

2018 Forum Tutorial

Session 2 – S1000D Implementation

A Generic Viewpoint

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Housekeeping

- As we move beyond ‘theory’ to ‘implementation’, there may be specific products mentioned in the course of the discussions. Neither the speakers or AIA are endorsing any product that is mentioned.
- We can not tell you what the “best” solution is for your situation without understanding your situation in detail. This section is about making you aware of some of the issues in implementing S1000D.
- Unless otherwise noted, implementation is based on the guidance of the current S1000D release 4.2
- When talking with software vendors. Make sure that you know your requirements and options up-front.

Agenda

- Benefits of S1000D
- What does an S1000D System look like?
- Approaches to create S1000D content
- What is an S1000D workflow?
- Challenges to be aware of in Implementing S1000D
- Once you have S1000D and still want something else
- Frequently Asked Questions (FAQs)

Business Case for S1000D

S1000D offers significant advantages over previous data models

1. Data interoperability and interchange

Supplier content to be easily ingested into the overall aircraft data set, validating form, fit and function.

2. Robust 'parts' capability

Parts information is an integral aspect that has been 'baked in' the data model.

3. Content Reuse

Reuse lowers content creation and revision costs and improves consistency.

4. Multi-channel delivery

Options include PDF, desktop and mobile delivery, Interactive Electronic Technical Manuals (IETMs) and 3rd party apps



Data Interoperability & Interchange

- For top-level OEMS this allows the aggregation of content from multiple suppliers and presents information concisely and consistently.
- For suppliers this allows the creation of content one time that can be used in multiple instances.
- By utilizing a different BREX you can easily create different versions of the same content.

Robust “parts” support

- S1000D has spares "baked" in due to its heritage. As it was for military support (spares are needed) – from sourcing to provisioning to replacement.
- The spec allows for significant and useful data to be wrapped around parts.
- Other modular XML data models used in technical documentation (i.e., DITA) do not offer solid support of parts information (DITA was for originally for software and doesn't tend to have a lot of “parts” support).

