S – Series ILS Specification Overview / Status of all Specifications

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Index

- General Information about ASD / AIA
  - Historical background
  - Purpose & organisation

- Guideline for the Usage of the S-Series ILS specifications

- Published Specifications

- Interoperability between the ASD/AIA S–Series ILS specifications – data exchange

- Future activities – planned topics

- Website specification downloads and conclusion
Why international Specifications?

In the early 70s, each Program used their own Standards / Specifications. In the meantime most of them are obsolete and not updated. They haven’t been customized in terms of new technologies / In Service experience.... etc).

<table>
<thead>
<tr>
<th>Procedure</th>
<th>User</th>
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</thead>
<tbody>
<tr>
<td>MIL-H-8910</td>
<td>Netherlands, Italy, Belgium</td>
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<td>MIL-STD-1388</td>
<td>USAF</td>
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<td>ATA 200</td>
<td>Civil Airlines</td>
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<td>TORNADO SSP</td>
<td>RAF, IAF, GAF for TORNADO</td>
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<tr>
<td>B007 (VG 95007)</td>
<td>German Army, Navy</td>
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<tr>
<td>GAF T.O. (C-1-4)</td>
<td>German Air Force</td>
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<tr>
<td>AVP 77 (AIR 104)</td>
<td>RAF, French AF, French Army</td>
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</table>
Historical Background (2/3)

Birth of Suite of S – Series ILS Specifications

Outcome of the NATO Acquisition Workshop
(Paris 1983)

Historical Background (3/3)

Memorandum of Understanding between AIA and ASD

More than 300 major aerospace and defence companies and their suppliers are members of AIA, embodying every high-technology manufacturing segment of the US Aerospace and Defence Industry.

The ASD employs 750,000 people and encompass over 2000 companies in 19 European countries to achieve and maintain technological excellence in the segment of Aeronautics, Space, Defence and Security Industries.

MoU between AIA and ASD on S-Series co-operation (21st of July 2010)

Marion Blakey (AIA)  
Francois Gayet (ASD)
Purpose

❖ Establish a common understanding of ILS and its processes for international usage

❖ Optimize the Life Cycle Cost and performance of the product and support system

❖ Respond quickly to initial and changing requirements / technologies

❖ Enable collaboration between Customer and Industry through simplification of electronic information exchange
Suite of S - Series ILS specifications

(Allocation of ILS elements)

10. Sustaining Engineering

7. Product Support Management

1. Computer Resources
2. Design Influence
4. Maintenance
5. Manpower and Personnel
6. Packaging, Handling, Storage & Transportation
10. Sustaining Engineering

8. Supply Support

12. Training and Training Support

4. Preventive Maintenance

11. Technical Data

Customer requirements

ICN-88885-SX009301B-005-01
Original title:
INTERNATIONAL GUIDE FOR THE USE OF THE S-SERIES INTEGRATED LOGISTIC SUPPORT (ILS) SPECIFICATIONS

Current issue:
SX000i issue 1.1 July 2016

www.SX000i.org
Description:

SX000i provides a guide for the use of the S-Series ILS specifications by
- ILS managers and practitioners as well as for the management and future development of the specifications by the
- ILS specification Council and ASD Product Services Specification Group (PSSG)
- ILS specification Steering Committees (SC) and Working Groups (WG)

Its main goals are:

- Explains the vision and objectives for the S-Series ILS specifications
- Provides a framework that documents the global ILS process and interactions
- Explains how the ASD/AIA S-Series ILS specifications interface with other standardization domains including program-, global supply chain- and configuration management, engineering, manufacturing, security, safety, quality, data exchange and integration and life cycle cost
- Describes the global governance of the S-Series ILS specification development
- Provides guidance on how to meet specific business requirements using an appropriate selection of defined processes and specifications
### Mapping of the ILS Elements (extract)

The table below provides a detailed mapping of the different ILS elements and associated activities to the different S-Series ILS specifications.

