Simplifying the workflow in S1000D and ATA projects by reusing maintenance task and material data

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Subject Matter Expert for
Agenda

• Organizational challenges and stakeholders
• Benefits of a common IPS repository
• Increase the efficiency in creation of TechDoc
• Change- and Configuration Management
• Tagging-Guideline and Writing-Procedures
• Challenges during implementation
• Real world examples
Organizational challenges and stakeholders
Organizational challenges and stakeholders

In the whole maintenance development process many types of data, stakeholders, databases and processes are involved.

High risk of quality loss
Additional Challenges

• Mixed fleets and operators
• Different TechDoc-Standard (S1000D and ATA) & project rules
• Civil and military projects
• Mixed toolset and IT-systems
• Many interfaces for data interchange
• Loss of data or rewrite of data
• No single point of contact for technical issues
• Different publishing solutions
Benefits of a common IPS repository
Benefits of a common IPS repository
Increase in efficiency in creation of TechDoc

IPS-discipline
Maintenance-Planning, -Management & -Improvement

Framework Generation Including PrelReqs & CloseReqs & Steps

Content Generation

Procedural Data Modules

IPD Data Modules

IPS-discipline
Supply Support & Provisioning

Spare Parts Catalogues

Full Generation No (less) authoring tasks required

IPS-discipline
Technical Data (Technical Documentation)
Procedural/Task generation

MFC: N1234
PNR: ENG123-A4

Remove procedure
Open for access procedure
Disassemble procedure
Repair procedure

- Rectifying or Supporting Task
- Function (Infocode)
- Preliminary / Closing Requirements (Links to Tasks)
- Intervals, Personal, Material, Safety
- Subtasks

Preliminary Reqs:
- <prelreqs>
- <spares>
- <supplies>
- <supequip>
- <safety>
- <mainfunc>
- <step1>, <step2>, ...
- <closereqs>

Closing Reqs:
DMC-PRJ1-A-25-11-70-000A-300A-Z
DMC-PRJ2-ABB-A25-11-70-00AA-300A-Z
25-11-70-870-801-A01

DMC - PRJ1
PRJ2
2
3
4
A
B
C
2
3
4
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

<preliminaryRqmts>
<reqSpares>
<reqSupplies>
<reqSupportEquips>
<reqSafety>
<mainProcedure>
<proceduralStep>
<closeRqmts>

ATA ISpec 2200
S1000D 2.3
S1000D 4.1

- <con>
- <note>, <caution>, <warning>
- <task> or <subtask>
- <prcitem1>, <prcitem2>, ...
- 

Content Generator

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IPD generation

- Structure (SNS), Figure + Variant
- Illustration(s) or Multimedia Objects
- Part entries
- References / Links

Illustrated Parts List

MFC: N1234
PNR: ENG123-A4

SNS:
Title:
Illustrations:
Entries:
Part Number:
Quantity:

S1000D 2.3

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<isn>
<mfc>, <pnr>
<qna>

S1000D 4.1
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<title>
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<quantityPerNextHigherAssy>

DMC-PRJ1-A-25-11-70-00A-941A-Z
DMC-PRJ2-ABB-A25-11-70-00AA-941A-Z

25-11-70-870-950-A01

ATA ISpec 2200

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<itemdata>
<pnr>, <iplnom> ...
<upa>
Benefits

- Reuse of independently written Tasks / IPLs
- Generation of Procedure-/Task and IPD/IPL data modules
- Flexible data mapping with project or install location specific values
- Reuse of centralized material (spares, supplies or equipment)
- Automatic linking to other Tasks / IPL
- Generation of Common Information Repository (CIR)
- Generation of Maintenance Schedule data modules
- Generation of ATA T-Files / S2000M CSNIP / UPIPCO / UPIPCT
Change- and Configuration Management

Structure update

1. Structure
2. IPL / Material
3. Tasks
4. Data modules

MFC: N1234
PNR: ENG123-A4

include

replaced by

MFC: N1234
PNR: RING-A1

MFC: B3426
PNR: C23-88.1

Engine

Gearbox ring
**Change- and Configuration Management**

**Material data update**

**Generated Procedure Revision B**
- spare
- change modify mark 1
- nomen inner-tube (black)
- identno inner-tube (black) Part KT222/IT-001A
- mfc KT222
- pnr IT-001A
- qty 2
- uom EA