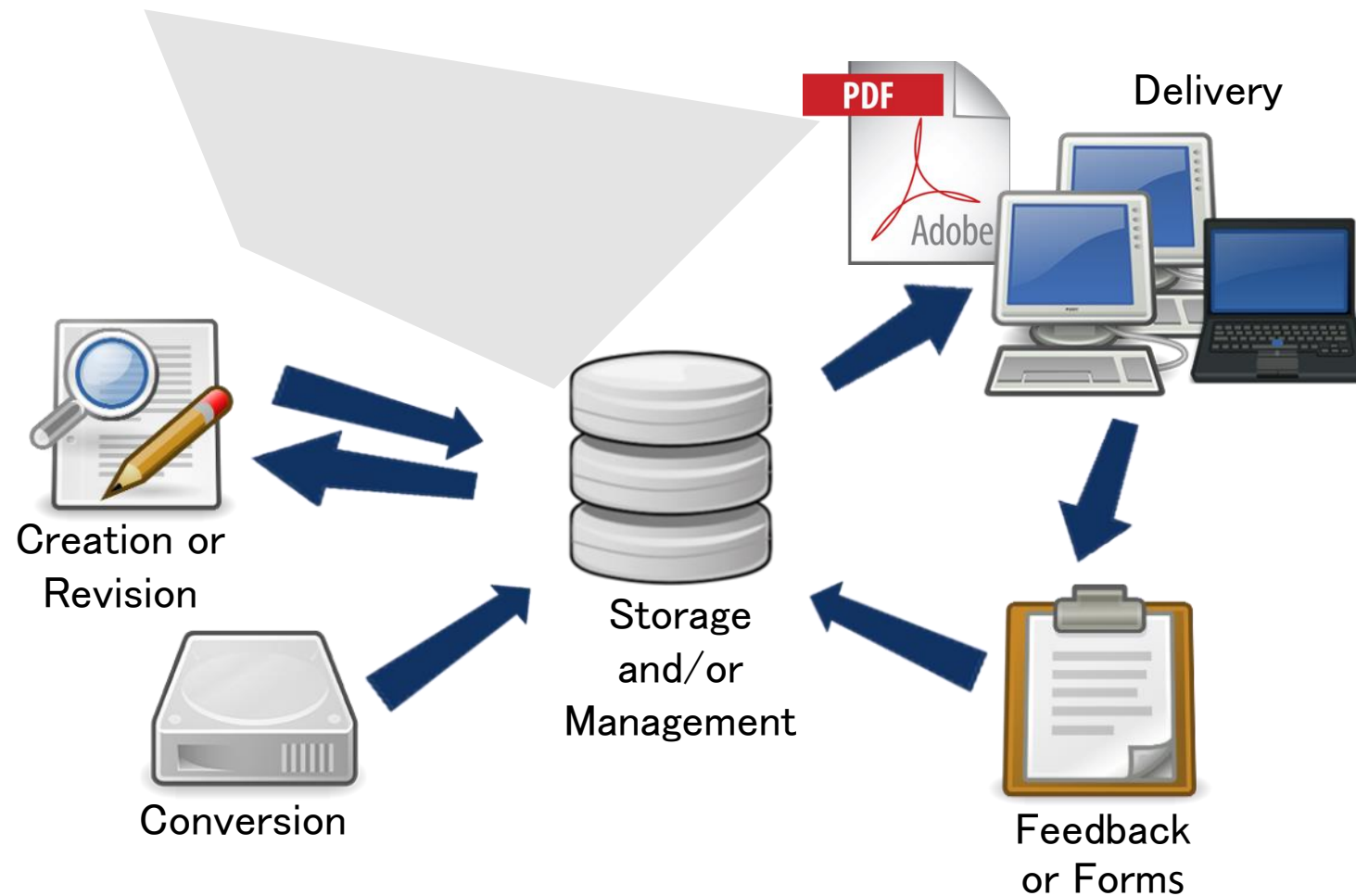
Content Reuse

- S1000D utilizes a modular approach to content – meaning that different pieces can be assembled together to create the top-level documentation. And modules can be created once and used in multiple instances.
- Reuse offers a significant cost savings when used for product families – products that are mostly the same with minor differences between them.
- Content reuse allows for faster content creation times and revision times.

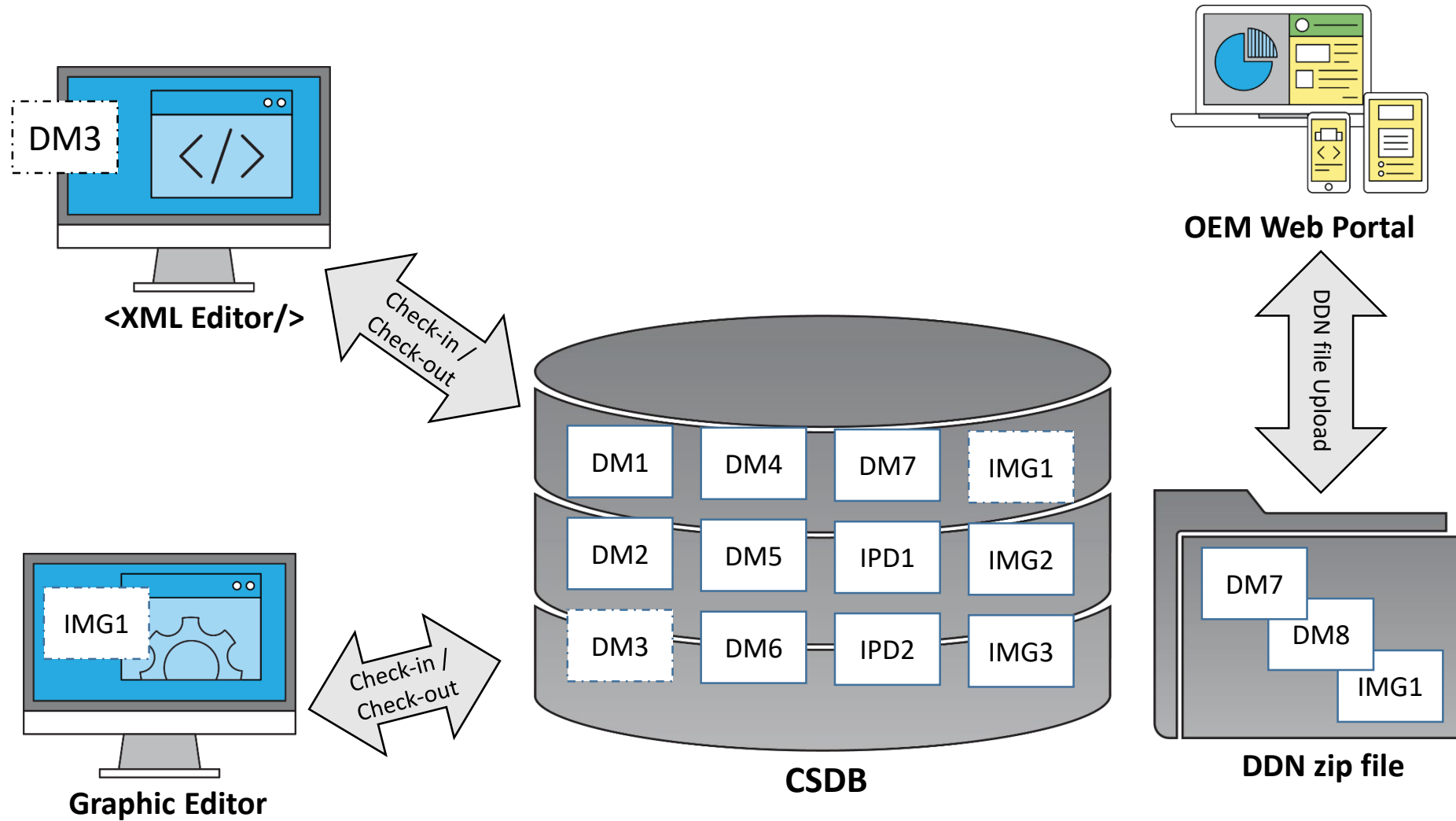
Multi-channel Delivery

- Where paper and PDF have been the dominant delivery technologies in the past, there is a push to deliver the right information (and nothing extraneous) in the manner the consumer wants it.
- Trends are towards mobile delivery with dynamic updates. With paper when needed.
- Mobile delivery can be in the form of Interactive Electronic Technical Manuals (IETMs) and Delivery Portals. Both work (much) better with XML-based content. PDF is difficult for mobile users as it doesn't respond to the (typically) smaller screen size.

