ATA iSpec 2200 Overview
Contents

• History
• Description
• Functional Areas
• Technical Areas
• Digital Deliverables
• ATA SGML Concept
• ATA Data Model
• What’s Next?
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History

Digital Data Specifications (incl. SGML) become Appendix of ATA 100

ATA Specification 100 (early digital data specifications included)

1989 - 1993

Creation of ATA Specification 2100 (iSpec 2200) based on:
- ATA 100
- ATA 2100

< 1989

1994 - 1999

2000
ATA Specification 2200
(iSpec 2200)

Information Standards for Aviation Maintenance

Revision 2004.1

AIR TRANSPORT ASSOCIATION

Air Transport Association of America, Inc.
1301 Pennsylvania Avenue, NW - Suite 1100
Description

- Recommended specifications for the content, structure, and deliverables to meet communication requirements [physical, electronic and future technology] of aircraft product technical information.

- A suite of data specifications and data models for the digital representation and exchange of technical data.

- Objective is to:
  - Minimize cost and effort expended by operators and OEMs
  - Improve information quality and timeliness
  - Ensure that manufacturers provide data that meets airline operational needs
Functional Areas

• Generic Resources
  ‣ ATA Numbering System
  ‣ Effectivity
• Maintenance Requirements
  ‣ Scheduled maintenance
  ‣ Maintenance Planning
• Maintenance Procedures
  ‣ Maintenance manuals
• Configuration Management
  ‣ Aircraft, engine and component configuration
  ‣ Next Higher Assembly and Next Lower Assembly
• Training (SDS only)
• Flight Operations
  ‣ Master minimum equipment list
  ‣ Flight crew operating manual
Technical Areas

- Data Model
  - Integrated Data Environment
- SGML Specifications
  - DTD Requirements (GenReq, FuncReq, TechReq)
  - SGML Document Type Definitions (DTDs)
- Graphics
  - ATA graphic profile for TIFF and CGM
  - Intelligent graphics, wiring diagrams
  - Multi-media
  - Style guide
- Direct Access and Retrieval
  - Retrieval requirements, language and schemata
  - Direct Access
  - Digital Security
  - Digital Certificates
  - Digital Signatures
- Common Support Data Dictionary

ATA /Spec 2200 Overview
Digital Deliverables

- Aircraft Illustrated Parts Catalog (AIPC)
- Aircraft Maintenance Manual (AMM)
- Aircraft Recovery Manual (ARM)
- Component Maintenance Manual (CMM)
- Component Maintenance Manual Parts List (CMMIPL)
- Consumable Products Manual (CPM)
- Engine (Shop) Manual (EM)
- Engine Cleaning Inspection and Repair Manual (EMCIR)
- Engine Illustrated Parts Catalog (EIPC)
- Engine Parts Configuration Management (EPCM)
- Fault Reporting and Fault Isolation Manual (FRFM)
- Flight Crew Operations Manual (FCOM)
- Illustrated Tool and Equipment Manual (ITEM)
- Maintenance Planning Document (MPD)
- Maintenance Review Board Report (MRB)
- Maintenance Steering Group (MSG-3)
- Master Minimum Equipment List (MMEL)
- Non-Destructive Testing Manual (NDT)
- Power Plant Build-up Manual (PPBM)
- Power Plant Build-up Manual Illustrated Parts Catalog (PPBMIPL)
- Production Management Database (PMDB)
- Service Bulletin (SB)
- Service Bulletin Index (SBI)
- Structural Repair Manual (SRM)
- System Description Sections (SDS)
- Tool and Equipment Manual (TEM)
- Weight & Balance Manual (WBM)
- Wiring Diagram Manual (WM)
- Graphics Exchange (GLEXCHANGE)
- Intelligent Graphics Exchange (IGEXCHANGE)
Contents

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• ATA SGML Concept
  ‣ What is SGML?
  ‣ ATA SGML Methodology and DTDs in ATA iSpec 2200
  ‣ Basic ATA SGML Mechanisms (Effectivity, Revisions, …)

• ATA Data Model
• What’s Next?
ATA SGML Concept: What is SGML? (1/4)

A unique source of information...

<PROC><TITLE> Operational Test </TITLE><WARNING>Make sure that... </WARNING> <STEP>On the maintenance panel 285VU, push the pushbutton switch...</STEP> <STEP>Open the circuit breaker...</PROC>

Data Loading

Technical Databases

Printing

Data Consultation

Off-line & On-line
• Separates the three main components of a document:
  ‣ Structure
  ‣ Contents
  ‣ Layout

**ATA SGML Concept: What is SGML? (2/4)**

- **Content**
  - FLIGHT CONTROL
  - This chapter

- **Structure**
  - AMM
    - Title
    - Chapter
    - Title
    - Para

- **Layout**
  - Helvetica 18pt, Bold
  - Helvetica 12 pt, Medium
    - Indentation...
The Document Type Definition (DTD) defines the document structure including:

- All elements and their attributes
- Element content model
- Element sequence and occurrence
ATA SGML Concept: What is SGML? (4/4)

• The SGML document is also called “SGML Instance”

