The S-Series of ILS specifications

Overview

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Table 1 References

Document No.	Title
www.sx000i.org	The SX000i and SX001G, SX002D, etc, specifications website
www.s1000d.org	The S1000D website
www.s2000m.org	The S2000M website
www.s3000l.org	The S3000L website
www.s4000p.org	The S4000P website
www.s5000f.org	The S5000F website

Document No.	Title
www.s6000T.org	The S6000T website
www.asd-ste100.org	The ASD-STE100 website

1   The S-Series of ILS specifications

Introduction

The international aerospace and defense community have, over the past 20 years, invested considerable effort to develop specifications in the field of Integrated Logistic Support (ILS).

The work was initially accomplished by integrated Working Groups (WG) composed of Industry (initially members of the AeroSpace and Defence Industries Association of Europe (ASD)) and customer organizations (MOD, etc) in a collaborative environment. The structure and functional coverage of these specifications was largely determined by NATO requirements specified during an international workshop (HAW Acquisition Logistics) in Paris in 1993.

In July 2010 an MoU was signed between ASD and AIA (Aerospace Industries Association of America, Inc.) in order to promote a common, interoperable, international suite of integrated logistics support specifications in the aerospace and defense industries of Europe and the United States and to make optimal use of the resources available, ASD and AIA agreed to work in concert on the joint development of the **S-Series of ILS specifications**.

An ILS Spec Council was formed to conduct the overall governance of the development of the **S-Series of ILS specifications** except

- S1000D which is covered under a separate agreement between ASD, AIA and ATA (Air Transport Association of America, Inc.)
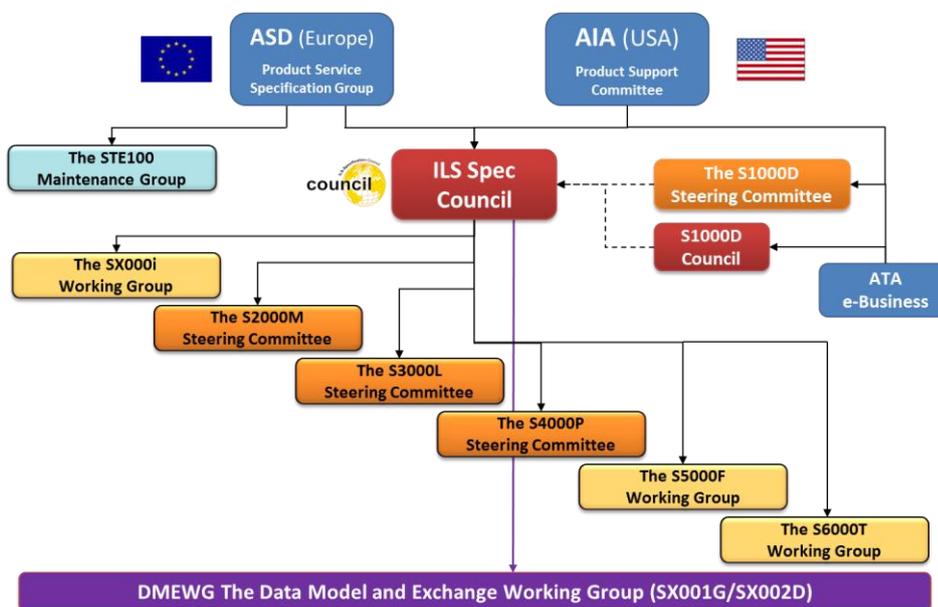- ASD-STE100 which is an ASD specification

Fig 1 The organization

Vision

The Council's vision for the **S-Series ILS specifications** is

- to be the international integrated specification suite for logistics support of aerospace and defense Products

Mission

The mission for the Council, its specification Steering Committees and Task Teams is

- to minimize project dependency by defining clear guidance and by managing and limiting inclusion of project and national specific rules and constructs
- to ensure commonality between the ILS related specifications to support the re-use across projects
- to give rules and guideline for the realization of an integrated logistic support to emphasize the main principle of ILS, the integration of the different logistic disciplines (the "I" in ILS must be the main driver)
- to ensure the application of the basic ISO standards such as ISO Dates and Language Codes
- to establish well defined data transfer mechanism between the different logistic disciplines based on PLCS
- to cover all aspects of supportability over the entire life cycle of a product
- to be the contractual baseline for industry and customers
- to be up to date with the technical development and changes in support philosophy

The following specifications are currently available or in the process of development:

