



S1000D

AIA /ATA/ ASD
S1000D Users Forum

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“S1000D for Boeing 787”

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The Boeing Company



AeroSpace and Defence
Industries Association of Europe



Air Transport Association

Boeing Commercial Airplanes S1000D Implementation Journey

September 1994
1st Boeing ATA SGML
Data Delivery to
Airlines

- 
- DTD and business rule refinement
 - System refinement

March 2005
Boeing Commits to S1000D
as 787 Support Information
Architecture

Systems Requirement & Standards Refinement

- S1000D V2.x – V2.3; 2 CAWG CPFs Submitted
- 787 Content Creation & Management Systems
- Information Delivery Systems
- Customer Content Management, Creation, and Delivery

- 2006**
- 787 Support Data Systems Development Begins
 - S1000D V2.3 – V3.0 Requirements Work; 5 CAWG CPF's Submitted

March 2008
First S1000D V2.3 Sample
Data Delivered to Airlines

Jan 2009
Systems upgraded to
S1000D v3

2009-2010
System & Data
Refinement

Time (not to linear scale)



787 Information Types in S1000D

Information Targeted:

- System Description Section (AMM part 1)
- Aircraft Maintenance Procedures (AMM part 2)
- Fault Isolation Procedures (FIM)
- Structural Repair Data (SRM) *
- Wiring Diagrams (WDM)
- System Schematics (SSM)
- Illustrated Parts Data (IPD/IPC)
- Service Bulletins (SB) *

- * - FAA Approved Information

Criteria For Selection:

- Instructions for Continued Airworthiness
- Level of customization
- Frequency of revision
- Volume of data
- Linkage to other manuals
- Available Today in ATA Spec 2200 SGML
- S1000D Support

Boeing Offers Technical Information Primarily via Toolbox on MyBoeingFleet.com

OPERATIONAL
PERFORMANCE

LIFECYCLE
SOLUTIONS

The screenshot displays the Boeing Maintenance Performance Toolbox web application. The interface includes a top navigation bar with the Boeing logo, the title "Maintenance Performance Toolbox", and a search bar. Below the navigation bar are tabs for "Main", "Systems", "Structures", "Library", "Data Manager", "Authoring", "Parts", "Tasks", and "Training". The "Library" tab is currently selected. The main content area shows a tree view of folders under "Contents", including "Fault Isolation", "Maintenance Planning/Reliability", "Maintenance Procedures", "Parts", "Schematics", and "Supplier Data". The "Maintenance Procedures" folder is expanded, showing sub-folders like "Aircraft Maintenance Manual", "Baggage/Cargo Loading Manual", "Boeing Component Maintenance Manual", "Engine Ground Handling", "Non-Destructive Test Manual", "Standard Overhaul Practices Manual", and "Structural Repair Manual". The right pane displays "No content to display". The interface also features a "Select Data Type" dropdown, "BACK" and "FORWARD" buttons, and a "SESSION HISTORY" dropdown.

Bulk Data also Offered in S1000D for Selected Information Types

- **Airline Operations & Maintenance Control**
- **Line Maintenance**
 - ◆ **Aircraft operator and 3rd Parties**
- **Heavy Maintenance**
 - ◆ **Aircraft operator and 3rd Parties**
- **Airline Engineering (includes Airline Technical Publications)**
- **Regulatory Agencies**
- **OEM Engineering and Field Support**
 - ◆ **Includes Engine Manufacturers and other suppliers**
- **Aircraft Modification (Usually not aircraft operator)**
- **Tooling Suppliers**
- **Aircraft Owner (Leasing Companies)**

- In Civil Aviation there are information types that are Approved, those that are Accepted, and those that require no review
 - ◆ Approved means there is actually a signature on file following a formal review process (e.g. Structural Repair)
 - ◆ Accepted means information is forwarded to the Regulatory Agency prior to aircraft delivery and certification as demonstrated compliance including the Instructions for Continued Airworthiness requirements (FAR Part 25)
- In addition, Maintenance Information is part of an airline's Maintenance Program per FAR Part 121
- FAA has accepted Maintenance Performance Toolbox as a data delivery tool
- FAA has NOT approved information in S1000D yet
 - ◆ Service Bulletins released after delivery of aircraft