Historical Technology Stack



What's in a S1000D Tech Stack



Role of the XML Editor

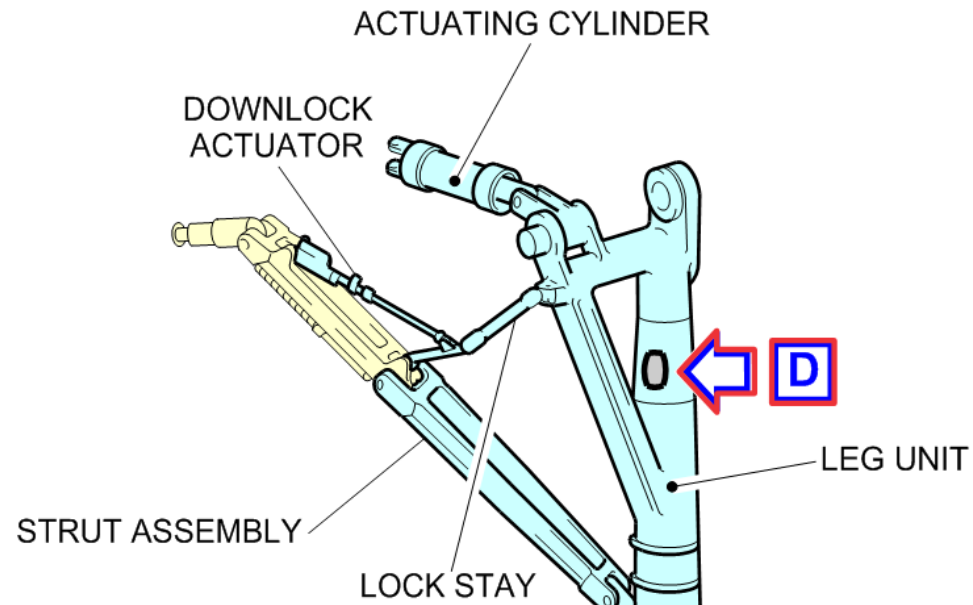
- The XML editor allows for the creation and revision of Data Modules (DM files).
- While similar to a word processing editor (e.g., Word and Framemaker), the XML editor (typically) allows the writer to see the XML tags.
- Editors can (typically) be modified to show only relevant operations.

```
1 <?xml version="1.0"?>
   <currency_list date="04/13/05">
3  <!-- Currency list and exchange rates -->
   <currency number="01" valid="1">
5     <iso>USD</iso>
     <name>United States Dollar</name>
7     <change>1.0</change>
   </currency>
9   <currency number="02" valid="1">
     <iso>EUR</iso>
11    <name>Euro</name>
     <change>0.779907</change>
13   </currency>
   <currency number="03" valid="0">
15     <iso>ATS</iso>
     <name>Austrian Schilling</name>
17     <change>10.73175</change>
   </currency>
19 </currency_list>
```

Listing 1: Simple XML Code

Role of the Graphics Editor

- The Graphics editor allows for import, creation and revision of 2D and 3D Images (IMG files).
- Images typically come from Engineering and are stripped down for clarity and BREX compliance.



Role of the CSDB

- The Common Source Data Base holds data components for revision and assembly.
- In addition to basic “Content Manage System” functions (Check-in/Check-Out, Access Control, Revision Control, etc.) it also verifies that the content data conforms to the S1000D standard and associated BREX.
- You can create and deliver S1000D content without a CSDB, it will make the process easier.



Role of the Transfer Portal

- The transfer portal is how you upload and download content with your customer. If you are delivering content to your customer, you will typically use the prime's portal to transfer the data.
- The portal accomplishes several important functions:
 - Security
 - Data Fidelity
 - Assignment

NOTE: Some portals are easier to work with than others.

Role of the Delivery Portal

- The top-level OEM aggregates data from multiple suppliers to create complete publications. The rules associated with S1000D are intended to provide a single look, feel and voice to the content (despite the reality that hundreds of companies may have been involved in creating the technical information).
- They may elect to deliver content in 'electronic' format (IETMs and/or HTML) or 'hardcopy' (PDF).

Approaches to S1000D

- Conversion
 - Keep using your current technology and convert to S1000D when ready
- Out-sourced Support
 - Have a 3rd Party provider create your S1000D deliverables
- On-premise Tool
 - Use your writer(s) and tool inside your firewall
- Cloud-based Tool
 - Use your writer(s) and tools in the cloud

Convert existing “ATA” content

Issue	
Cost	DMs: 2-3 Hours / IMGs: 4-6 Hours
Work Location	Off-site
Data Location	Off-site
Turnaround	Months (function of volume)
Workflows	Utilize your current process
Training	N/A
IT Support	Varies
Other Issue	Significant rearrangement of data

Write from Engineering Docs

Issue	
Cost	DMs: 4-6 Hours / IMGs: 4-6 Hours
Work Location	Off-site
Data Location	Off-site
Turnaround	Months (function of volume)
Workflows	Utilize your current process
Training	N/A
IT Support	Varies
Other Issue	Potential interaction with Engineering