- SX000i - International guide for the use of the S-Series of Integrated Logistics Support (ILS) specifications
- S1000D - International specification for technical publications using a common source database
- S2000M - International specification for material management - Integrated data processing
- S3000L - International specification for Logistics Support Analysis - LSA
- S4000P - International specification for developing and continuously improving preventive maintenance
- S5000F - International specification for in-service data feedback
- S6000T - International specification for training analysis and design
- SX001G - Glossary for the S-Series of ILS specifications
- SX002D - Common data model for the S-Series of ILS specifications
- SX003X - Interoperability matrix for the S-Series of ILS Specifications
- S1000X, S2000X, S3000X, S4000X, S6000X - Input data specifications
- ASD-STE-100 - International specification for the preparation of maintenance documentation in a controlled language (Simplified Technical English)
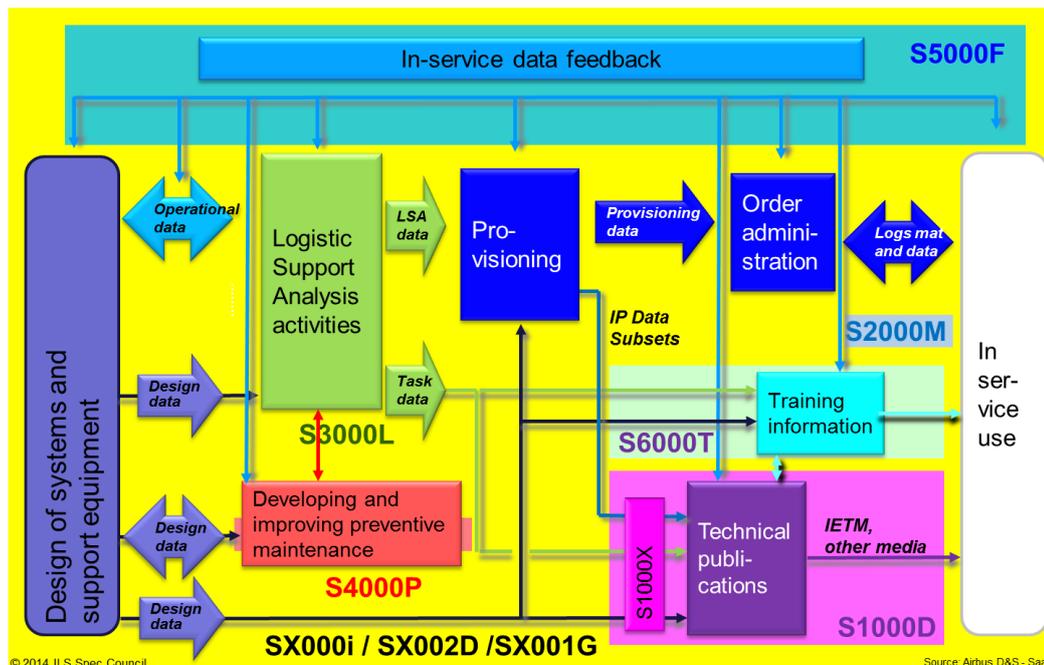

Fig 2 The S-Series of ILS specifications

2 SX000i - International guide for the use of the S-Series of Integrated Logistics Support (ILS) specifications

Introduction

By defining common logistics processes to be used across all S-Series of specifications and the interactions of the current S-Series of specifications with the logistics processes, the SX000i forms the basis for sharing and exchanging data securely through the life of products and services. The SX000i also provides governance for the maintenance of current S-Series specifications and the development of new S-Series of ILS specifications.

Purpose

SX000i provides a guide for the use of the S-series of 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 ILS specification Steering Committees (SC) and Working Groups (WG).

SX000i:

- explains the vision and objectives for the **S-Series of ILS specification**
- provides a framework that documents the global ILS process and interactions
- explains how the ASD/AIA S-Series of ILS specifications interface with other standardization domains including Program management, Global supply chain management, Engineering, Manufacturing, Security, Safety, Configuration management, Quality, Data exchange and integration, and Life cycle cost
- describes the global governance of ASD/AIA ILS specifications development
- provides guidance on how to satisfy specific business requirements using an appropriate selection of defined processes and specifications

SX000i Guide development history

During the development of the ASD ILS specifications, the different WGs identified the need for an "umbrella" specification to ensure the compatibility and commonality of ILS processes among the S-Series of ILS specifications. In 2011, the decision was made to develop, publicize and maintain an Integrated Logistic Support Guide, named SX000i, so as to provide a compatible and common ILS process to be used in the other ILS specifications. Development of SX000i was viewed by the ILS specifications Council as an essential step to achieving the vision for the S-Series of ILS specifications.

In June of 2011, the SX000i working group was formed and SX000i development commenced. The current title of SX000i, International Guide for the Use of the S-Series of integrated logistics support specifications, was approved by the ASD/AIA ILS Specifications Council in June of 2012.

Following the formation of the SX000i WG, the ASD/AIA Data Model and Exchange Working Group (DMEWG) was formed under the ILS Specifications Council in October 2011. Working in close coordination with the SX000i WG, the DMEWG coordinates the data modeling activities that are performed within the respective ILS Specification SCs and WGs so as to harmonize and consolidate data requirements into one coherent data model.

Publication of SX000i, and continuing DMEWG coordination activities, enable the achievement of the vision for the suite of ILS specifications "to apply common logistics processes so as to share and exchange data securely through the life of products and services".

