Aircraft Reliability
Data Collection and Exchange
- Spec2000 Chapter 11-

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SPEC2000 Chapter 11 – What is it?

• A common language that allows aviation industry partners to exchange detailed reliability data easily and cost effectively.

• It IS already published in the Spring 2004 release of the ATA SPEC2000 E-Business standards. (If your organization subscribes to SPEC2000 for standards such as material procurement, you already have access to the reliability data records in chapter 11).

SPEC2000 Chapter 11 – What is it NOT?

• It is NOT a database or central repository for reliability data.

• It is NOT a reliability report generation tool.
SPEC2000 Chapter 11 - Scope

Operator/OEM Reliability Data Exchange and Collection

In Scope

Airframe OEM Database

Out of Scope

Reliability Analysis & Reports

Out of Scope
The need for reliability data standards:

- Operators need to collect, organize and report reliability data to many different organizations: Manufacturers, suppliers, regulatory authorities, each other.

- Some of the benefits of reliability data exchange:
  - Assist operators and manufacturers to attain and maintain higher reliability through trend monitoring.
  - Facilitate maintenance program development, escalation and de-escalation.
  - Determine which modification has a better payback by comparing removal and failure rates of operators incorporating various Service Bulletins/modifications.
  - Determine if certain problem areas are unique to an operator or if others are experiencing the same problems.
Current reliability data flow, where we are today.
Current reliability data flow

- The volume of data exchange is high and the industry is currently using multiple data exchange languages. This adds complexities, inaccuracies and costs to the exchange processes, resulting in data and data analysis that is less effective and less timely.
Spec2000 Chapter 11, simplified exchange, where we need to be

Multiple data sources, one standard for sharing data

- Schedule Interruptions
- Pilot Snags
- Heavy Mtce Findings
- Airline Component Shop Findings
- 3rd Party Mtce Providers
- Airline’s Reliability Department

Trading Partners:
- Airframe Manufacturers
- Suppliers
- Engine Manufacturers
- Maintenance Providers
- Other Operators:
  - For Technical Performance
  - Data Exchange

SPEC2000 CHAPTER 11
ONE STANDARD FORMAT
FOR CONTENT AND EXCHANGE
METHODOLOGY
SPEC2000 Chapter 11, Overview & Evolution

- SPEC2000 Chapter 11 has been created by the aviation industry.

- The ARDTF membership is the largest active SPEC2000 task force. A small sampling of task force representatives: All Nippon Airlines, Virgin, SAS, Iberia, Continental, Delta, United, Westjet, American, Fedex, Air Canada, Boeing, Airbus, Bombardier, Embraer, Dassault-Falconjet, Parker, Hamilton Sundstrand, Thales, Smiths, Teijin Seikki, Honeywell, Pratt and Whitney, IAE, NBAA, ERA, Lufthansa Technik, SR Technics, to name but a few.
The evolution of SPEC2000 Chapter 11

Component Reliability Data Collection Task Force begins

Created Component Reliability data Collection standard in Chapter 11

Aircraft Reliability Data Collection Standardization begins

ARDTF establishes framework for developing aircraft reliability data standards

Spec2000 Chapter 11 Conditional Acceptance of Aircraft Reliability standard

ATA releases Spec2000 Chapter 11

NOW time to Become Spec2000 Compliant!

The Aircraft Reliability Data Task Force is the largest Spec2000 Task Force ever!
SPEC2000 Chapter 11 Reliability Data Records
SPEC2000 Chapter 11 records

Chapter 11 has 9 records:

- **LRU Removal record**
  - Purpose: Collect details of the components removed from an aircraft as well as reasons for removal and details of component being installed.
  - Fields include elements such as the manufacturer part and serial numbers, the operator’s unique part and serial numbers if applicable, hours and cycles data for the removed and installed components.

- **Shop Findings record**
  - Purpose: Collect detailed component tear down reports from an airline’s shop or other repair facilities.
  - Fields include elements such as fault found, part numbers of the piece parts that are replaced, modifications incorporated in the shop visit.
Chapter 11 records (ctd.)