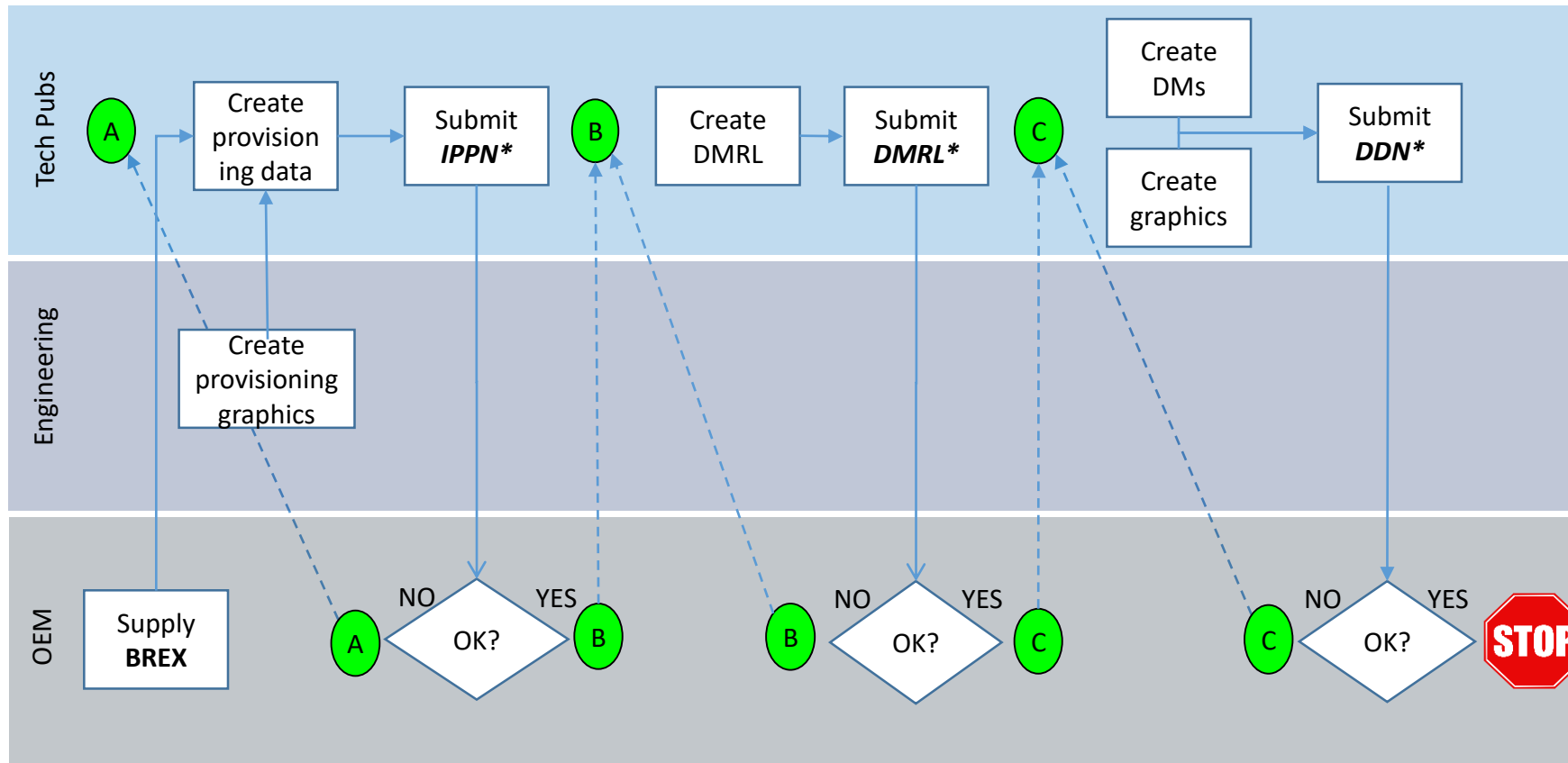
On-Premise Tool

Issue	
Cost	Significant
Work Location	On-site
Data Location	On-site
Turnaround	Initial: 20% - 40% longer than ATA Proficient: 20% - 40% faster than ATA
Workflows	Change because of modular approach
Training	Significant
IT Support	Significant
Other Issues	

Cloud-based Tool

Issue	
Software Cost	Generally < \$10K per writer
Work Location	On-site
Data Location	Off-site
Turnaround	Initial: 20% - 40% longer than ATA Proficient: 20% - 40% faster than ATA
Workflows	Change because of modular approach
Training	Significant
IT Support	Minimal
Other Issues	

A typical S1000D Process



DMRL Data Module Requirements List
DDN Data Dispatch Notes
DM Data Modules

IPPN Initial Provisioning Project Number
CSDB Common Source Data Base
 * Files are outputted from the CSDB

Built-In Workflows & BREX

- Some CSDB tools have built-in Workflows based on the type of content you are working on (AMMs vs CMMs) and who you are making deliveries to.
 - The Airbus process is different than the Boeing process
- Some CSDB tools have built-in BREX or guided wizards to help you in developing your BREX.

Process Notes

- The top-level OEM will typically identify the process from start to approved.
- The top-level OEM may not provide the BREX for the project, instead expecting you to 'figure it out'. Sigh.
- The top-level OEM may not tell you why the deliverable (e.g., DM, IMG, etc.) is not accepted. Sigh.