The companies and organizations that are currently participating in the development of SX000i are:

- Airbus   France
- Airbus Defence and Space   Germany and Spain
- Boeing Defence Systems   USA
- Bundeswehr   Germany
- ESG Elektroniksystem und Logistik GmbH   Germany
- FACC AG   Austria
- HEME GmbH   Germany
- O'Neil   USA
- SELEX ES   Italy

- Tusas Aerospace Industries (TAI)   Turkey
- UK Mod   United Kingdom

SX000i is expected to be published in the second quarter of 2015.

Ten-liner

SX000i will provide the framework for the global ILS process, as well as the guidelines for the selection and use of the S-Series of ILS Specifications. Nonetheless, SX000i will also define the global specification governance, as well as the mechanisms that will be used to ensure that the **S-Series of ILS specifications** is both integrated and interoperable.

SX000i consists of six chapters:

- Chapter 1 - Introduction to the guide
- Chapter 2 - Integrated logistic support framework
- Chapter 3 - Usage of the S-Series of ILS Specifications in an ILS program
- Chapter 4 - AIA/ASD ILS specification governance
- Chapter 5 - Terms, abbreviations and acronyms
- Chapter 6 - Comparison of specification terminology

Web-site

Free download will be available at www.sx000i.org

3   S1000D® - International specification for technical publications using a common source database

Introduction

S1000D® (European Community Registered Trade Mark) is an international specification that gives rules and guidance for the production of technical publications, using XML and storing the information as "data modules" in a Common Source Database (CSDB). Data modules are small XML files that typically contain, for example, a single maintenance procedure.

Purpose

This specification is predicated on the concept of "write once, use many" and, to that end, uses data modules, which can be reused and/or repurposed in one or many ways. Structural integrity and consistency is supported by 26 XML Schemas for the different types of information.

S1000D development history

S1000D was born from a need to support a multi-nation, multi-manufacturer aerospace project known as Eurofighter. The need was realized by project leads who observed that the technical publications from the nations and manufacturers were being written to different specifications, which led to inconsistency. In 1985 this situation prompted the Documentation working group of ASD (formerly AECMA) to invite military representatives from the European nations to form a joint team for the development of a common military aircraft specification for technical publications.

Release history:

1989
The first issue of the specification was released at the Paris airshow in June 1989. During the following years five changes (Change 1.1 thru Change 1.5) were released.

1995
The first "full blown" specification (Change 1.6) was published in 1995 and consisted of four main chapters in two volumes with 24 Annexes and one SGML DTD. The specification provided for descriptive, procedural and general information for air vehicles, engines and aerospace ground equipment. IETPs were linear, database oriented or integrated and supported by HyTime.

1998
The next issue of S1000D was Change 1.7 which was released in 1998. There was a significant change in this issue from Change 1.6. Aerospace ground equipment was supported by separate DTDs for descriptive, procedural and schedules information. Air vehicles were supported by these plus crew and illustrated parts

information. SGML DTDs were also provided for data dispatch notes, In-Process review forms and CSDB lists. The concept of Web based IETPs was also introduced in this issue.

1999
In 1999, Change 1.8 of the specification was released. In the main, Change 1.8 harmonized the aerospace ground equipment DTDs and the air vehicle, engine and equipment DTDs.

2001
Change 1.9 was released in 2001. The most significant aspects of Change 1.9 were the introduction of XML DTDs and IETP-X, which used XML based functionality such as XLink. Also included in this change was relaxation of the rules for the use of different file types to allow for types such as PNG and PDF, and the removal of various elements that were presentation related.

2003
In 2003, at Issue 2.0, S1000D was transformed and completely restructured into nine main chapters that now supported not only air vehicles, engines and aerospace ground equipment but also land and sea based defense projects. It was at this issue that an MOU was signed between ASD and the AIA to jointly maintain future issues of the specification. Another significant change was the introduction of XML Schemas. More information types – commenting, data module lists and publication modules were also added to the suite of SGML and XML DTDs and XML Schemas. This was also the issue that introduced the Process data module and the functionality matrix.

2004
Issue 2.1 was released in 2004. The changes were mainly editorial but more importantly, the new SGML DTDs and XML Schemas were added to support wiring data modules. Also in 2004, an MOU was signed between ASD and ADL. The intention of this MOU was to harmonize the requirements of SCORM with S1000D.

2005
2005, at Issue 2.2, the BREX data module was introduced and a large number of change proposals were resolved.

2007
In 2007, an MOU was signed between ASD, AIA and ATA and Issue 2.3 was released. Important changes at this issue were the introduction of the Technical Information Repository and the container concept (from ATA) and the beginnings of a new applicability model. At Issue 2.3, the concept of the "Product" was introduced and XML was declared as the master text format as opposed to SGML.

Later in 2007 Issue 3.0 was released. This issue included important changes to the wiring DTDs and Schemas but of most significance was the enhancement of the applicability model, which finally replaced the applicability model that was there in S1000D since Change 1.6.

2008
In 2008, S1000D was completely revised again and now included over 100 US Army change proposals, including the introduction of the new checklist Schema and support for the Maintenance Allocation Chart (MAC). Issue 4.0 also included the first results of the harmonization with SCORM and the learning and SCORM content package Schemas were introduced. The container and TIR functionality was further enhanced.