<table>
<thead>
<tr>
<th>Life Cycle Sustainment Management</th>
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<tr>
<td><strong>Maintenance Planning and Management</strong></td>
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<td><strong>Product Support Management</strong></td>
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<td><strong>Supply Support</strong></td>
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<td><strong>DAU &amp; ILS S-Series Terminology</strong></td>
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</table>
| Capture product support requirement | S | P | i | T
| Develop ILS plan | S | | | | | | | | |
| Manage in service ILS activities | S | | | | |
| Configuration management | * S | P | P | T2.0 | T
| Perform decommission management | S | F | i | T
| Test management | | | | T2.0 |
| Lessons learned | | | | T2.0 |

<table>
<thead>
<tr>
<th>Packaging, Handling, Storage &amp; Transport (PHSST)</th>
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<tbody>
<tr>
<td>Develop Maintenance Concept</td>
</tr>
<tr>
<td>Perform Level of Repair Analysis</td>
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</tbody>
</table>
| Develop Maintenance Plan | S | F | i | T

| **ASD/AIA SX000i - Guideline for the usage of the S-Series ILS specifications** |

S = Support  
P = Partial in depth covered  
I = not covered – only Info  
T = Top – level coverage  
F = Full in depth covered  
Blank = not covered

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* Defense Acquisition University

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It provides a detailed mapping of the different ILS elements and associated activities to the different S-Series ILS specifications.
Content of the current / future SX000i

Index of the SX000i issue 1.1 and Issue 2.0

Chap. 1: „Introduction of the S-Series ILS specifications“
Chap. 2: „ILS Framework“
Chap. 3: „Use of the S-Series ILS specifications in an ILS program“
Chap. 4: „Governance of the S-Series ILS specifications“
Chap. 5: „Terms, abbreviations and acronyms“
Chap. 6: „Comparison of the specification terminology“
Chap. 9: „Terms, abbreviations and acronyms“
Chap. 10: „Terms, abbreviations and acronyms“
Chap. 11: „Comparison of the specification terminology“

Outlook:

Issue 2.0 is planned to be published in 2021

➢ ILS program guide (ILS managers’ s guidebook)
➢ ILS activities for each life cycle stage / contract type
➢ Support System Design effectiveness
➢ Tailoring / contracting against SX000i
➢ ILS programme data model
➢ ILS data elements

The existing Chapter 4 „Governance of the S-Series ILS specifications“ will be moved to a separate document, ILSC-2018-001.
Original title: INTERNATIONAL SPECIFICATION FOR TECHNICAL PUBLICATIONS UTILISING A COMMON SOURCE DATABASE.

Current issue: S1000D Issue 4.2 December 2016
**Description:**

- S1000D is an international specification for the production of technical publications

- S1000D covers relevant activities to **support maintenance and operation of a product**

- S1000D specifies a set of standardized rules for the **creation, management, distribution, use and update** of common information in a workshare environment

- S1000D is **NOT a ready-to-use solution** for all technical publication problems

- S1000D can **NOT be implemented without thorough planning and coordination** between all involved project partners
The S1000D Process

- **S3000L**: Customize S1000D (Business rules)
  - Maintenance/support concept
  - Product breakdown
  - Maintenance planning
  - Maintenance tasks

- **S2000M**: Agree information set (Scope & Rules)

- **S6000T**: Create Update DML

- **S5000F**: Produce / update DM, PM, SCO, SCORM

- **S4000M**: Agree Publication Structure

- **S5000F**: Generate Publication

- **S5000F**: Produce Media & publish

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**Design:**
- 3D Modules / Drawings
- Product description
- Etc...

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**Chapter 1**: Introduction
**Chapter 2**: Documentation process
**Chapter 5**: Information sets & publications
**Chapter 4**: Information management
**Chapter 8**: SNS & information codes
**Chapter 3**: Information generation
**Chapter 6**: Information presentation/use
**Chapter 7**: Information processing
**Chapter 9**: Terms & data dictionary

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*The S1000D Process* is a technical documentation format used in the aerospace and defense industries. It includes various processes such as customizing S1000D, agreeing information sets, creating and updating DML, producing and updating media, and generating publications. The design includes 3D modules, product descriptions, etc. The document includes chapters on introduction, documentation process, information sets and publications, information management, SNS and information codes, information generation, information presentation, and terms and data dictionary.
One cycle of a change process

- Min duration of one cycle to create a new baseline (Internal or Published S1000D Issue) ≈ 182 days
- Review of In-work CPFs at SC F2F meetings → two SC F2F meetings per year
- WebEx meetings in between F2F meetings to review New CPFs and review correct incorporation

**Abbreviations**
- CPF (Change Proposal Form)
- DSWG (Data Samples Working Group)
- EPWG (Electronic Publications Working Group)
- PPWG (Production and Publishing Working Group)
- SC (Steering Committee)
Original title:
INTERNATIONAL SPECIFICATION FOR MATERIAL MANAGEMENT AND INTEGRATED DATA PROCESSING.