Implementation Challenges

- Simplified Technical English
- Graphics
- Legacy Content
- BREX (Business Rules)
- Creation and Approval Process

Simplified Technical English

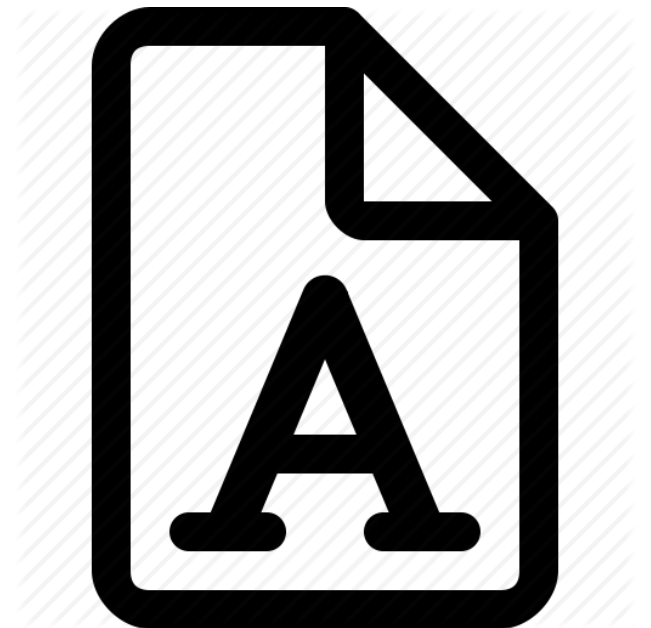
- A controlled language spec with the goals of
 - Reduce ambiguity
 - Improve the clarity, especially procedural writing
 - Improve comprehension for non-English speakers
 - Make human translation easier, faster and more cost effective
 - Facilitate computer-assisted translation and machine translation
 - Improve Reliability concerns of maintenance and assembly by reducing their probability to introduce defects

Simplified Technical English

- The STE specification consists of two parts:
 - Writing Rules (no slang, active voice, etc.)
 - Dictionary (approved and unapproved words)
- STE will not make bad writers good, but it will make good writers better.
- Related Sessions: Technical & Management Track
 - ASD-STE100 implementation in S1000D
1:30P – 3P on Wednesday (Session 1C)
 - How STE & S1000D Can Improve Profitability
3:30P – 5P on Wednesday (Session 1D)

Graphics

- Graphics are desired to communicate in a simple, clear and economical manner.
- Requirements vary by OEM, but Issue 4.2 is very clear about the requirements.
- As a rule, the advised orientation is portrait.
- As with text, there are three aspects to graphics:
 1. Authoring (see Chapter 3.9.2)
 2. Identifying (see Chapter 4.4)
 3. Managing (see Chapter 3.9.2.7)

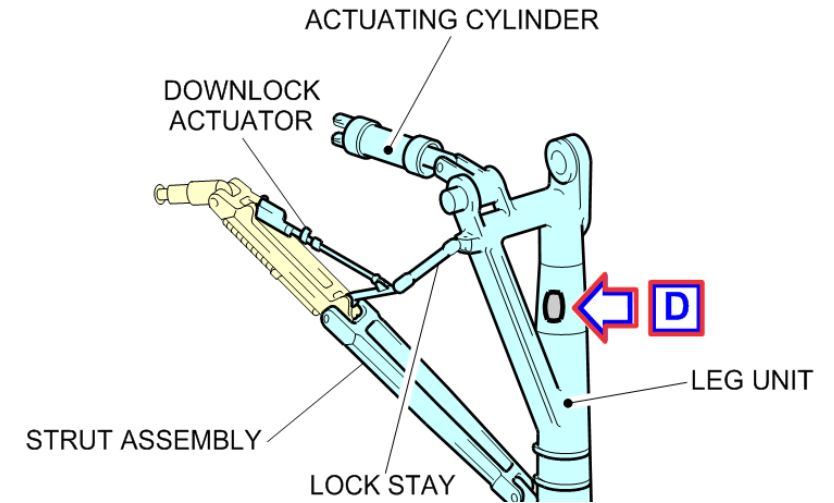


High-level Graphics Observations

- Always better to start with Engineering models.
 - Most CAD systems support output
- Engineering graphics are created for Engineering, not “Tech Pubs”.
- There is typically a significant effort to get compliant S1000D graphics

2-D Graphics Authoring

- Graphics should have a consistent appearance:
 - Line weights and styles
 - Annotations and symbols
 - Lettering case and styles
 - Isometric projection
 - Colors follow a hierarchal structure and specific color palette
 - Yellow = Reference / Light blue = On this illustration / Grey = Parts shown on subsequent graphic / Red = Warning
 - Image size (full page, flexi height and landscape fold-out)
- Clear and Concise are key:
 - Remove extraneous data
 - Usually monochrome but use color when it adds clarity

