Agenda

- Project Description
- Mapping Core Constructs
- Paradigm Shifts
- Summary
- Conclusion
Project Description

- S1000D based system
- Started in 2005
- Core support for issue 3.0, 4.0.1, +
- Transform iSpec 2200 to 4.0.1 and back
- Work with OEM aircraft and engine maintenance data
- Transform between S1000D issues
• **Different operational paradigms**
  
  • One-time: OEM iSpec 2200 to S1000D for delivery
  
  • Round-trip: OEM iSpec 2200 to S1000D, delivering both iSpec 2200 and S1000D
  
  • Periodic revision import: Airline converting each OEM iSpec 2200 revision to S1000D
Project Description

- **No ideal mapping**
  - Specifications introduce new features
  - Feature paradigms change (e.g. applicability)
  - Requires creative mapping or extensions
  - What happens in the system, stays in the system
  - iSpec 2200 round-trip to S1000D and back can be automated
    - S1000D intermediate must preserve non-S1000D constructs and is not deliverable as proper S1000D
    - Can be purified (removing ATA unique attributes), but is not how it would be authored natively in S1000D
  - Can be presented in traditional ATA style
  - iSpec 2200 one-way to S1000D requires authoring
Mapping Core Constructs

• iSpec 2200 Manual to S1000D Publications
  ✓ iSpec 2200 structure (chapter, section, etc.) maps directly to S1000D publication modules/pmEntry’s
    ➢ PM naming limits options
    ➢ For round-trip must preserve anchor attributes
      ➢ CHAPTER maps to PM w/ATA attributes
      ➢ SECTION maps to pmEntry w/ATA attributes

• Primary content Anchors to Modules
  ✓ Most iSpec 2200 content in anchors compatible with data modules - task, figure, pageset, cpsheet
  ➢ Very few anomalies like AMM page block
  ➢ Handling lower anchors round-trip
    ➢ SUBTASK maps to proceduralStep w/ATA attributes
Mapping Core Constructs

- **AMTOSS/JEMOSS to Data Module Code (DMC)**
  - Core similarity (AMTOSS/JEMTOSS to DMC):
    - Chapter - system
    - Function code - information code
  - Different rules for defaulting
    - varnbr vs. infoCodeVariant
  - Manual level vs. global level uniqueness
  - Where to capture ATA manual/doctype in DMC
  - iSpec sequence number, etc. have no proper place
    - Concern for round-trip back to iSpec 2200 & DMC uniqueness
  - Decision:
    - Algorithmic mapping w/special rules (e.g. for infoCodes)
    - Explicit one-to-one map
Mapping Core Constructs

- **REFINT/REFEXT to internalRef/dmRef**
  - Manual vs. module scoping:
    - compatible
    - Round-trip needs support for manual scope concept

- **Effectivity to Applicability**
  - S1000D applicability is flexible superset of iSpec effectivity
  - iSpec has no syntax for relating multiple SBs
  - Constrain applic use in S1000D to anchor equivalents
    - Problematic to interpret scope iSpec 2200 SGML effect by inclusion directly, and more so after conversion to S1000D
Paradigm Shifts: iSpec GNBR vs. S1000D ICN

<table>
<thead>
<tr>
<th>iSpec GNBR</th>
<th>S1000D ICN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent GNBR usually does not change when illustration changes</td>
<td>Issue specific ICN is unique for changed illustration</td>
</tr>
<tr>
<td>Changed illustration picked up for all uses unless using element is changed</td>
<td>Changed illustration is used only if using element in DM is changed</td>
</tr>
<tr>
<td>Lack of explicit indicator for illustration change complicates management</td>
<td>ICN issue number changes to mark illustration change, simplifies management</td>
</tr>
<tr>
<td>Use of graphic entities allow GNBR and filename to differ</td>
<td>Base filename = infoEntityIdent</td>
</tr>
</tbody>
</table>

- **Need special handling of iSpec illustrations**
  - Determine when illustration has changed
  - Maintain map to proper ICN
Paradigm Shifts: Tech Repositories

• iSpec 2200 constructs used differently:
  • AIPC PNRFILE with part data
  • FRMFIM fault message data
  • Wiring equipment and wire lists
  • iSpec 2200 vendor lists used in many doctypes
  • All of these local to one manual instance