Current issue:
S2000M Issue 6.1 July 2017
ASD/AIA S2000M – Material Management

Description:

The specification S2000M defines the processes, procedures and provides the information for data exchange to be used for material management throughout the lifecycle of a product.

- It is the intention that S2000M shall be the common Material Support specification to be used by Governments, Procurement, Support Agencies, and Industry.
- By agreement between Customer and Industry, it can be supplemented by additional international or national requirements for specific projects.
- The use of the specification and any supplementary processes should always be subject of contractual agreement between Customer and Industry.
- It is also the intention of Industry that the specification shall be used, whenever possible, in projects involving other Customers throughout the world.
The S2000M Process

**Design:**
- Drawings

**Transportation:**
- Storage Info

**Commercial Information:**
- Maintenance Concept
- Spares
- Tooling
- Drawings
- Storage Info
- Material Supply (Initial Provisioning/repromotion) ➔ initiated by the Customer (Chapter 3)

**Simplified Illustration:**
- Illustrated Parts Data (IPD)
- Initial Provisioning List (IPL) ➔ Candidates for maintenance repair
- Draft ➔ approval

**NATO-Codification (optional)**

**NATO-Stock Number**

**Request**

**Pre-Assessment-Meeting (optional) directly with Customer**

**ASD/AIA S2000M – Material Management**
Content of the current / future S2000M

**S2000M Issue 6.1:**

- Chapter 1 – Provisioning
- Chapter 2 – Spare Parts List (SPL)
- Chapter 3 – Material Supply (MS)
- Chapter 4 – Communication Techniques (CT)
- Chapter 5 – Data Dictionary (DD)

**Chapter 6 – Definitions, Abbreviations and Reference Documents**

**Outlook S2000M issue 7.0**

- Use of S2000M for Performance Based Logistics
- Economical listing of Consumables
- Information if an item is Export Controlled (e.g. ITAR *)
- Narrative wording concerning compliance with REACH**

* International Traffic in Arms Regulations
** Registration, Evaluation, Authorisation of Chemicals
Original title:
INTERNATIONAL PROCEDURE SPECIFICATION FOR LOGISTICS SUPPORT ANALYSIS (LSA)

Current issue:
S3000L Issue 1.1 July 2014

www.S3000L.org
Description:

Logistic Support Analysis (LSA) is an extended process to analyse carefully all elements of a complex technical product. The final goal of this analysis process is to establish an optimized support concept at reasonable costs during the complete product life cycle.

In this context, the term support concept means/includes corrective and preventive maintenance as well as operational support (e.g. transportation, packaging, storage, servicing, operational handling).

Three main goals can be identified:

- Influence on design to improve/optimize the product itself (mainly driven by RM&T analysis activities)
- Determination of the support concept and identification and optimization of the required support resources (personnel and material)
- Establishment of the basic information for the ILS elements to ensure data consistency throughout the complete product life cycle

LSA is not to be considered a standalone supportability analysis discipline or an ILS discipline. LSA does not provide a final ILS product such as technical publication, but it is the crucial coordinating element of the ILS organization to achieve the goals of an ILS approach.
The S3000L Process

Definition of product breakdown structure based on design information

The LORA identifies the optimized maintenance level to perform the maintenance activities

Determination of tasks by identification of task requirements:
- Corrective Maintenance Task Requirements (CMTR)
- Preventive Maintenance Task Requirements (PMTR)
- Operational support task requirements (e.g. identified by "PHST*" analysis)

A potential LSA candidate requires corrective, preventive maintenance or operational support.
(e.g. Equip. Subsystem, System)

Analyzing each support task concerning all 12 ILS elements
(e.g. technical documentation, Spare parts, GSTE** etc...)

