>
<td>D6-84731 including SAE AS 5678 standards</td>
<td>N/A</td>
</tr>
<tr>
<td>Data encoding standards</td>
<td>D6-84731 including ATA Spec 2000 Ch 9-5 standards</td>
<td>N/A</td>
</tr>
<tr>
<td>Communication protocol</td>
<td>EPC Class 1 Gen 2 (EPC C1G2)</td>
<td></td>
</tr>
</tbody>
</table>

### Driving requirements – Environmental, Interoperability and Placement
Factors influencing performance

- **Physical environment**
  - Tag selection and placement

- **Data environment**
  - Tag data conformity and consistency

- **Application design**
  - Efficient user interface tool with alerts for timely actions

- **Organizational preparedness**
  - Training of personnel on new tools; Skills and knowledge

**Key Performance Indicator – Data available anytime anywhere**
Flyaway RFID tag selection

- **Standard tag sizes**
  - Type I and II: Operate on metal and non-metal surfaces
  - FAA AC 20-162 A: Addition of the RFID tag is considered as a minor change and should not result in changing the form, fit or function of the part
  - Supplier guidance through Lab and in-situ testing on the placement

- **Recommended tag suppliers – Brady and Fujitsu**
  - Boeing qualified several Type I & II tags to affix on the aircraft parts
  - Other tag suppliers can be selected by the equipment suppliers provided they comply with Boeing requirements

Goal to minimize the cost to implement with qualified tags
Flyaway RFID tag data requirements

- **Tag types**
  - Single-Record Birth, Dual-Record, and Multi-Record
  - Birth record should be permalocked

- **Data Consistency**
  - Digital marking of Birth Record in RFID tag shall match with the printed part marking

- **Data Conformity**
  - Aerospace & Defense Identifier (ADI) EPC format
  - Follow the latest version of the ATA Spec 2000 Ch 9-5 standard for data encoding
  - Provide Boeing with a sample RFID tag encoded with data both in the EPC and the User Memory to check for the data format
Application design & Implementation status

- **IT infrastructure operational to support**
  - Data collection with handheld RFID readers
  - Backend ARLDB updates with data collected

- **RFID part marking on new and sustaining models**
  - 777X – Baseline
  - Sustaining models – Contract Change Notice released
  - Airplane Configuration Bulletin (ACB) released – Encourage airlines to add RFID tags on BFE parts
  - Boeing fabrication units started marking with RFID tags

**Goal to tag as many ARL parts as possible**
Auto localization/read capability

Goal: Automated data collection to reduce time and resources to both manufacturers and Airlines

- Boeing study based on two approaches

1. Installed RFID readers
   - Localization accuracy: read range and reader density
   - Performance is a challenge due to orientation etc.
   - Cost, weight, complexity may be prohibitive

2. Auto readers
   - Developing an auto reader that can localize RFID tags
   - Walk down the aisle with auto reader to register all tags in the cabin
   - 3D position relative to the auto reader location
   - Complex technology but looks promising so far

Research effort continues to reduce flow time at affordable cost
Moving forward

- Guide suppliers on tag placement
- Qualify new tags for small parts, curved surfaces and harsh environment

- Ergonomic readers
  - Smartphone, Tablet based
- Auto readers

- New standard SAE AS 6023
- Cargo and other regions

Committed to increasing the velocity of adoption
Call to action

- Airlines: Encourage their suppliers (particularly BFE) to incorporate RFID part marking based on compliant tags

- Suppliers: Start leveraging RFID internally and adopt compliant tags on the parts

- Tag suppliers: Develop standards based specialized tags for parts in harsh, curved surfaces and constrained space environments

Let us all work together to benefit aerospace industry