



Cassidian Air Systems

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S1003X™ - Connecting Logistic Support Analysis (LSA) and Technical Publications

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Introduction and overview (1)

- S1003X™ is an interface specification between S1000D® 4.0 and S3000L™ 1.0
- S1003X™ defines data required to populate S1000D® maintenance planning and procedural data modules from Logistic Support Analysis (LSA) activities
- S1003X™ has been developed by the S1000D® Maintenance Task Data Task Team (MTDTT) in close co-operation with the S3000L™ working group
- S1003X™ closes the interoperability gap between the two logistic disciplines support engineering and technical documentation
- S1003X™ is one of the building blocks for Integrated Logistic Support (ILS)
- S1003X™ contains mapping tables for data elements and attributes required for product type acceptance and product maintenance
- S1003X™ connects the Product Life Cycle Support (PLCS) based data model of S3000L™ with the XML Schema based data model of S1000D®

Introduction and overview (2)

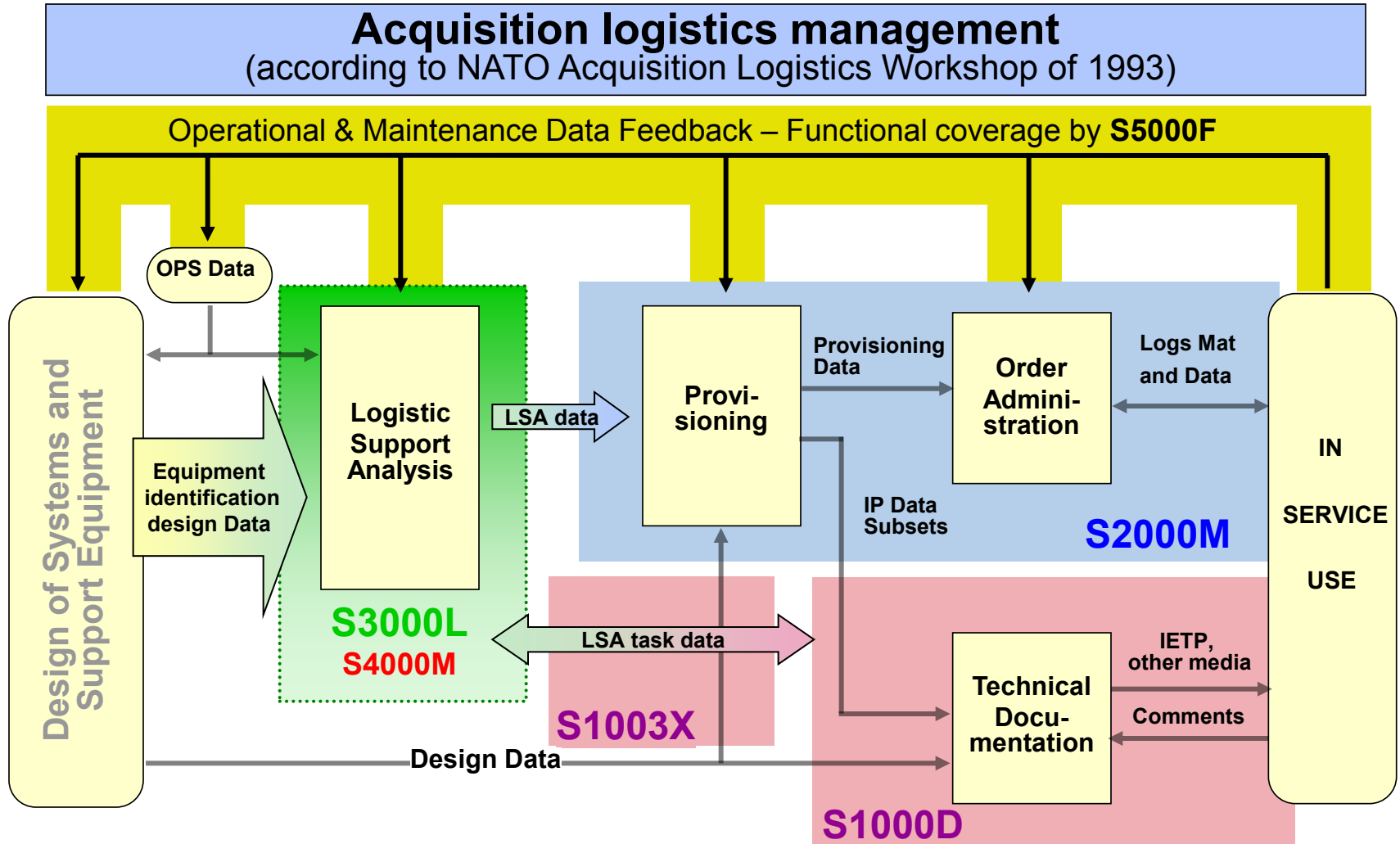
- S1003X™ uses a subset of the PLCS-based Aerospace & Defense (A&D) business Data EXchange (DEX) specifications
 -  Product breakdown for support and
 -  Maintenance task specification
- for data exchange.
- DEXs are developed and published in the OASIS [DEXlib repository](#)
 - DEXlib is the repository of information about PLCS, the OASIS PLCS DEXs and other related technology developed by the OASIS PLCS Technical Committee