The support of SGML was finally dropped at Issue 4.0.

2009
In 2009, Issue 4.0.1 was released as a complete replacement of Issue 4.0 to fix deficiencies experienced when applying Issue 4.0.

2012
In 2012, Issue 4.1 was finally released. This issue included more restructuring, a large amount of editorial changes plus bringing the specification up to date in many areas. The TIR became a Common Information Repository (CIR) because it now supported externalized applicability annotations as well as a centralized warning and caution repository. The concept of incremental updates of CIR data modules was also included together with the introduction of a new data module type, the update file. The harmonization with SCORM was significantly enhanced to include a new Schema for the Sharable Content Object (SCO), and the

assessment functionality was improved upon. New Schemas were also introduced to support Service bulletins and Front matter. A new Business rules index was added to assist readers in locating business rule decision points for adapting S1000D to project and/or organizational needs.

2016
Issue 4.2 will be released during the first quarter of 2016.

Ten-liner

- S1000D provides W3C compliant XML Schemas for all information types that are found in technical publications
- The specification describes in detail the purpose and associated rules for every XML element and attribute that is given in the Schemas
- Consistency is assured by a rigid metadata structure that is included in every data module
- The processes for using this metadata to manage the information in the CSDDB is fully detailed
- Schemas are also provided to support of the exchange of information
- Publication modules serve as a means to assemble all relevant data modules and associated graphics and multimedia objects into a publication
- Publication modules are the building blocks of a publication and further enhance the reuse and repurposing of data modules and associated graphics and multimedia objects.
- Rules and guidance are provided for all output types such as the layout for paper, the presentation of page oriented publications and display and functionality of IETPs
- The technical concepts and rules pertaining to the use of XML are fully explained
- To assist implementations in different projects, business rules, the BREX data module and the Business rules index are provided

Web-site

Free download at www.s1000d.org

4 S2000M - International specification for material management - Integrated data processing

Introduction

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

Purpose

The specification standardizes the business relationship between two or more parties (eg, contractor and customer) by providing the data elements, the process flow and the relevant transactions for data exchange.

S2000M is organized into basic chapters:

- Chapter 1A - Provisioning
- Chapter 1B - NATO Codification
- Chapter 1C - Spare parts list
- Chapter 2 - Procurement planning
- Chapter 3 - Order administration including repair and warranty
- Chapter 4 - Invoicing
- Chapter 5 - Repair administration (only supplied until Issue 4.0)
- Chapter 6 - S2000M Light

Chapter 1A Provisioning
Provisioning is the process of selecting support items and spares, necessary for the support of any military Product. The chapter defines the process and specifies the data, formats and transmission procedures to be used in providing provisioning information to the Customer. It also provides the data base from which

Illustrated Parts Catalogues (IPC) or IPDP (Illustrated Parts Data Publication) are produced. The rules for the production and presentation of the IPC in different media are covered by the specification S1000D.

In addition, Chapter 1A - Updating of initial provisioning data - defines the procedure by which the customer can assess the impact of changes on items and to comment on the proposed changes.

Chapter 1B NATO Codification
This chapter defines the process of exchanging information for NATO codification purposes between industry, the National Codification Bureaus and the customer.

Chapter 1C Spare parts list
This chapter defines the spare parts list which enables the contractor to supply parts data (including commercial data elements) to the customer in order to use the processes as described in Chapter 2 thru Chapter 4, without the necessity to use processes as described in Chapter 1A and Chapter 1B of the specification.

Chapter 2 Procurement planning
This chapter defines methods for Industry to provide pricing information on parts

- via price list
- via a quotation process
- via order based pricing

Chapter 3 Order administration
This chapter defines the process of order placement, and the flow of information concerning the progress of orders and deliveries. This order placement takes care of spares orders as well as repair orders and exchange of transportation information.

Chapter 4 Invoicing
Invoicing provides a standard process of transmitting invoice data and invoice status between the customer and contractor.

Chapter 5 Repair administration
For the Issue 5.0 of S2000M, this chapter is no longer supplied and its content deleted from this chapter. Repair/Overhaul and warranty is now part of Chapter 2, Chapter 3 and Chapter 4.

Chapter 6: "S2000M Light"
This chapter is a stand-alone "light" version of S2000M to support non-complex projects. It covers the processes of Chapter 1 thru Chapter 4 with a reduced set of data elements and messages.

S2000M specification development history
1981
The foundation of the ASD (former AECMA) supply working group at an international conference in Paris.

1992
Issue 2.1 - The first issue to be used in support of a project.

1998
Issue 3.0 - Introduction of Chapter 5 (Repair), SQ1 (Order based Pricing), deletion of Appendix 5 (EDIFACT).

2005
Issue 4.0 - Extension to land and sea. Introduction of Chapter 6 ("S2000M Light")

2012
Issue 5.0 - Move the repair information (Chapter 5) to Chapter 3

2014
Issue 6.0 (in progress) - A PLCS (ILS integration) adopted issue with XML messages. This issue will be harmonized with the IT environments of S1000D, S2000M and S3000L, based on ISO 10303 STEP (STandard for the Exchange of Product model data). Simplified data flow by using PLCS data exchange

specifications. The specification will be supported by the creation of interface specifications for data exchange with other disciplines (S1000D und S3000L).