• SGML mark up language components:
  ‣ Elements (start tag, end tag)
  ‣ Element content (nested elements, textual content)
  ‣ Element attribute initialization
Chapter 4-2. SGML Based Methodology and Document Type Definitions (DTD)

Blue sensitive zones are links to the CSDD
### DEFINITIONS

<table>
<thead>
<tr>
<th>Class</th>
<th>Definition</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific</td>
<td>Day, month, year of the original issue date of the production document. Where the OIDATE is not available the OIDATE of the production document instance may be substituted. Must be given in ANSI standard format of ’YYYYMMDD’.</td>
<td>2200</td>
</tr>
</tbody>
</table>

### APPLICATION IN SPECIFICATIONS

<table>
<thead>
<tr>
<th>Source</th>
<th>Context</th>
<th>Key (e.g., Tag or TEI)</th>
<th>Type</th>
<th>Included in DTDs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2200</td>
<td>ML</td>
<td>oidate</td>
<td>Attribute</td>
<td>AIPC; AMM; CMM; CPM; EIPC; EM; FRMFIM; LAP; LEA; FAAMMEL; MPD; MSG3; SB; SBI; SDS; SRM; TEMAN; WM</td>
</tr>
<tr>
<td>2200</td>
<td>ML</td>
<td>oidate</td>
<td>Element</td>
<td>Included in DTDs: SBI</td>
</tr>
</tbody>
</table>

**Name**: Original Purchase Order Number

**Mod**: 2002

### DEFINITIONS

<table>
<thead>
<tr>
<th>Class</th>
<th>Definition</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific</td>
<td>Specifies the purchase order number that was originally used to either purchase a part or repair a part. In the context of warranty, this means</td>
<td>2000</td>
</tr>
</tbody>
</table>
Guidelines for working groups defining DTDs with the objective to reach maximum commonality between DTDs.

Chapter 4-2-3. DTD Technical Requirements

The principal common mechanisms are:
Revision Management,
Effectivity Management,
Graphic Referencing Mechanism,
Cellular Tables,
Internal and External References Management,...
ATA SGML Concept: Revision Management

• **Marking revisions at anchor element level:**
  ‣ KEY attribute: identification key of an element
  ‣ REVDATE attribute: date of revision
  ‣ CHG attribute (N, R, D, U)

• **Marking revision of contents**
  ‣ Textual revision surrounded by:
    ‐ REVST element (revision start)
    ‐ REVEND element (revision end)

  ‣ Deleted anchor: content replaced by element DELETED

A. Safety Precautions
(1) On the center pedestal, on the ENG panel 115VU
   (a) Put a warning notice to tell persons not to start the engine.
(2) Make sure that the engine 1(2) shutdown occurred not less than 5 minutes.
(3) On the overhead maintenance panel 50VU:
   (a) Make sure that the ON legend of the ENG/FADEC GND PW/R/1(2) pu
   (b) Put a warning notice to tell persons not to energize the FADEC 1(2).
• EFFECT element
  ‣ EFFRG attribute (aircraft range)

• May be completed by:
  ‣ a Service Bulletin condition SBEFF,
  ‣ or a Customer Originated Change condition COCEFF
ATA SGML Concept: Graphic Management

- GRAPHIC element: composed of one or several SHEET elements
- SHEET element:
  - GNBR attribute contains a graphic entity
  - SHEETNBR attribute specifies the graphic sheet number
- GRPHCREF element: to refer to a graphic or sheet
ATA SGML Concept: Cellular Tables

• **Table structure:**
  ‣ THEAD element (header)
  ‣ TBODY element (table body)
  ‣ TFOOT element (footer)
  ‣ ROW element (table line)
  ‣ ENTRY element (table cell)
  ‣ COLSPEC, SPANSPEC element (column description)
ATA SGML Concept: Management of References

• Internal references

<REFINT REFID="EN244200861001">
</REFINT>

<GRPHCREF REFID="EN1234567890">
</GRPHCREF>

• External references

<REFEXT REFMAN="SSM" REFLOC="32-31/05">
</REFEXT>

3. Job Set-Up
Subtask 24-36-34-000-050 -
A. Aircraft Maintenance Configuration
   (1) Energize the ground service network
       (Ref. AMM 24-42-00-061-001).

**ON A/C 001-002, 031-065
(Ref. Fig. 001 SHEET 1)**

**ON A/C 004-007, 012-029**

<table>
<thead>
<tr>
<th>Equipment List</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGA</td>
</tr>
<tr>
<td>NSA031514-050</td>
</tr>
<tr>
<td>CIRCUIT BREAKER</td>
</tr>
<tr>
<td>210</td>
</tr>
<tr>
<td>(Ref. SSM 32-31/06)</td>
</tr>
<tr>
<td>00001</td>
</tr>
<tr>
<td>48VU</td>
</tr>
<tr>
<td>00</td>
</tr>
</tbody>
</table>

Technical data related to FIN
Contents

• History
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• ATA Data Model
  ‣ Vision
  ‣ What is a Data Model?
  ‣ Functional Areas
  ‣ Deliverables

• What’s Next?
Industry wide agreement on the Information Architecture for information transfer (Structure, Format and Business Rules)
ATA Data Model: What is a Data Model?