Terms and definitions

- Integrated Logistic Support (**ILS**) is a management method to integrate and manage the elements of logistic support through product life
- Logistic Support Analysis (**LSA**) is a process to analyze all elements of a complex technical system to guarantee optimal logistic support during in service
- The ISO 10303-239 standard “Product Life Cycle Support” (**PLCS**) specifies a generic information model that defines what information can be represented and exchanged to support a product through life
- A Data EXchange specification (**DEX**) identifies and documents a subset of the PLCS information model required for a specific business purpose



ILS processes and ASD specifications

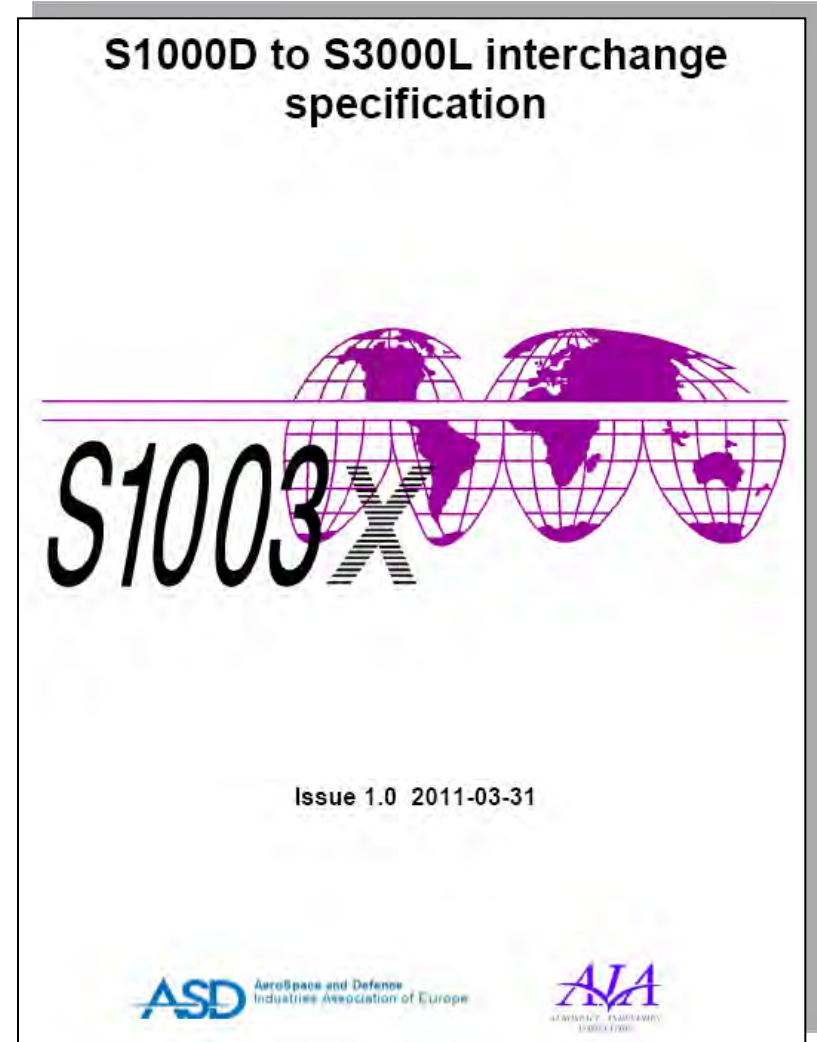


Status of the specification

- Joint development by ASD and AIA
- Participating companies/organizations:



- Kick-off meeting: 2007-11-13
- Draft issue 0.1 date: 2009-06-08
- Final issue 1.0 date: **2011-03-31**
- Downloadable from: www.s1000d.org



Specification structure and content (1)

Chap 1 - Background

- Purpose
- MTDTT
- Deliverables

Chap 2 - Introduction

- Introduction

Chap 3 - Principles of product breakdown structures

- Principles of product breakdown structures

Chap 4 - S1000D procedure and schedule Schemas vs S3000L

- S1000D vs S3000L views on a procedural task
- S1000D vs S3000L views on packaged tasks
- Populating S1000D data modules based on the S3000L data model

Chap 5 - S1000D data requirements

- General
- S1000D Identification and status section
- S1000D Maintenance procedure
- S1000D Maintenance planning information
- S1000D Applicability Schemas