**Generated Procedure Revision B**
- Generated Procedure Revision A
- Generated IPD Revision A
- Generated Procedure Revision B
- Generated IPD Revision B

**Automatic change tracking in DMs based on Revisions**
Tagging-Guideline and Writing-Procedures

Normative Directives and Requirements | Customer Strategy

- Business Rules Decision Points (BRDP)
- Customer Strategy strategic approaches

High-Level Customer Requirements

Use of S1000D requires a customer specific definition ("S1000D–tailoring")

Process- and System-Implementation

- Specification
  - BREX development
  - Content Generator development
  - Stylesheet development

- Implementation
  - Test Content

- Launch

Guidance Documents

- Tagging Guides (BREX, Schemas)
  - automized QA-processes

Content Development Specifications

- Content Generator development
- Stylesheet development

TechDoc-Project Planning

- Authoring, IPC-compiling, 2D-/3D-illustration, etc.

TechDoc-Project Planning

Content Development
Tagging-Guideline and Writing-Procedures

BREX

<structureObjectRule>
  <brDecisionRef brDecisionIdentNumber="BR-00071"/>
  <objectPath allowedObjectFlag="2">//maintLevel/@maintLevelCode</objectPath>
  <objectUse>Maintenance level</objectUse>
  <objectValue valueForm="single" valueAllowed="ml01">Level 1 (home)</objectValue>
  <objectValue valueForm="single" valueAllowed="ml02">Level 2 (authorized workshop)</objectValue>
</structureObjectRule>

<structureObjectRule>
  <brDecisionRef brDecisionIdentNumber="BR-00067"/>
  <objectPath allowedObjectFlag="0">//trade</objectPath>
  <objectUse>Element –trade- is forbidden</objectUse>
</structureObjectRule>
Tagging-Guideline and Writing-Procedures

- Rectifying Task
- Function (Infocode)
- Preliminary
  - Maintenance (Level = 2)
  - Intervals (100 Flight Hours)
  - Personal (Position=1, Category=Mechanical Engineer, Skill=Beginner, Trade=AF999, Time=0,25h)
- Material
- Safety
- Subtasks

BREX

```
<structureObjectRule>
  <brDecisionRef brDecisionIdentNumber="BR-00071"/>
  <objectPath allowedObjectFlag="2">//maintLevel/maintLevelCode</objectPath>
  <objectValue valueForm="single" valueAllowed="ml01">Level 1 (home)</objectValue>
  <objectValue valueForm="single" valueAllowed="ml02">Level 2 [authorized workshop]</objectValue>
</structureObjectRule>
```
Tagging-Guideline and Writing-Procedures

Stylesheet development

Stylesheet

Project A

Stylesheet

Project B
Challenges during implementation

• Definition of independently Tasks / IPLs
• Convincing the customer to create detailed guidelines
• Generation scripts and data mapping
• Project- / Install-Location specific characteristics
• Shift of work - less work for Authors – more for engineers
• Who is responsible for warning, caution & notes
• And many more 😊
Real world Aircraft examples

Design Interface
- PMTR

Technical Data
- Procedure
  - Reuse of material data using MaterialSetter & Update processes

Supply & Provisioning
- IPL

Generation of Mater Maintenance Plan
- MMP

Generation of schedule DM based on procedure DMs
- Schedule

Generation of IPD DMs
- IPD

Swiss Aircraft Manufacturer

iLS.Suite

PMTR

Procedure

IPL

MMP

Schedule

IPD

Generation of Mater Maintenance Plan

Reuse of material data using MaterialSetter & Update processes

Generation of schedule DM based on procedure DMs

Generation of IPD DMs

Siemens

Cortona3D

Teamcenter
Real world Helicopter examples

**Design Interface**
- PMTR

**Maintenance Planning**
- Task

**Supply & Provisioning**
- IPL

**Technical Data**
- Procedure
- Schedule
- IPD

*Generation of procedural and schedule DM on basis of Maintenance Tasks*

*Generation of IPD DMs*

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Swiss & Dutch Helicopter Manufacturer
Real world Submarine examples

Design Interface
- PMTR

Maintenance Planning
- Task

Supply & Provisioning
- IPL

Technical Data
- Procedure
- Schedule
- IPD

Generation of procedural and schedule DM on basis of Maintenance Tasks

Generation of IPD DMs

German Submarine Manufactor
Thank you
for your attention!

Questions?