PHST* = Packaging, Handling, Storage, Transportation
GSTE** = Ground Support Test Equipment
Content of the current / future S3000L

Issue 1.1:
- Introduction to the specification
- General requirements
- LSA business process
- Configuration management in LSA
- Influence on design
- Human factors analysis

Level of repair analysis
- Chap 11

Maintenance task analysis
- Chap 12

Software support analysis
- Chap 13

Life cycle cost considerations
- Chap 14

Obsolescence analysis
- Chap 15

In-service LSA
- Chap 16

Disposal
- Chap 17

Interrelation to other ASD specifications
- Chap 18

Data model
- Chap 19

Data exchange
- Chap 20

Terms, abbreviations and acronyms
- Chap 21

Data element list
- Chap 22

Chapter 7 to 10
Identification/processing of task requirements

Outlook:

New S3000L issue 2.0 in preparation (planned to publish in 03/2019)
- Review of all issue 1.1. chapters in terms of editorial and formal optimization/improvement:
  - Terminology and wording
  - Upgrade of illustrations
  - Harmonization with other ASD specification (especially SX000i and S4000P)
- Establishment of the internal link to chapter 19
  In each main chapter 2-17, a subchapter is added to establish the link to the data model chapter 19 which classes (data element groups) are covered by which main chapter
- Mainly modified chapter 16 (In-service LSA):
  Introduction of In-Service Support Optimization (ISSO), including a generic ISSO analysis logic (comparable to the ISMO logic in S4000P)
- Update of chapter 19 in correlation with the actual Common Data Model (CDM) of the S-Series ILS specifications
Original title:
INTERNATIONAL SPECIFICATION FOR DEVELOPING AND CONTINUOUSLY IMPROVING PREVENTIVE MAINTENANCE

Current issue:
S4000P Issue 1.0  May 2014

www.S4000P.org
Description:

Chapter 2 of the S4000P assists a Product manufacturer, suppliers, customers including regulatory authorities (if any), involved in the analysis process developing and releasing initial Preventive Maintenance Task Requirements (PMTR) and intervals for new products prior entry into service.

Chapter 3 provides the In-Service Maintenance Optimization (ISMO) process applicable for later optimizations/modifications of the OMP and/or of the Product design.
ASD S4000P – Preventive Maintenance Analysis and Optimization

Content of the current S4000P Issue 1.0

Introduction to the specification Chap 1
Development of Preventive Maintenance Task Requirements Chap 2
  Analysis methodologies for a Product:
  ➢ System analysis
  ➢ Structure analysis
  ➢ Zonal analysis (modular)
Continuously improving preventive maintenance „ISMO“ Chap 3
Interfaces of S4000P (Dummy) Chap 4
Terms, abbreviations and acronyms Chap 5
Examples Chap 6

... and of the future S4000P Issue 2.0

Introduction to the specifications Chap 1
Developing PMTR Chap 2
  Developing of PMTR both with intervals (PMTRI) and PMTR for special events
  PMTRE cover e.g. bird strike, lightning heavy landing...
Optimizing PMTR Chap 3
  Optimizing of PMTR both with intervals (PMTRI) with ISMO and PMTR for special events (PMTRE)
Optimizing PMTR - Review of PMTRE for special events Chap 3.5
Interfaces of S4000P Chap 4
  ➢ S4000P interfaces outside the S-Series of Spec’s
  ➢ S4000P interfaces inside the S-Series of Spec’s
Data Model and Data exchange Chap 5
Terms, abbreviations and acronyms Chap 6
Examples Chap 7

NOTE:
Developing of PMTR both with intervals (PMTRI) and PMTR for special events
PMTRE cover e.g. bird strike, lightning heavy landing...

NOTE:
Optimizing of PMTR both with intervals (PMTRI)
with ISMO and PMTR for special events (PMTRE)
Outlook:

Issue 2.0 will provide additional support and additional solutions for preventive Product maintenance analysis aspects not being covered by any other analysis specification/standard today.

Main advantages and benefits:

- Applicability on and flexibility to be used for all complex Product types
- Provision of analysis methodologies and processes covering the whole Product life cycle
- Integrated specification of the ASD/AIA S-Series ILS specifications (harmon. processes, data model, data exchanges, integrated IT support etc.)