- Common information repository

Specification structure and content (2)

Chap 6 - S3000L data required to populate S1000D data modules

- S3000L data required to populate S1000D data modules
- Units of functionality

Chap 7 - S1000D feedback to S3000L

- S1000D feedback to S3000L

Chap 8 - Use of DEX for S1000D and S3000L data exchange

- Use of DEX for S1000D and S3000L data exchange

Chap 9 - Samples with S1000D and S3000L instantiations

- Introduction
- Key concepts
- S1000D schedule Schemas and S3000L
- Examples with S1000D and S3000L instantiations

Data mapping (1) - Repair procedure example

Repair procedure (for equipment 401)	
Subtask 1	Reference on: Fault location procedure
Subtask 2	Remove cover 1 (opening 4 quick fasteners)
Subtask 3	Reference on: Remove cover 2
<ul style="list-style-type: none"> -- Working step 1 Open 24 screws for removal of cover 2 -- Working step 2 Remove cover plate -- Working step 3 Remove sealing 	
Subtask 4	Reference on: Remove equipment 401
<ul style="list-style-type: none"> -- Working step 1 Remove electrical connector E01-013 -- Working step 2 Open safety screws S01 and S02 -- Working step 3 Open attaching screws A01 to A07 -- Working step 4 Remove equipment 401 from housing 	
Subtask 5	Reference on: Disassemble equipment 401
<ul style="list-style-type: none"> -- Working step 1 	
Subtask 6	Remove defective component 5
Subtask 7	Install new component 5
Subtask 8	Reference on: Assemble equipment 401
Subtask 9	Reference on: Install equipment 401
Subtask 10	Reference on: Test function of equipment 401
Subtask 11	Reference on: Install cover 2
Subtask 12	Install cover 1