2015
Issue 6.0 will be released end of 2015.

Ten-liner
The specification S2000M defines the processes, procedures and provides the information for data exchange to be used for material management of a Product during its life-cycle.

Its purpose is to standardize the business relationship between two or more parties (eg contractor and customer) by providing the data elements, the process flow and the relevant transactions for data exchange.

The specification S2000M is organized into basic chapters:

- Chapter 1A Provisioning - Chapter 1B NATO Codification - Chapter 1C Spare parts list
- Chapter 2 Procurement planning
- Chapter 3 Order administration including repair and warranty
- Chapter 4 Invoicing
- Chapter 5 Repair administration (only supplied until Issue 4.0)
- Chapter 6 S2000M Light

Web-site
Free download at www.s2000m.org

5 S3000L - International specification for Logistics Support Analysis - LSA

Introduction
With the introduction of new and complex technical products, a proper support system must be made available in a timely manner. This requires an extended analysis process to ensure consideration of logistic requirements during the design of the product and to support the establishment of a proper support system. The process includes a number of analysis activities concerning a wide range of technical/logistic considerations and the careful documentation of the results of these analysis activities. The achievement of proper supportability is of crucial importance concerning operation and life cycle costs. Early consideration of logistic aspects is increasingly important with regard to both operational and economic aspects. A product that cannot be operated and maintained properly and cost effectively is not acceptable to the operator.

Purpose
The specification S3000L is designed to cover the activities and requirements governing the establishment of the LSA process.

S3000L

- provides rules for the establishment of the product system breakdown and for the selection of LSA candidate items to be analyzed in detail
- describes type and methodology of performance of the specified analysis activities
- gives guidelines on how to process the results of the analysis tasks and on how to achieve a cost-efficient support concept
- covers the interface to the customer within the LSA process
- covers the interface between the LSA process and the support engineering areas (eg reliability, maintainability and testability)
- covers the interface between the LSA process and the ILS disciplines, which provide the typical logistic ILS products:

  - Personnel and training requirements
  - Supply support
  - Technical data services

- Special support and test equipment
- Facilities and infrastructure requirements
- IT support requirements

S3000L specification development history

The development work was allocated in the year 2006 to an international team of experts working under the joint chairmanship of AIA and ASD representatives. The following companies and organizations contributed to the work to the initial issue:

- AgustaWestland   United Kingdom
- Airbus   Germany
- Boeing   United States
- Dassault Aviation   France
- EADS Casa   Spain
- EADS Military Systems Germany
- Eurocopter   France
- LOGSA   United States
- MBDA   France
- Saab AB   Sweden
- UK MoD   United Kingdom

The final draft of the specification S3000L (Issue 0.1) was officially published in June 2009. The main purpose of this draft was to enable experts from interested companies and organizations to provide comments on the first approach to the S3000L expert team. The commenting phase was officially closed by end of 2009. More than 20 experts from different nations contributed with their inputs to improve the final draft for the publication of the first official Issue 1.0.

In June 2010, Issue 1.0 of S3000L was finally released and published for free download via the website of ASD-STAN. With the signing of a Memorandum of Understanding between ASD and AIA at the Farnborough Air Show in July 2010, the ASD/AIA ILS Council was formed and the ILS community implemented a new platform for harmonization and coordination of the different ILS specification activities. In November 2010 the kickoff of the S3000L Steering Committee (S3000L-SC) took place in Washington, the first official SC meeting was conducted in April 2011 in Paris. The S3000L Steering Committee is steadily growing and in April 2013 at the S3000L-SC in Berlin, it reached a size of approximately 35 persons (full members and observers) from 12 countries.

The specification is maintained and permanently harmonized with other ASD specifications. The next Issue 1.1 will be published end of 2014. It includes as main improvements an updated UML data model, an updated chapter 10 concerning Scheduled Maintenance Analysis (harmonized with S4000P) and a completely modified chapter 16 concerning In-service LSA as a continuous process over the complete Product life cycle.

Ten-liner

S3000L describes the processes and analysis activities to be used for the definition of a suitable support environment to operate technical complex and long living products. Complementary to the extensive procedural chapters in the specification, the corresponding data environment is described by a detailed entity relationship model using standard UML technology (based on ISO Standard 10303, AP239, PLCS).