Data Configuration managed for life of aircraft

Applicability was the major function added in S1000D V3 to support the 787

■ Data managed by tail number and component

◆ **Service Bulletins (Modifications) can apply to both airframe and component**

- Track Pre and Post over time
- Bulletins can be nested

***Great Support by S1000D Community
to Develop Version 3***

Lessons Learned (1)

Innovation versus Standardization

The time and effort required to update the specification is significant, often causing proprietary updates to be made in advance of the specification

Examples:

Use of N2D Tag within Parts

- ◆ **For Part data that has no definition in the IPD schema, N2D tags are allowed to be defined by the OEM to place this data**
- ◆ **For OEM data, there is a common XML schema, but the IPD N2D tags are project specific**
- ◆ **Airlines and their suppliers likely will be forced to create a different solution for Boeing data**

BCME (Boeing Common Metadata Edition)

- ◆ **Boeing created an XML metadata definition for non-S1000D Boeing data**
 - **Organization of content is not DMC based – it is ATA based due to cross model documents.**
- ◆ **Airlines will need to understand Boeing's XML metadata definition to handle non S1000D data**

Paradigm shift for Boeing, customers and regulatory agencies to think in Data Modules versus publications

Examples:

- ◆ **Approval and Acceptance of ICA by Publication Type**
- ◆ **Organization Structure in Boeing by Publication Type**
- ◆ **Access Control by Documentation Type**

Delivery System UI is Bridge

Lessons Learned (3) – Search becomes even more important in UI

Standard Numbering System (SNS)/S1000D DMC based navigation is cumbersome and does not meet industry usability expectations

The screenshot displays the Boeing Maintenance Performance Toolbox interface. At the top, the Boeing logo is on the left, and navigation links for Home, Site Map, Contact Us, and Help are on the right. Below the logo is the title "Maintenance Performance Toolbox" and a series of tabs: Main, Systems, Structures, Library, Data Manager, Authoring, Parts, Tasks, and Training. The "Library" tab is active. Below the tabs, there is a search bar with "787-S TBC 801" and "TBC*" entered, and a "Select Data Type" dropdown menu. The main content area shows a tree view of maintenance procedures. The tree is expanded to show "Maintenance Procedures" > "Aircraft Maintenance Manual" > "PMC-B787-81205-A0101-00 AIRCRAFT MAINTENANCE MANUAL (AMM)". Underneath, there are several folders for different maintenance tasks, including "000-099 Function, data for plans and description", "100-199 Operation", "200-299 Servicing", "300-399 Test, Check", "500-599 Disconnect, remove and disassemble procedures", "510-519 Disconnect", "520-529 Removal", "520 Removal", "20 STANDARD PRACTICES - AIRFRAME", "21 AIR CONDITIONING", "21-20 AIR CONDITIONING DISTRIBUTION", and "21-20-01 AIR DISTRIBUTION DUCTS". The right side of the interface shows a search results area with "No content to display".

OEM Costs

- ◆ Higher capacity “data factory”
- ◆ Data storage
- ◆ Authoring processes change

Customer Costs

- ◆ Faster data synchronization (Warnings & cautions in Kanji)
- ◆ Movement of data to remote sites and devices
- ◆ Keep Task Cards synchronized with changes in procedures

Need to plan process changes carefully

- **Being first to deliver S1000D in commercial aviation has both advantages and disadvantages**
 - ◆ **Simultaneous development of final specifications, business rules, OEM systems and Customer systems**
 - ◆ **Lessons generally learned the hard way**

- **Choice of using S1000D instead of ATA Spec 2200 is a long term investment**
 - ◆ **Aircraft models have a 50 year life cycle**

Focus must be on information Customer

Questions ?