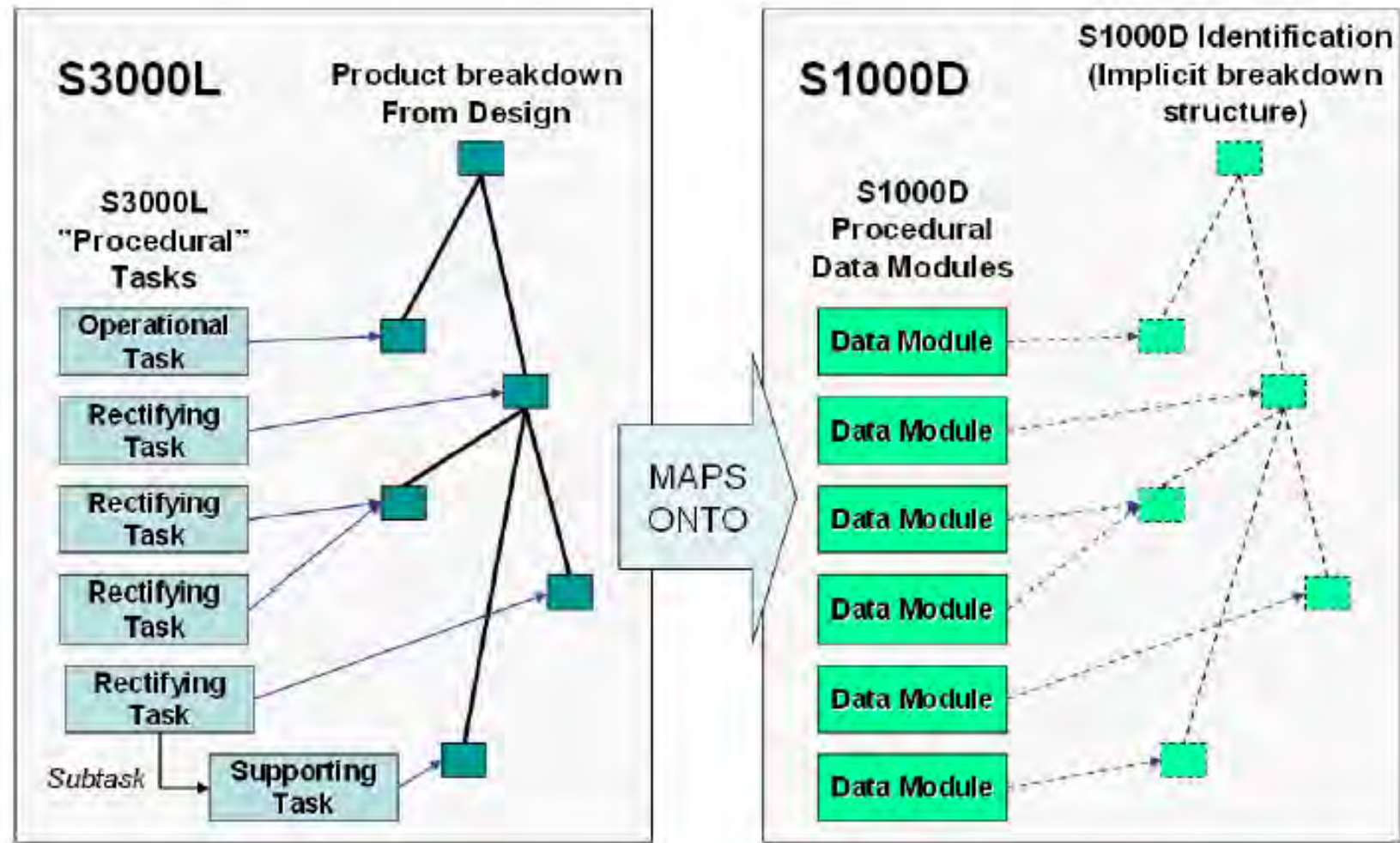
Repair procedure (for equipment 401)	
Subtask 1	Reference on: Fault location procedure
Subtask 2	Remove cover 1 (opening 4 quick fasteners)
Subtask 3	Reference on: Remove cover 2
<ul style="list-style-type: none"> -- Working step 2 Remove cover plate -- Working step 3 Remove sealing 	
Subtask 4	Reference on: Remove equipment 401
<ul style="list-style-type: none"> -- Working step 1 Remove electrical connector E01-013 -- Working step 2 Open safety screws S01 and S02 -- Working step 3 Open attaching screws A01 to A07 -- Working step 4 Remove equipment 401 from housing 	
Subtask 5	Reference on: Disassemble equipment 401
<ul style="list-style-type: none"> -- Working step 1 	
Subtask 6	Remove defective component 5
Subtask 7	Install new component 5
Subtask 8	Reference on: Assemble equipment 401
Subtask 9	Reference on: Install equipment 401
Subtask 10	Reference on: Test function of equipment 401
Subtask 11	Reference on: Install cover 2
Subtask 12	Install cover 1