The specification is organized into 22 chapters, which can be grouped into the following clusters:

- Chapter 1   Introduction and general guidance how to use the Specification
- Chapter 2 - 17   Procedural chapters describing LSA process and the corresponding analysis activities
- Chapter 18   Description of interrelations to other ASD specifications S1000D, S2000M, S4000M, S5000F (will be extended with new published specifications as required)
- Chapter 19 - 20 Data modeling part including UML model and data exchange definitions
- Chapter 21   Terms, abbreviations and acronyms
- Chapter 22   Alphabetical Data Element List (DEL)

Web-site

Free download at www.s3000l.org

6   S4000P - International specification for developing and continuously improving preventive maintenance

Introduction

For a new product or for a product variant, the maintainability of the intended product design must be assessed by Maintainability specialists providing Engineering Support. Accumulated in-service experience with other products must be taken into account.

In parallel to the product design process, Preventive Maintenance Task Requirements (PMTR) with intervals and/or redesign requirements must be assessed on an analytical basis and determined if applicable and effective. Results must be available prior to product design-freeze milestones (latest prior to the critical design review (CDR) of the Product).

According to the overall ASD scope, the specification S4000P must cover all kind of product types including any complex technical platform, system, equipment or facility (eg. on air/sea/land, under the sea-/ground-level, in space).

The S4000P analysis methodologies allow a structured, traceable and complete determination of PMTR with intervals for a product, which become the basis to elaborate and document a product maintenance program/Operators' Maintenance Program (OMP) prior to start the product in-service phase.

During the product in-service phase, S4000P provides an additional process that allows reviewing the completeness and effectiveness of preventive maintenance tasks from a product OMP taking into account Product in-service experience and the state-of-the-art analysis methodologies. Such a review of the OMP is to be fully traceable and applicable for all products types.

Every S4000P analysis methodology or process must be tailored and precised for a product under analysis in an analysis guideline or -handbook to be acceptable to regulatory authorities (if involved), maintainers, operators, manufacturers and suppliers.

Purpose

The main purpose of this specification is to assist regulatory authorities and all parties involved in the analysis process in developing and releasing initial PMTR and intervals for new Products prior entry into service. S4000P analysis methodologies remain applicable for later optimizations/modifications of the Product design in product systems and/or of product structure and/or of product zones.

Once developed, authorized and packaged into interval clusters in a product OMP, the S4000P In-Service Maintenance Optimization (ISMO) process enables continuously improving Product maintenance during its in-service phase.

Every development or improvement of a preventive maintenance task for a product supports at least one of the following aspects:

- Ensure / maintain product safety, including safety/emergency systems and/or emergency equipment
- Avoid any conflict with law and/or significant impact on environmental integrity (ecological damage) during product mission/operation and/or maintenance
- Optimize mission/operational capability/availability of the Product
- Optimize product economy (Life Cycle Costs = LCC)

S4000P main advantages and innovations:

- In comparison to other known analysis methodologies, the application of ASD S4000P is not limited to pre-defined product types like on military or civil aircraft only. The S4000P analysis principles are developed by industry to be applicable for all complex technical products. This comprises products on air, on ground, under the ground, on sea, under the sea level or even in space for civil and/or military usage.
- To cover the whole product life cycle, S4000P provides the innovative ISMO methodology to prove and optimize the product maintenance during its complete in-service life in addition to the product maintainability analysis that has to take place during the design and development phase provided as Engineering/Design support.

- When defining preventive maintenance tasks, the S4000P product system analysis takes into account product-integrated test- and condition monitoring technology being realized more and more in modern products.
- The S4000P product structure analysis covers all kind of present and of future product structure materials and material combinations.
- The S4000P product zonal analysis is based on a modular analysis concept to cover the zonal analysis of all kind of product types.

S4000P specification development history

S4000P development work started in 2013.

European experts from the following international companies and organizations have developed S4000P:

- Airbus Defense & Space   Germany/Spain
- Airbus Helicopters   Germany/France
- BAe Systems   United Kingdom
- LogKdoBw   Germany
- LSC Group Ltd.   United Kingdom
- Saab AB   Sweden
- UK MoD   United Kingdom

Ten-liner

The specification S4000P Issue 1.0 defines the processes, procedures and provides information and examples how to develop and continuously improve PMTR with intervals specific for complex technical products during a product life cycle.

Its purpose is to contribute to product safety, to ensure law conformity including environmental integrity, to achieve maximum mission/operational availability and to minimize operational and maintenance costs (economy).

The specification S4000P Issue 1.0 contains the following chapters:

- Chapter 1   Introduction to the specification
- Chapter 2   Development of preventive task requirements with intervals
- Chapter 3   In-service maintenance optimization (ISMO)
- Chapter 4   Interfaces of S4000P
- Chapter 5   Terms, abbreviations and acronyms
- Chapter 6   Examples

Web-site

Free download is be available at www.s4000p.org

7   S5000F - International specification for in-service data feedback

Note

The specification S5000F is still under development. Two draft Issues for review has been released. The first draft (Issue 0.1) was issued during 2013 and followed by draft Issue 0.2 which was released during spring 2014. A draft 0.3 will be issued at the end of April 2015.

Planned issue date for the Issue 1.0 of the S5000F specification is during the third quarter of 2015.