- **Aircraft Hours and Landings record**
  - Purpose: Collect detailed hours, cycles and utilization data from operators. This data can also be used as the basis for MTBUR calculations, etc.
  - Fields include elements such as days out of service counts, ETOPS specific hours and cycles, etc.

- **Aircraft Event record**
  - Purpose: To capture aircraft event data such as delays, cancellations, incidents, etc.
  - Fields are very comprehensive and can capture all elements of a schedule interruption tracking system. Attributes specific to ETOPS operations are also captured with specific data elements.
Chapter 11 records (ctd.)

- **Aircraft Logbook record**
  - **Purpose**: Collect technical/journey log entries such as pilot reports, maintenance corrective action, etc.
  - **Fields** include elements such as discrepancy symptom code, corrective action codes, findings code.

- **Scheduled Maintenance record**
  - **Purpose**: Collect scheduled (heavy and line) maintenance data, findings and corrective action, and provide reference ability back to the operator’s maintenance program.
  - **Fields** include elements such as OEM MPD task number, operator unique task number if applicable, task inspection method and associated findings.
SPEC2000 Chapter 11 records

Chapter 11 records (ctd.)

- **Service Bulletin/Modification record**
  - Purpose: Provide data on service bulletin/mod incorporation and unincorporation.

- **Aircraft Status Change record**
  - Purpose: Capture changes in aircraft ownership, operator, long term storage disposition, engine model changes, etc.

- **Summary Counts record**
  - Purpose: Collect summarized rate and count information on an operator's fleet, e.g. schedule interruption counts by ATA, etc.
# SPEC2000 Chapter 11 records

## Field Name & Format

<table>
<thead>
<tr>
<th>Field #</th>
<th>Type</th>
<th>Max. Length</th>
<th>Attribute Name</th>
<th>Example</th>
<th>Condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>AN</td>
<td>6</td>
<td>Aircraft Model</td>
<td>757</td>
<td>MANDATORY</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>AN</td>
<td>6</td>
<td>Aircraft Manufacturer Serial Number</td>
<td>25398</td>
<td>MANDATORY</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>AN</td>
<td>10</td>
<td>Aircraft Registration Number</td>
<td>N560UA</td>
<td>CONDITIONAL</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>AN</td>
<td>6</td>
<td>Operator Aircraft Internal Identifier</td>
<td>550</td>
<td>CONDITIONAL</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>AN</td>
<td>5</td>
<td>Aircraft Engine Manufacturer Code</td>
<td>74455</td>
<td>CONDITIONAL</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>AN</td>
<td>20</td>
<td>Originating Discrepancy Identifier</td>
<td>Log Page #</td>
<td>MANDATORY</td>
<td>In Chap 11 this is identified in removals as Operator Event Identifier</td>
</tr>
<tr>
<td>15</td>
<td>AN</td>
<td>20</td>
<td>Maintenance Action originating Identifier (the link to the original discrepancy)</td>
<td>TBD</td>
<td>CONDITIONAL</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>AN</td>
<td>20</td>
<td>Originating Incident Reference Number</td>
<td></td>
<td>MANDATORY</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>AN</td>
<td>2</td>
<td>Interruption Code</td>
<td>P = Primary, C = Consequential</td>
<td>MANDATORY</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>AN</td>
<td>2</td>
<td>Total Number of Consequential Interruptions</td>
<td>3</td>
<td>CONDITIONAL</td>
<td>If the Interruption Code = P</td>
</tr>
<tr>
<td>19</td>
<td>AN</td>
<td>13</td>
<td>Discrepancy (Symptom) ATA System Code</td>
<td>215100</td>
<td>MANDATORY</td>
<td>In CSDD shown as Catalog Sequence Number</td>
</tr>
</tbody>
</table>

## Field Type (Mandatory vs Conditional)

- **MANDATORY**: Must be provided.
- **CONDITIONAL**: May be provided if additional information is needed.

**ORIGINATING INCIDENT REFERENCE NUMBER** identifies the originating document referenced for information when recording a specific airplane event.
• Records have been structured to include a field that can be used to link records together.