S1000D preliminaryRqmts

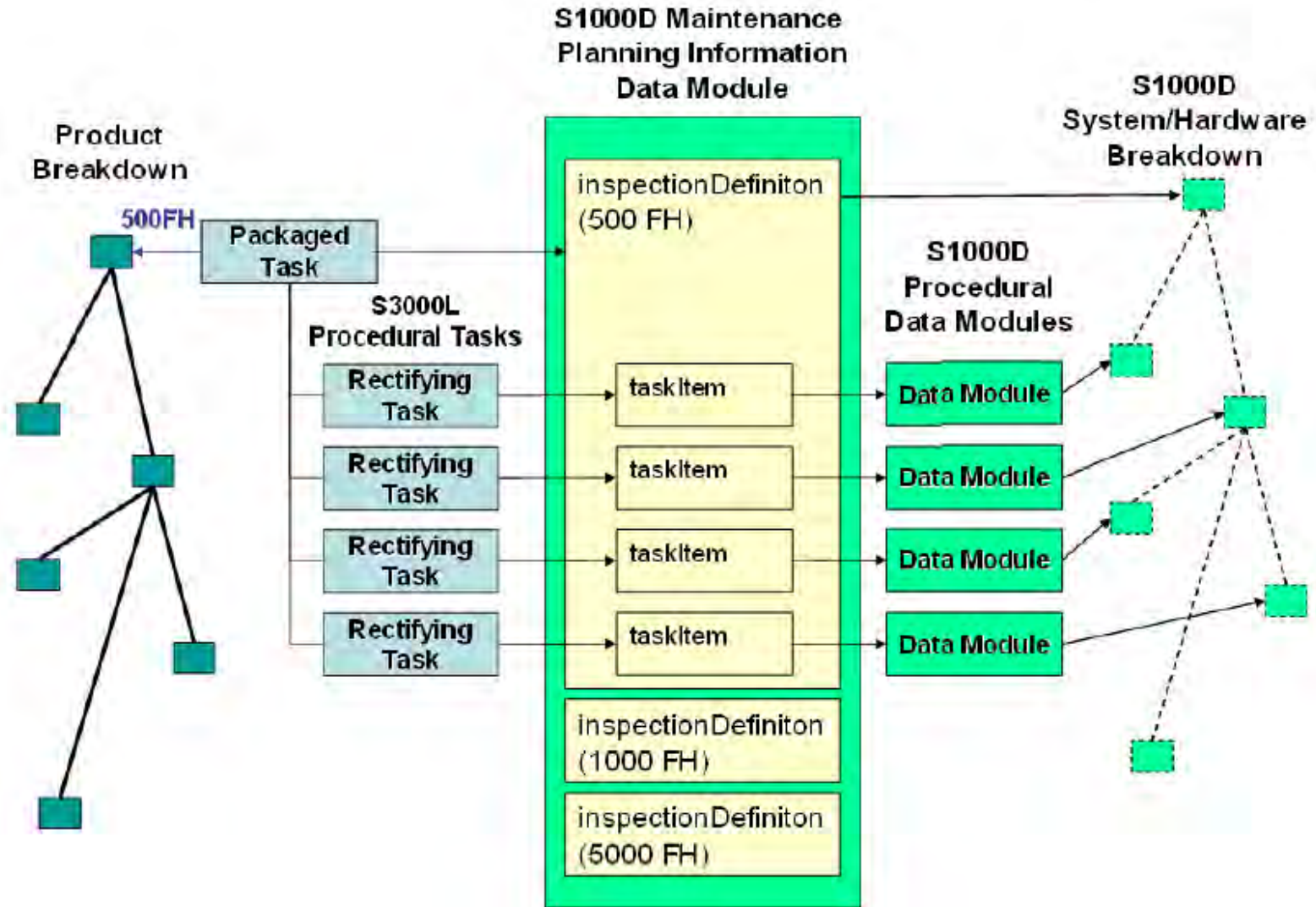
S1000D mainProcedure

S1000D closeRqmts