Introduction

In-service data feedback is one of the most important functions of in service support. It enables fleet managers, support managers and technical system manufacturers to perform a thorough analysis of operational and maintenance performance of a 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 contracts

The overall aim to be achieved through in-service data feedback is the increase of fleet availability and optimization of effectiveness. In addition the in-service data feedback information is a firm requirement by industry to agree to and manage in-service contracts and to fulfil their obligations in the regard to product liability.

The scope of S5000F is to handle information from the in service operation between different stakeholders. The specification does not only cover information from the operator to the industry or maintainer but also information from the industry or maintainer to the operator. The information can be exchanged in both directions.

The processes in the specification focus naturally on operational and maintenance feedback information and the activities that take place in the operational phases of the life cycle of the product. The Life Cycle of a product is divided as per SX000i into five phases:

- preparation
- development
- production
- in service
- disposal

The last two phases, in service and disposal are the phases that mainly are handled within the scope of S5000F. The in-service data feedback information is transferred to the organization of interest using a data model that is consistent with SX002D. The actual exchange is performed using an XML Schema based on PLCS.

Purpose
The purpose of using S5000F alone or together with other S-series of ILS specifications is to obtain a structured way to handle the operational and maintenance data feedback between different stakeholders. Stakeholders can be operators, industries (manufacturers or maintainers), vendors, suppliers, etc.

By using the data model of S5000F and the common data model for the S-series and PLCS for handling and exchanging information this can be made in an efficient way.

S5000F specification development history
During 2008 the plans for developing the S5000F was drawn up within the AIA/ASD organization. There were already some S-series specifications developed and used for integrated logistic support purposes. These specifications were:

- S1000D for Technical publications
- S2000M for Material management
- S3000L for Logistic Support analysis (LSA), (S3000L was under development at the time)
- S4000M for Maintenance task analysis

The AIA/ASD organization noted that there was a need for a specification handling operational and maintenance data feedback from the operational field or the in service field to the maintainer and/or the Product manufacturer.

It was decided that the S5000F specification shall:

- take into account the activity model given by ISO 10303-239 PLCS and shall support data exchange by PLCS Data Exchange Sets
- include process application guidelines and rules for information exchange
- be tailorable and include guidelines for tailoring
- take into account current ISO/EN baseline documents
- enable online interfaces to the S-series of ILS Specs, ie S1000D, S2000M, S3000L, S4000M

The kick off meeting was held in Munich in October 2008. On this meeting the purpose and the scope of S5000F were presented for interested industries and organizations (eg, armed forces and authorities).

The development work was allocated to an international team of experts working under the joint chairmanship of AIA and ASD representatives. The following companies/organizations are contributing to the development:

- Airbus Defence & Space   Germany/Spain
- Andromeda Systems   United States
- Boeing   United States
- Bundeswehr   Germany
- Dassault Aviation   France
- ESG   Germany
- OCCAR   Europe (based in Germany)
- Rolls Royce   UK
- Saab AB   Sweden
- UK MoD   UK

During spring 2013 an internal draft (Issue 0.1) for AIA/ASD review was released. Comments were received and taken care of by the S5000F working group. Before summer 2014 Issue 0.2 of the specification was released for public review. Based on the comments of the group, a third draft is planned for end of April 2015. Final comments will be handled by the group and then the Issue 1.0 will be released during the second quarter of 2015.

Ten-liner

The S5000F - International specification for in-service data feedback describes a structured way to handle 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 specifications, based on the PLCS standard.

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 complex technical system manufacturers to perform a thorough analysis of operational and maintenance performance of a technical system.

The overall aim to be achieved through operational and maintenance data feedback is the increase of fleet availability and optimization of effectiveness. In addition the in-service data feedback information is a firm requirement by Industry to agree to and manage in-service contracts and to fulfill their obligations in the regard to product liability.

Web-site
Free download will be available at www.s5000f.org

8   S6000T - International specification for training analysis and design

The Working Group (WG) for S6000T (International specification for training analysis and design) started work in November 2013. The current draft outline includes information gathering, analysis, design, interfaces with other non-S-Series specifications and human performance. Whilst drafting work is underway, the WG is ensuring that the methodologies and requirements from all the member nations are captured. Other work includes support for the DMEWG, the Terminology Task Team and identifying the touch points with other S-Series specifications for input to the various Sn000X specifications as well as a possible future S6000X.

The following companies/organizations are contributing to the development:

- General Dynamics   United States
- Airbus Space and Defence   Germany
- Boeing   United States
- O'Neil & Associates   United States
- Isselnord   Italy
- Itorum   Russia

- Austrian Aeronautics Industries Group   Austria
- MDBA Systems   Germany
- Selex ES   Italy
- Harris Corporation   United States
- Flatiron Solutions   Sweden
- NATO   BrusselsBelgium
- UK MoD   United Kingdom
- BAE Systems   United Kingdom

9   SX001G - Glossary for the S-Series ILS of specifications

Introduction

Interoperability between the respective S-Series of ILS specifications requires a common terminology to be applied to all the specifications. The SX001G Glossary contains terms and definitions as well as acronyms used in the S-Series of ILS Specifications and guides users towards a common terminology. The task of developing a consolidated and harmonized common terminology across the S-Series of ILS specifications is very large and requires the collaboration of a number of individual groups. The Data Modeling and Exchange Working Group (DMEWG) is responsible for coordinating the development and publication, the Terminology Task Team is responsible for the consolidation and harmonization of terms and definitions, and the ILS Spec Council and the respective S-Series of ILS specifications are responsible for review, acceptance, and incorporation of the terms and definitions.