Remark:

- Several successful applications for military A/C and submarines in EUROPA.
- NATO signature of STANREC 4795 comprising the ISMO process (see chapters 3.1. to 3.4. in Issue1.0 “S4000P” and chapter 10 “S3000L”)
- Signature and release of the S4000P application guideline for the German forces/German MoD in 2017
Original title:
INTERNATIONAL SPECIFICATION FOR IN-SERVICE DATA FEEDBACK

Current issue:
S5000F issue 1.0 September 2016
Description:

The S5000F - International Specification for In Service Data Feedback describes a structured way to share information between different stakeholders regarding a system or product. The information will be transferred using an XML schema that is interoperable with the other S-Series ILS specifications.

Collection of in-service data has many purposes and is one of the most important functions of in service support. It enables fleet managers, support managers and manufacturers to perform a thorough analysis of operational and maintenance performance of a complex technical system.

The results of the analysis can be the basis for:

- Enhancement of the maintenance and support concept
- Improvement of the product or the system by modifications and retrofit activities
- Sophisticated operational planning
- Management of requirements and contract
Content of the current S5000F

Issue 1.0:

- **Introduction** (Chap 1)
- The in-service data feedback process (Chap 2)
- Feedback data for the purpose of Reliability, Availability, Maintainability capability and Testability analysis (Chap 3)
- Feedback of data for maintenance analysis (Chap 4)
- Feedback of safety data (Chap 5)
- Feedback of data for supply support (Chap 6)
- Feedback of Life Cycle Cost analysis (Chap 7)
- Feedback of data for warranty analysis (Chap 8)
- Feedback data for the purpose of product health and usage monitoring (Chap 9)
- Feedback of data to support obsolescence management (Chap 10)
- Feedback of data for integrated fleet management data (Chap 11)
- Feedback of data for configuration management (Chap 12)
- Feedback of data to support the management of in-service contracts (Chap 13)
- Feedback of non pre-defined information (Chap 14)
- Data model (Chap 15)
- Data exchange (Chap 16)
- Data element list (Chap 17)
- Tailoring and contracting against S5000F (Chap 18)
- Data required for the different use cases (Chap 19)
- Terms, abbreviations and acronyms (Chap 20)
Content of the future S5000F

The S5000F process

Outlook:

Issue 1.1 is planned to be published by the end of 2018 and will include the following updates:

- New software chapter
- Export Control
- Shop findings
- Enhanced environment
- Transport (to be confirmed)
- Some new other „Use Cases“

Issue 2.0 is planned to be published in 2021. First ideas are under discussion:

- New chapter for Feedback for/from Disposal
- Harmonization with ECCAIRS* (if feasible/practical)
- Harmonization with IEEE 1636** (if feasible/practical)
- Integration of REACH***

* European Coordination Centre for Accident and Incident Reporting System
** Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA)
*** Registration, Evaluation, Authorisation of Chemicals
Original title:
INTERNATIONAL SPECIFICATION FOR TRAINING INFORMATION

Planned issue:
S6000T issue 0.1 (planned to publish in 3rd Quarter of 2018)
Description:

Successful training requires a firm foundation:
- Detailed, comprehensive requirements
- Solid design definition data

Purpose of the S6000T specification: To define all levels of requirements and design data necessary to support product training development.

S6000T will cover:
- An introduction to the specification
- Information gathering
- Analysis
- Design
- Touch points between the elements of S6000T and the common data model

Also under consideration:
- Human factors
- S6000X, which is the specification that will detail all the mapping between elements of S6000T and the rest of the S-Series ILS specifications
The S6000T Process

- **Training situation analysis**: Analyze operational environment, existing training capabilities and potential gaps
  - Identify **tasks** to be trained *(input from MTA / LSA database)*
  - Define **classification** of tasks *(difficult / simple, frequency, importance for product operability)*

- **Identify background concerning experience and educational needs**

- **Develop training objectives** *(including conditions for performance)*
  - Determine required **media** *(including technical publications)*
  - Sequence the **training objectives** into learning objectives
  - Describe **IT requirements** *(e.g.: LMS* or reporting system)*

- **Develop learning content** *(training material)*
  - Assembly / group learning objects and structure learning courses
  - Implement **sequencing** requirements
  - Define required **data**

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LMS* = Learning Management System
SCORM** = Shareable Content Object Reference Model
Interoperability between the ASD/AIA S-Series Specification - Data Exchange

DMEWG (Data Management Exchange Working Group)