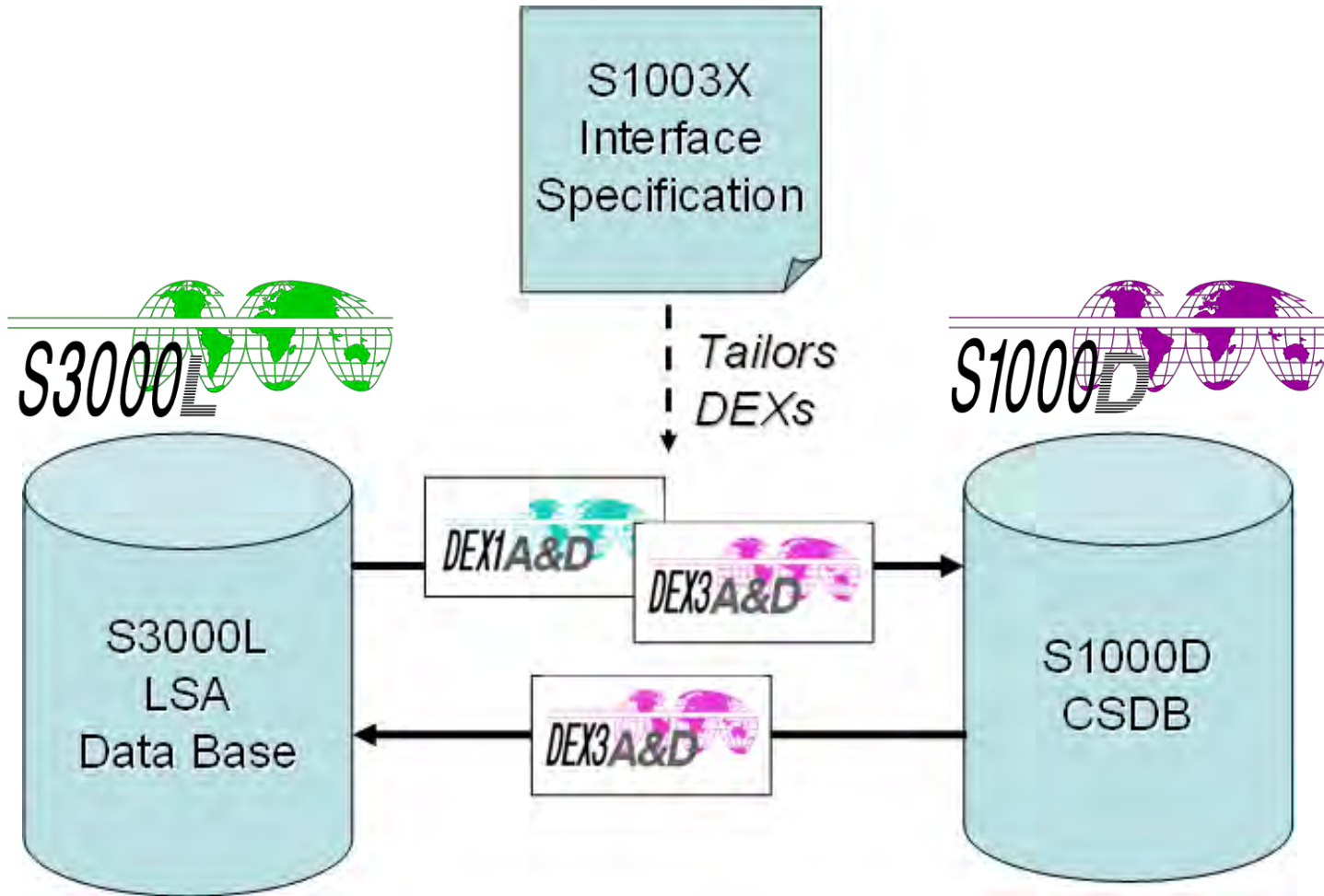
Data mapping (2) - S3000L procedural tasks to S1000D procedural data modules