• This allows more efficient drill down and analysis to find “root cause” data.
**Spec2000 Chapter 11 Records**

**Linking the Event, Logbook, LRU Removal, Shop Report**

<table>
<thead>
<tr>
<th>EVENT</th>
<th>LOGBOOK</th>
<th>REMOVAL</th>
<th>SHOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERI</td>
<td>EV930630</td>
<td>RTI</td>
<td>SFI</td>
</tr>
<tr>
<td>OEI</td>
<td>LG41106</td>
<td>OEI</td>
<td>RM10774</td>
</tr>
<tr>
<td>ROC</td>
<td>LTX</td>
<td>DOT</td>
<td>LTX</td>
</tr>
<tr>
<td>OPR</td>
<td>LTX</td>
<td>AMC</td>
<td>Q400</td>
</tr>
<tr>
<td>AMC</td>
<td>Q400</td>
<td>AIN</td>
<td>4232</td>
</tr>
<tr>
<td>ICD</td>
<td>P</td>
<td>ROC</td>
<td>LTX</td>
</tr>
<tr>
<td>DTA</td>
<td>2311</td>
<td>OPR</td>
<td>LTX</td>
</tr>
<tr>
<td>ATA</td>
<td>231101</td>
<td>LOC</td>
<td></td>
</tr>
<tr>
<td>IOD</td>
<td>11-Aug-01</td>
<td>DOC</td>
<td>P</td>
</tr>
<tr>
<td>AIN</td>
<td>4232</td>
<td>MCC</td>
<td>11-Aug-01</td>
</tr>
<tr>
<td>DLY</td>
<td>1</td>
<td>MAH</td>
<td>3.5</td>
</tr>
<tr>
<td>TCI</td>
<td>3</td>
<td>DCT</td>
<td>#2 comm will not receive</td>
</tr>
<tr>
<td>DTM</td>
<td>0.53</td>
<td>DCT</td>
<td>#2 VHF: TX-CARRIER ONLY RX-STATIC-UNREADABLE. NO VOICE AT ALL.</td>
</tr>
<tr>
<td>DCT</td>
<td>#2 comm will not receive</td>
<td>RET</td>
<td>VHF TRANSCEIVER - STATIC-RT UNREADABLE.</td>
</tr>
<tr>
<td>MNT</td>
<td>Replaced transceiver.</td>
<td>MNT</td>
<td>REMOVED &amp; REPLACED VHF TRANSCEIVER. CONDUCTED TEST IAW TASK 23-11-00-710-801. TEST GOOD.</td>
</tr>
<tr>
<td>INT</td>
<td></td>
<td></td>
<td>*Power supply failure: Unrelated. Replaced. Intermittent. MX19 OUT - 3522;911M26 - Fault code present: Unrelated. Intermittent. DPU FC 11101,999 - Unit sent to XXX; CONFIRMED DEFECT. DPU BOARD REPROGRAMMED.</td>
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SPEC2000 Chapter 11 Reliability Data Records
Exchange Protocol

- Being cognizant of the evolution of data exchange formats, a decision was made by the ARDTF to adopt XML, including the development of XML schemas for the Chapter 11 records that are already published.
Airlines can achieve improved aircraft reliability and cost savings as a result of enhanced reliability data:

- quality;
- quantity;
- depth; and
- exchange speed and efficiency.
Example potential savings

- $3.2m annual savings from reduced delays and cancellations.
- $305,000 annual savings from reduced non-routine maintenance.
- $1.1m savings from expedited check interval escalation.

KEY ASSUMPTIONS:

- 50 seat RJ operation, fleet of 50 aircraft, 8 hrs/cycle per day.
- Cost of mechanical interruption = 22 cents per seat mile.
- $55 hourly labour rate.
SUMMARY

- Chapter 11 of SPEC2000 is a global standard for the exchange of aircraft, engine and component reliability data developed by key industry representatives.
- This standard will provide significant reliability and cost benefits to the industry.
- The standard is available today and several companies already have implementation plans and activities underway.