Data exchange in a common format

Auxiliary Specifications

Data Input Specifications for Sn000X

Design of systems & support equipment
The SX001G contains:

- **Issue 1.1 scope** is limited to the terms & definitions of the business terms and data items.
- **Business terms** include concepts that are significant to understand the S-Series ILS specifications
- **Data items** correspond to elements defined within the data models of the S-Series ILS specifications

**SX001G**

*Glossary for the S-Series ILS specifications*

**SX002D**

*Common Data Model for the S – Series ILS specifications*

- **Issue 1.1 (Published)**
  - Product and product variant
  - Product breakdown
  - Part as designed
  - Bill of material
  - Allowed product configuration

- **Issue 2.0 (Planned)**
  - Project and contract
  - Task requirement
  - Task
  - Task resources
  - Time limits

Provides a harmonized information model for information that is common to more than one Specification

**XML Schema Authoring Rules**
Description:
The purpose of S1000X, S2000X, S3000X, S4000X and S6000X is to specify all input data required from other specifications to S1000D, S2000M, S3000L, S4000P and S6000T, respectively, in a standardized way.

Content:
▪ The definition of these required input data is not limited to the S-Series ILS specifications but must include any source necessary to create the respective deliverables.
▪ Sn000X defines all required input data for the respective specification in a standardized way.
▪ Sn000X gives rules and guidance for the mapping of elements and attributes.
▪ This includes process descriptions concerning the order of data receipt from the different source specifications/systems including associated triggers.
▪ The order relationship and interdependence of the data are defined in the mapping requirements.
▪ The terminology is based on the glossary given in SX001G and the source and target data model/schema is based on the common data model in SX002D.
Interoperability between the ASD/AIA S-Series ILS specification – Data Exchange

Auxiliary Specifications

**SX004G**
(Unified Modeling Language (UML) model reader’s guidance)

**General:**
- The SX004G describes how to read and understand the language (UML) class models that are created in the SX002D.
- Provides a clear instruction on how the S–Series ILS specifications UML models need to be read and to make sure, all parties have a common understanding.

**SX005G**
(S-Series ILS Specifications XML schema implementation guidance)

**General:**
- The SX005G defines the rules for the managing of the data exchange via updated messages between two systems that are compliant with the respective S-Series ILS specifications.
- XML schemas defined for the respective S-Series ILS specifications define data that can be sent from one data system to another.
Future Activities / planned Topics

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<th>Year</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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<th>2022</th>
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Cycle 1 release
2021-04-30
New date!
Future Activities / planned Topics

Specification Issue plan

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<th>Iss 6.0</th>
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Issued

Planned
Future Activities / planned topics

**S – Series ILS Specification Publication Process:**

The ILS Council has agreed to **perform a block release for all S-Series ILS specifications**, with the exception of S1000D. This means that all specifications will be **published at the same time**, so as to ensure the interoperability of the whole S-Series of ILS specifications. The cycles of the different block releases will overlap, so as to ensure that each SC/WG can continue working without having to wait for all the editorial work to finish.

This block release will take place every two years, at a date set by the ILS Council.
Future Activities / planned Topics

**DMEWG objective to fully adopt AP239 ed. 3 into the S – Series ILS Specifications**

For the time being the S-Series are using XML schema but in the future it has to be taken in account that the data exchange outside the scope of the S-Series ILS specifications (e.g. 3D models) needs a new approach and in this case the AP239 ed. 3 could be an adequate option.

Nevertheless the PSSG agreed as long as PLSC ed.3 is in the development phase and not mature enough (based on their complexity) no change from XML to PLCS ed.3 is planned.

The close contact to the PLCS WG is guaranteed by the active participation of ASD / AIA DMEWG members.
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Conclusion / Summary

Conclusion

The S-Series ILS specifications offers a powerful collection of specifications, which ensures the implementation and execution of an effective and efficient ILS process about the whole Product Life Cycle.

Future Developments will improve the performance of the ASD / AIA S-Series ILS specifications and their harmonization among each other (e.g.: Sn000X, Sx001G, Sx002D etc...). This includes a high potential of cost optimization and ensure the interoperability of the ILS disciplines.

The specifications are developed further by Experts and Providers of technically complex products under the umbrella of the international industrial Organizations (ASD, AIA, ATA)
Thank you
for your attention!

Questions?