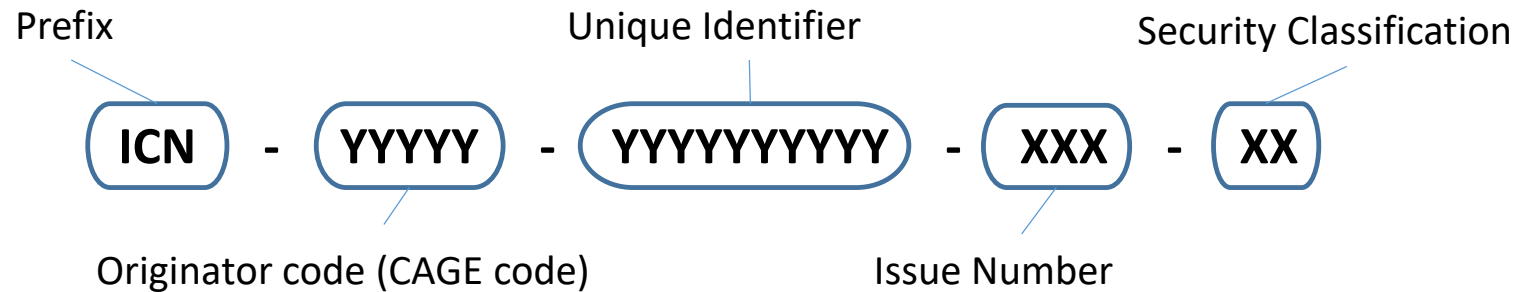


3-D Graphics Authoring

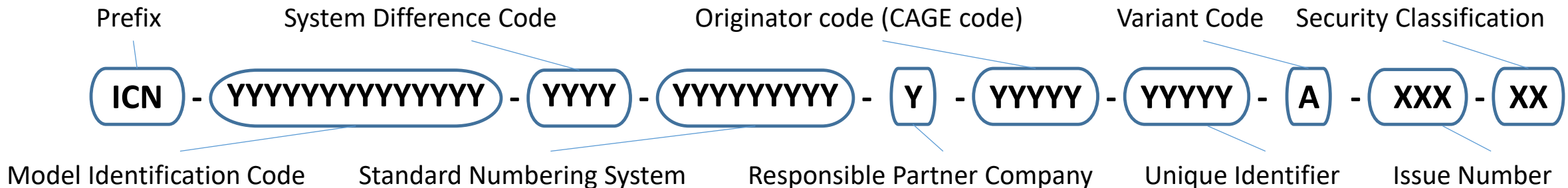
- Requirements identified in Section 3.9.2.5
- 3-D Graphics MUST be produced from Engineering information
- 3-D Graphics are recommended when the procedures are complex and users will benefit from 3-D graphics
- Currently no recommended file format for 3-D delivery

Graphics Identification

- Data Modules (DMs) are all assigned a unique code. Graphics are assigned an ICN code. Graphics can be in multiple DMs w/ same code.
- Types of ICN structures:
 - CAGE (less complex / does not align graphic with the project or equipment)



- MODELIC (more complex / aligns graphic with the project or equipment)