Data mapping (3) - S1000D inspectionDefinition relationship to S3000L tasks

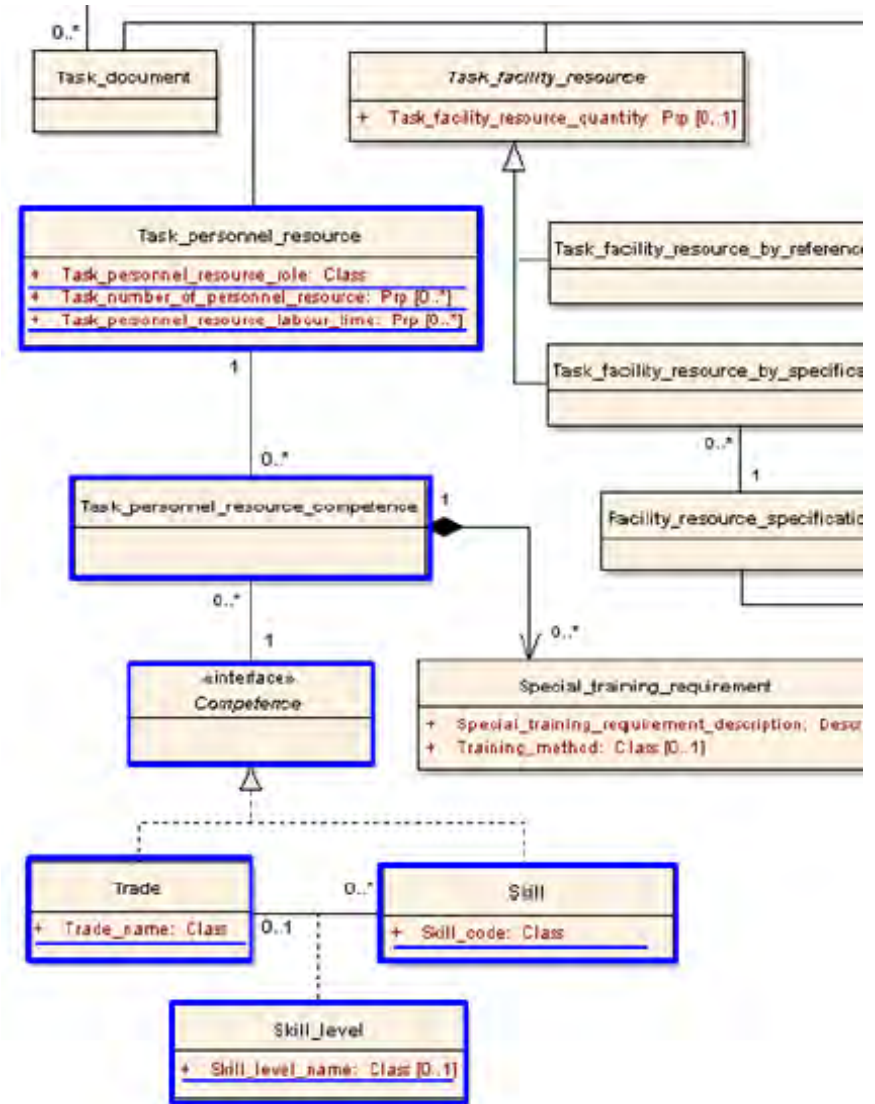


Data exchange - Tailored DEX1A&D and DEX3A&D (1)