- Structured graphical representation of the processes, business rules and information/data interchanged between a manufacturer/supplier and operator

- Modeling methodology and techniques provide information/data in a standard, consistent, and predictable manner in order to manage data as a resource

- Enables re-engineering of business processes and product life-cycle information targeted to achieve a world-wide accepted Integrated Data Environment
ATA Data Model: What is a Data Model?

• Critical Success Factors for the industry standard Data Model:
  ‣ Generic - facilitates development of systems of varying purpose, scope and complexity
  ‣ Rigorous and precise - representation of data is complete, correct, consistent and usable
  ‣ Concise - facilitates improved understanding, communication, consensus and validation
  ‣ Conceptual - represents functional requirements rather than physical or organizational constraints

• Flexible - supports phasing of the life cycle, i.e., M&E model to be followed by Flight Ops, Training, Material Management

• Application - use of the model enables improved:
  ‣ Business process analysis
  ‣ Applications development
  ‣ Re-engineering
  ‣ Systems integration
  ‣ Acquisition of information systems
ATA Data Model: Functional Areas

• Derived through an affinity analysis between the structured decomposition of the industry functions/processes and the information/data used by those functions/processes

• Functional areas (business areas) were then used in the architecture of iSpec 2200

• The functional areas are also consistent with a value chain analysis
ATA Data Model: Functional Areas

- Reliability Assessment
- Operations Planning
- Configuration Management “B”
- Maintenance Requirements “A”
- Maintenance Procedures “C”
- Maintenance Event Forecasting
- Enterprise Resource Management
- Maintenance Event Production
- Maintenance Event Archive
- Maintenance Discrepancy
- Line Maintenance Event Planning
- Component Maintenance Event Planning
- Maintenance Training “D”
- Flight Scheduling
- Flight Operations
- Product Design Engineering
- Flight Scheduling
- Product Design Engineering
ATA Data Model: Deliverables

• General explanations on ATA CD, “ATA Data Model”

• Data Model developed using relational Data Modeling tool (COOL:Biz)

• Data Model accessible through Model Browser on Internet (including download capabilities)

• Contains:
  ‣ Industry Decomposition Diagram
  ‣ Entity-Relationship Diagrams divided in major subject areas
  ‣ Entity, attribute and relationship definitions
2-2. ATA Online Data Model

2-2-1. Status Level and Change Highlights

The following represents the status level and change highlights for each Subject Area covered by the [ATA Online Data Model]

1. ATA Maintain and Operate Airports
   1.1. Structure Changes
   - None.
   1.2. Name Changes
   - None.
   2. Definitions Changed
   - None.

2. CM-AL Allowable Compositions
Updated: 2004-08-17 11:43:21 by Ron Sorensen

**Definition**

A unit of work that groups Subtask(s) into one maintenance objective (e.g., Open a panel, Install a component). The functions of a Task are to allow accomplishment sequencing of Subtasks and Subtask accomplishment to the maintenance program.

**Comments**

* (none) *

**Purpose**

Fundamental

**Subtypes**

* (none) *

**Diagrams that contain this Entity**

- Entity Relationship: FO-Flight Operations ERD
- Entity Relationship: GR-EFF Effectivity S-O ERD
- Entity Relationship: MR-Maintenance Procedures S-O ERD
- Entity Relationship: MR-Maintenance Requirements S-O ERD

**Attributes**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Unique Key</th>
<th>Minimum/Maximum</th>
<th>Information Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Title</td>
<td>Yes</td>
<td>&lt; 3:1 &gt;</td>
<td>ID</td>
</tr>
<tr>
<td>Task Variant</td>
<td>No</td>
<td>&lt; 3:7 &gt;</td>
<td>Character</td>
</tr>
<tr>
<td>Task Identifier</td>
<td></td>
<td>(129)</td>
<td></td>
</tr>
<tr>
<td>Task Task Title</td>
<td>Yes</td>
<td>&lt; 3:1 &gt;</td>
<td>ID</td>
</tr>
<tr>
<td>Task Task Variant</td>
<td>Yes</td>
<td>&lt; 3:1 &gt;</td>
<td>ID</td>
</tr>
</tbody>
</table>

**Relationships From Other Entities**

<table>
<thead>
<tr>
<th>Entity</th>
<th>From Name</th>
<th>To Name</th>
<th>Cardinality</th>
<th>Cardinality Derived</th>
<th>Type</th>
<th>Derived</th>
</tr>
</thead>
</table>
What’s next?

Future Data Exchange Project

INDUSTRY DATA MODEL
- Mainten. Procedures
- Mainten. Requirem.
- Configur. Managem.
- Flight Ops
- Generic Resources

EXCHANGE DATA MODEL
- Methodology & Technical Requirements
- XML Design Rules
- Mainten. Procedures
- Mainten. Requirem.
- Configur. Managem.
- Flight Ops
- Generic Resources

Information Set 1
Information Set 2
Information Set 3
Information Set n