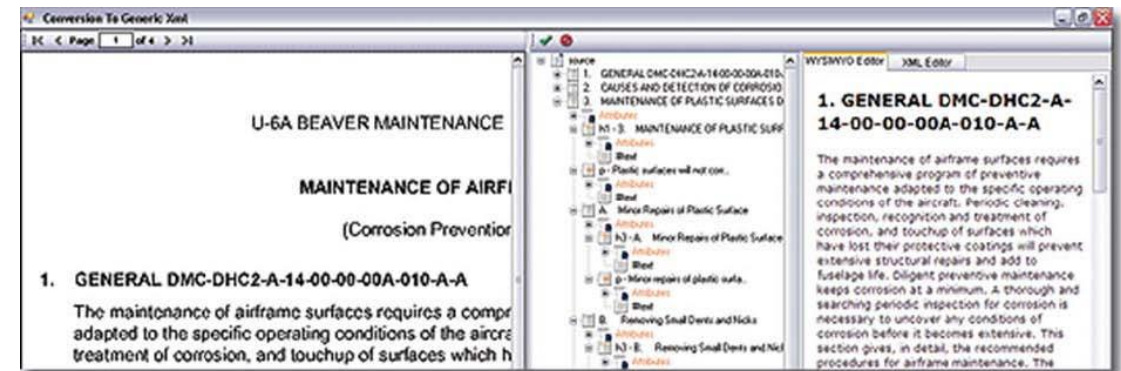


Legacy Content

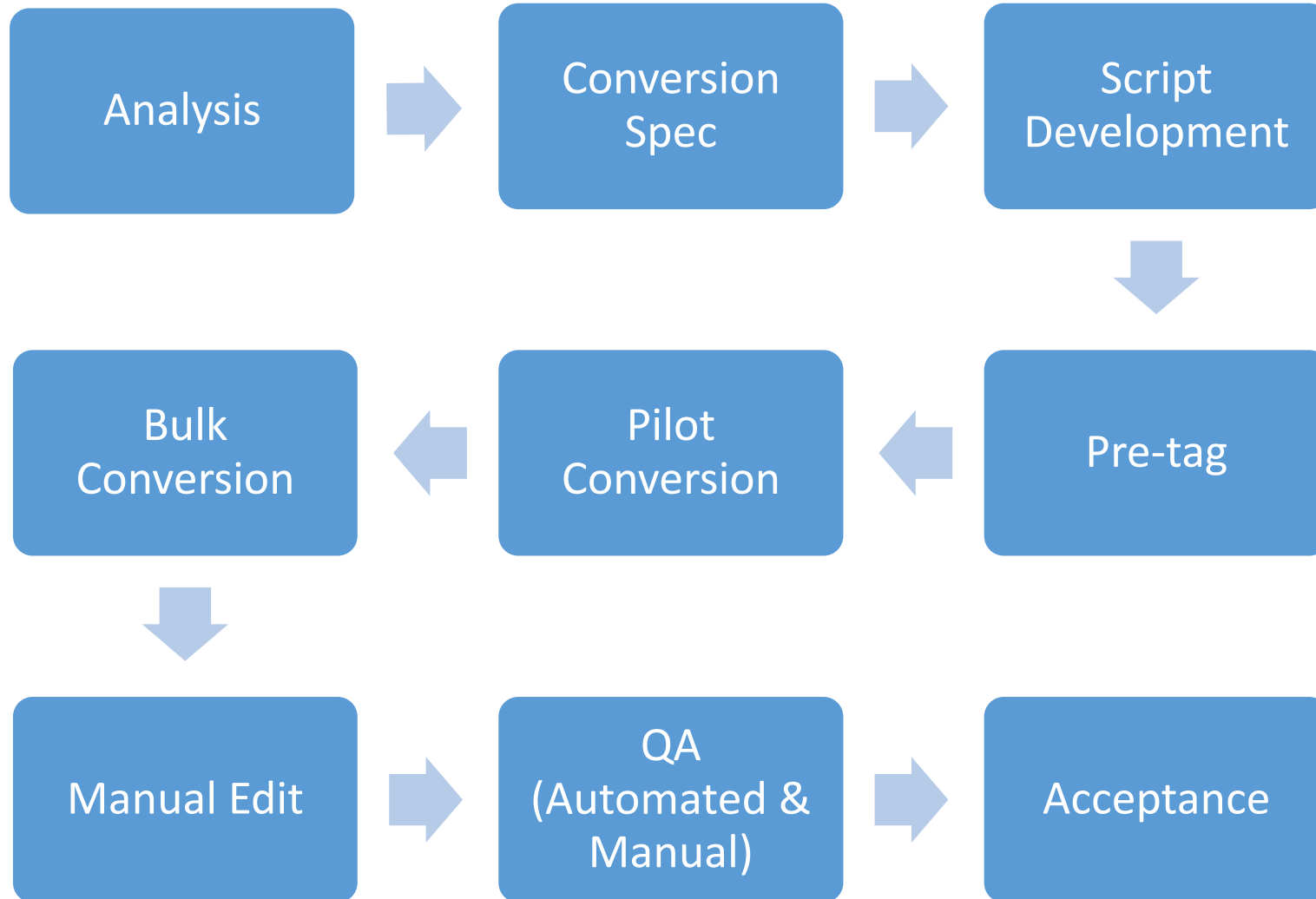
- Migrating legacy content to garbage XML is easy.
- Migrating content to good S1000D is tough to do right:
 - Manuals have to be chunked into DMs
 - Graphics have defined colors, line weights, orientation, etc.
 - Significant amounts of data that are not in the legacy content have to be identified
- Typically legacy content has to be deconstructed and reconstructed
- Related session: Data Conversion Track
 - 8:30A – 10A on Wednesday in Grand Ballroom

Conversion: Quality Requirements

- Do you have a requirement to prove all data provided converted successfully to S1000D?
 - Does the conversion tool produce a traceability file?
- Data Validation and Functional Testing:
 - Developing Test Scripts



Conversion Process



Conversion Observations

- The effort of a conversion is directly proportional to the consistency of the content.
- Manual conversions are wildly inconsistent.
 - Two writers will perform a give tasks more than two different ways.
- Automated conversions require a software set-up.
- **ALWAYS ALWAYS ALWAYS** do a pilot conversion.
 - Go completely through the process
 - Extrapolate the effort required by your approach
- It may be easier to re-write legacy content into DMs in your legacy toolset (rather than a deconstruct/reconstruct in XML)

BREX (Business Rules)

- Typically – but not always supplied by OEM
- Airframe BREX typically drives
 - Engine BREX
 - 3rd Tier Supplier BREX
- Airframers sometimes change the BREX mid-project