• S1000D has a variety:
  • TIRs for Functional items, Circuit breakers, Parts, Zones, access points, Enterprise information, Supplies, Supplies requirements, Tools, Functional areas, Controls and indicators
  • All of these have no inherit scope limitation
  • FRMFIM fault message data and wiring equipment and wire lists are not TIRs but handled in dedicated modules types

• In 4.1: Common Information Repository
Paradigm Shifts: Tech Repositories

• Issues:
  - S1000D limits where TIR entries can be referenced without using a dmRef/@referredFragment (pointing to ID of the target element in DM)
  - Good for dynamic IETP display, but incompatible content models limit rendering TIR information in-line as for XML to be rendered to PDF
  - S1000D Enterprise information TIR is only place to store structured data for address, phone, etc. thus choice is:
    • Un-structure data into a simple DM
    • Migrate date to Enterprise TIR and reference those entries
    • Display the TIR
• Task frontmatter tables for parts, consumables, tools, etc.

• In-Line para level markup where parts, consumables, tools, etc. are used

➤ iSpec 2200 and S000D have nearly opposite approach to the paradigm
<table>
<thead>
<tr>
<th>iSpec Task PreReqs</th>
<th>S1000D Preliminary Req</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic tables</td>
<td>Content specific structure</td>
</tr>
<tr>
<td>No specific or standard structure</td>
<td>Highly specific content models</td>
</tr>
<tr>
<td>Table entries are not target of in-line markup</td>
<td>Entries designed to be target of in-line markup</td>
</tr>
<tr>
<td>Table entries usually don’t reference external data</td>
<td>Entries usually reference external data for item</td>
</tr>
</tbody>
</table>
Paradigm Shifts: Task Frontmatter & In-Line Refs

**iSpec In-Line Markup**
- Dedicated elements (CON, CSN, STD etc.)
- Logically targets external data
- iSpec says doesn’t behave as link, but frequently links to target in external manual

**S1000D In-Line Markup**
- Limited dedicated elements like circuitBreakerRef
- Use internalRef to point to supply, part, in prelim req tables
- Link takes user to table in module
- Entry in table links to external manual
Paradigm Shifts: Task Frontmatter & In-Line Refs

**iSpec Editing**
- Focus on editing in-line markup
- Insert in-line markup where desired
- Points to external manual
- Derive basic frontmatter tables from in-line markup with no need for formal authoring

**S1000D Editing**
- Focus on editing prelim req tables
- Add entry to prelim req tables when needed
- Table entry points to target DM or TIR, potentially both
- Use generic internal reference in-line to point to prelim req table
Transformation Issues

- iSpec task pre-reqs lack information needed to build S1000D preliminary req tables
- Without S1000D preliminary req tables for targets, iSpec in-line markup cannot be transformed to S1000D internal refs
- Problematic to capture iSpec in-line markup
- Transform from S1000D back to iSpec is straightforward, but dumb's down information
Paradigm Shifts: Task Frontmatter & In-Line Refs

• Net
  ➢ Can round-trip iSpec data in S1000D with special handling
    • For example, capturing iSpec CON with an S1000D controlIndicatorRef with special type
  ➢ One-way transform requires authoring of proper S1000D preliminary req data
Summary

• S1000D is coming
• Both OEM and Airline transitions take time
Summary: Why Do You Care?

- Cost for supporting two standards at once
  - Existing airframes now only iSpec 2200
  - New airframes require S1000D

- Costs in transition
  - Two systems
  - Tech pubs and support must work in both environments
  - Technicians may need to work in both systems

- iSpec 2200 to S1000D transformation provides single, integrated solution
  - One-time: OEM iSpec 2200 to S1000D
  - Round-trip: OEM iSpec 2200 to S1000D and back
  - Revision import: iSpec 2200 revisions to S1000D
• No magic, hard decisions are needed

• Round-trip iSpec 2200 to S1000D can be automated
  • A given source data class requires some unique setup
  • Similar to support needed for native iSpec 2200

• Single solution can support iSpec 2200 and S1000D
• Acknowledgements
  • Delta Airlines, Minneapolis
  • X-Hive
  • Rolls-Royce Group plc

• Link to last year’s presentation
  • http://www.ataebiz.org/forum/2010_ata_e-biz_forum/
    Mayer_Transforming2200toS1000D.pdf

• Questions and answers