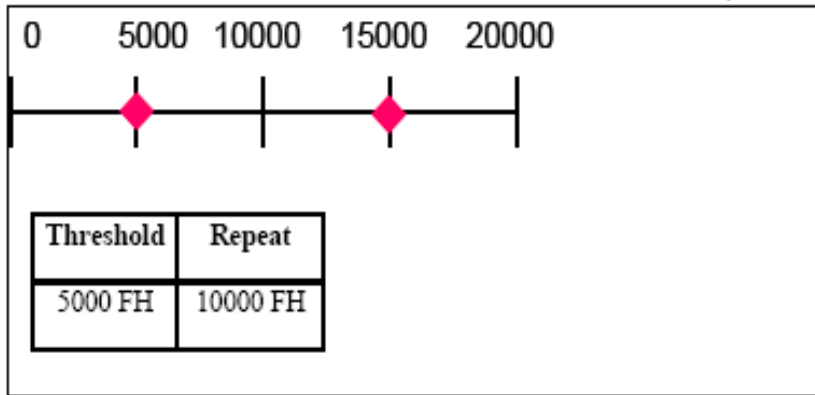
Data exchange - Tailored DEX1A&D and DEX3A&D (2)

- Only the data in the blue framed boxes are mapped to S1000D®
- Mapped: Task personnel requirements such as trade and skill
- Not mapped: Special training or facility requirements



Maintenance planning example

- Threshold does not equal - Repeat

 <table border="1" data-bbox="106 599 405 742"> <thead> <tr> <th>Threshold</th> <th>Repeat</th> </tr> </thead> <tbody> <tr> <td>5000 FH</td> <td>10000 FH</td> </tr> </tbody> </table>	Threshold	Repeat	5000 FH	10000 FH	<p>Perform at 5000 flight hours and repeat every 10000 flight hours thereafter.</p>
Threshold	Repeat				
5000 FH	10000 FH				
<p>S1000D mapping</p>	<p>S3000L mapping</p>				
<pre data-bbox="79 835 898 1175"><limit limitTypeValue="PO"> <threshold thresholdUnitOfMeasure="FH"> <thresholdValue>5000</thresholdValue> </threshold> </limit> <limit limitTypeValue="PE"> <threshold thresholdUnitOfMeasure="FH"> <thresholdValue>10000</thresholdValue> </threshold> </limit></pre>	<p>An instance of <i>Periodic_task_limit</i> with an instance of <i>initial_threshold</i> where the <i>Threshold_definition</i> is an instance of <i>Parameter_threshold</i> with the attribute <i>Threshold_value</i> set to Value = "5000" and Unit = "Flight_hour" and a repeat association with an associated instance of <i>Repeat_task_limit</i> which has a threshold where the <i>Threshold_definition</i> is an instance of <i>Parameter_threshold</i> with the attribute <i>Threshold_value</i> set to the value = "10000" and Unit = "Flight_hour".</p>				

Summary and way ahead

- S1003X™ defines data required to populate S1000D® maintenance planning and procedural data modules from Logistic Support Analysis (LSA) activities
- S1003X™ enables configuration-controlled generation of required information for through life maintenance of products based on the PLCS standard
- In general, there is no 1:1 relationship between S3000L™ tasks and S1000D® data modules, eg a repair task results in equipment removal, test and installation
- Thus S1003X specifies a bi-directional link between LSA and TechPubs
- The codes of generated data modules must be fed back to the LSA environment
- Way ahead
 - Definition of a common ILS use case probably based on an enhanced bike sample set
 - Development of a prototype for connecting LSA and TechPubs
 - Proof of concept for automated generation of data modules from an S3000L database
 - Implementation of the outstanding S1000D® CPFs to improve the interface
 - Manage the synchronization of S3000L™ and S1000D® updates

Abbreviations

- **A&D** Aerospace & Defense
- **AIA** Aerospace Industries Association of America
- **AP** Application Protocol
- **ASD** AeroSpace and Defence Industries Association of Europe
- **DEX** Data EXchange specification
- **ILS** Integrated Logistic Support
- **ISO** International Standards Organization
- **LSA** Logistic Support Analysis
- **MTDTT** Maintenance Task Data Task Team
- **OASIS** Organization for the Advancement of Structured Information Standards
- **PLCS** Product Life Cycle Support
- **TechPubs** Technical Publications
- **UML** Unified Modeling Language
- **UoF** Unit of Functionality

Thank you for your attention!

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