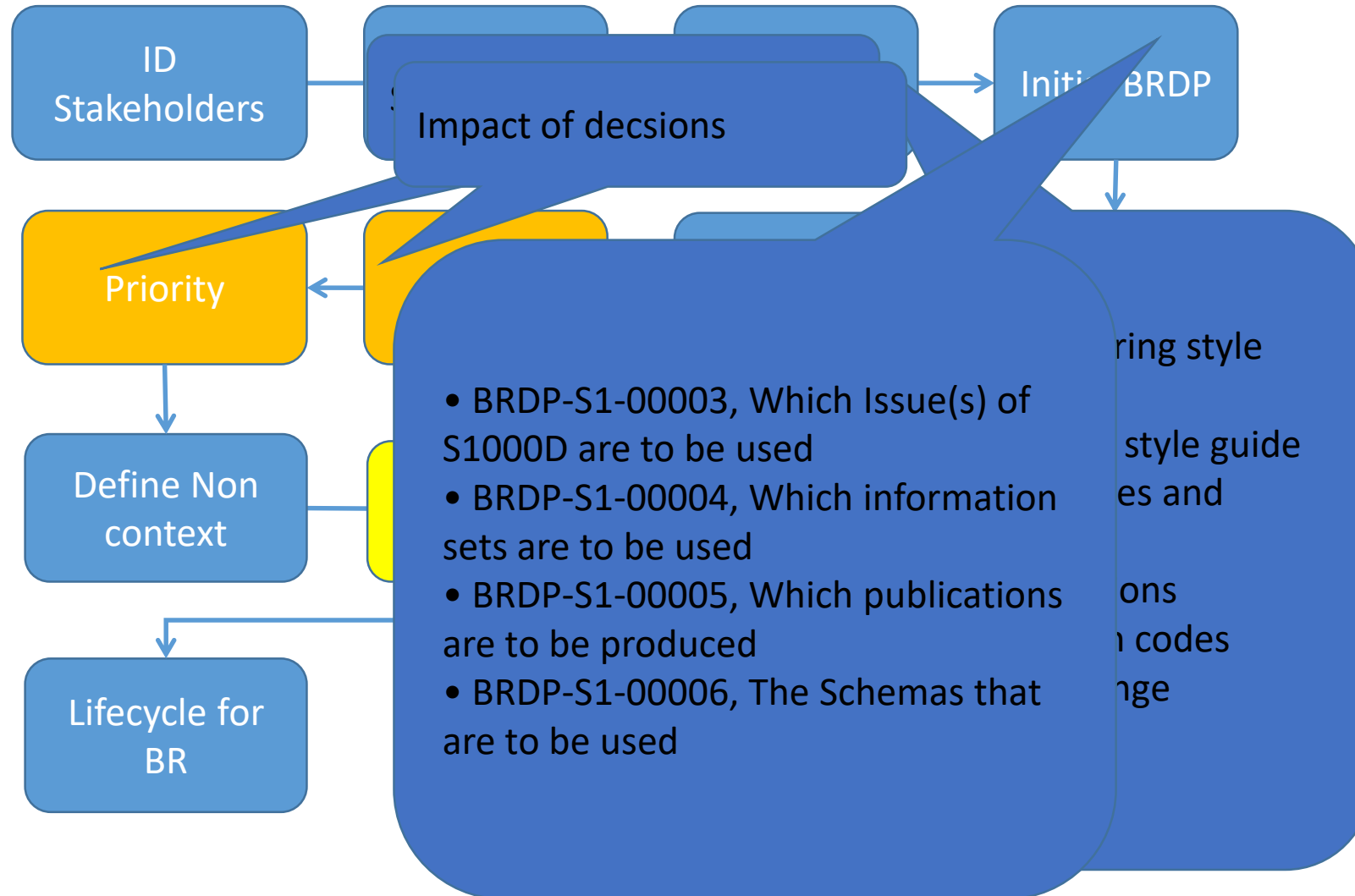
Business Rule Implementation

- We have seen that S1000D has a BRDOC and a BREX... so what...
- What does this mean to someone who is trying to implement 4.x
 - People
 - Process
 - Technology

BREX Implementation – People aspect

- Business rules aren't scary....every technical publication program has had rules previously.
- Most contracts have had requirements;
 - Look and feel – conform to XYZ
 - Scope and depth – meeting user needs
 - Scheduling - when to be delivered
 - Quality – correct to XYZ
 - Etc
- S1000D just introduces a standardised way of documenting these rules that enables all stakeholders to agree and enables automated checking...possibly

BREX Implementation – Process aspect



BREX Implementation – Technology aspect

WE have discussed software procurement to support S1000D.

BREX capability “may” be built into;

- Editing toolsets for automated checking or constraining the content of the XML elements and attributes
- CSDB toolsets for assurance and QA of data constructs, automated checking.
- BRDoc publishing??

Creation & Approval Process

- The “people” aspect of S1000D is perhaps harder than the technology or training aspect as there is a shift from a monolithic approach to a modular approach
- Workflows need to reflect S1000D concepts
- Approval checkpoints insure you are on-track

You have S1000D & want _____

- Transforming S1000D to ATA iSpec 2200 is a relatively straightforward and mostly automated process through an XSLT script.
- You will need to strip out:
 - IDNs
- You will need to insert:
 - Pageblock Info

FAQs

- Can you tell me what is the best approach?
Only after understanding your situation
- Can you tell me what is the best software?
Only after understanding your situation
- Is S1000D a challenge to implement?
Yes. But it's a matter of managing the technology, process and skills. This Forum is a great place to talk with others.
- Why do we have to deliver S1000D?
See slides 5-8

S1000D – Remember the good!

- Reduces update costs
- Supports the re-use of data (up to 40% re-use)
- Ease of data exchange
- Defined document structures are supported by established software tools




Is it really THAT bad? Or THAT ugly?

- Paradigm shift in data structure
- Initial cost to develop an S1000D publishing system/process
- Learning curve (XML)



Bonus 'New Orleans' slide

Category	Winner
Fine Dining	Bon Ton  / Commander's Palace  / Galatoire's
Cheap Dining	Pizza Delicious / Felipe's Mexican Taqueria
Live Jazz Music	Anywhere on south end of Frenchmen Street 
Live Cajun Music	Mulate's 
Best Muffuletta	Central Grocery
Best Hurricane	Pat O'Brien's (and Best Piano Bar)
Best Beignets	Café du Monde
Best Wine Bar	Bacchanal Wine 
Oldest Bar in US	Lafitte's Blacksmith Shop
Carousel Bar	Hotel Monteleone
Brewery	Crescent City Brewhouse



Thank You!

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