Due to the size of this task, a phased approach is being taken. Issue 1.0 of the SX001G Glossary is limited to the data terms/definitions and acronyms from the SX002D Common Data Model Issue 1.0. Future issues of SX001G Glossary will expand to eventually include all terminology required to understand the concepts and data from the set of S-Series of ILS specifications.

Purpose

The purpose of SX001G is to manage:

- definitions for central business terms used in the S-Series of ILS specification
- definitions for all terms used in the S-Series of ILS specification data models
- approved abbreviations and acronyms which can be used in the respective S-Series of ILS specification and/or in the naming of terms within the S-Series specification data models.

The DMEWG provides rules and guidelines for SX001G including:

- naming conventions
- authoring of definitions for the dictionary
- metadata required for each term
- relationship between S-Series of ILS specifications terminology and OASIS PLCS Reference data

SX001G specification development

The development work was initiated in 2011. The following companies and organizations contribute to the work:

- Airbus Defence & Space   Germany/Spain
- Boeing   United States
- ISS   United States
- LOGSA   United States
- O'Neil & Associates   United States
- Rolls-Royce   United Kingdom
- Saab AB   Sweden

Issue 1.0 is planned to be released in April 2015.

Ten-liner

SX001G – Glossary for the S-Series of ILS specifications includes the terms and definitions that are essential in understanding the central concepts and information defined in the S-Series of ILS specifications. The Glossary includes central business terms and definitions, the data model terms and definitions, and

abbreviations and acronyms. Rules and guidelines for the authoring of SX001G (eg, naming conventions, definition writing rules) are maintained by the Data Modeling and Exchange Working Group.

In the past, the respective S-Series of ILS specifications have not collaborated consistently on terminology. The establishment of the Glossary will not only help specification users, but will serve as a forcing function to harmonize terminology across the set of S-Series of ILS specifications.

Web-site
Free download of the dictionary is available at www.sX000i.org.

10   SX002D - Common data model for the S-Series of ILS specifications

Introduction
Interoperability between the respective S-Series of ILS specifications requires a common understanding of the key concepts to be applied to all the specifications. The SX002D Common Data Model (CDM) is a conceptual description of all data elements common to more than one S-Series of ILS specification. The task of developing a consolidated and harmonized data model across the S-Series of ILS specifications is very large and requires the collaboration of a number of individual groups. The Data Modeling and Exchange Working Group (DMEWG) is responsible for coordinating the development and publication.

Due to the size of this task, a phased approach is being taken. Issue 1.0 of the SX002D Common Data Model is limited to areas needed to define a product, its breakdowns and allowed configurations. Definitions for all classes and attributes defined in the SX002D Common Data Model are published as part of SX001G Glossary for the S-Series of ILS specifications, and are therefore not repeated in this specification. Future issues of SX002D Common Data Model will expand to eventually include all common concepts and data from the set of S-Series of ILS specifications.

Purpose
The purpose of SX002D is to harmonize data modeling activities that are performed within the respective S-Series of ILS specification, and to consolidate data requirements into one coherent S-Series data model, using UML.

SX002D represents the harmonized end-state common terminology/model for all S-Series of ILS specifications, not the current individual terminology/models used in the respective S-Series of ILS specification. The aim is to have the S-Series ILS specifications adopt the harmonized CDM terminology/model in future issues.

SX002D specification development
The development work was initiated in 2011. The following companies and organizations contribute to the work:

- Airbus Defence & Space   Germany/Spain
- Boeing   United States
- ISS   United States
- Isselnord   Italy
- LOGSA   United States
- O'Neil & Associates   United States
- Rolls-Royce   United Kingdom
- Saab AB   Sweden

Issue 1.0 was published December 2014.

Ten-liner
SX002D – Common data model for the S-Series of ILS specifications includes a conceptual description of all data elements common to more than one S-Series of ILS specification, and documents this as a consolidated and harmonized data model using UML.

Definitions for all classes and attributes defined in the SX002D Common Data Model are published as part of SX001G Glossary for the S-Series of ILS specifications.

In the past, the respective S-Series of ILS specifications have not collaborated consistently on concepts and terminology. The establishment of the Common Data Model will not only help specification users, but will serve as a forcing function to harmonize concepts and terminology across the set of S-Series of ILS specifications.

Web-site

Free download of the common data model is available at www.sX000i.org.

11 SX003X - Interoperability matrix for the S-Series of ILS Specifications

Introduction

During the development of the different specifications it was detected that there is currently a mismatch between the different specifications in terms of interoperability, in the sense that not all data are coherent between the different specification versions. Thus, the simultaneous use of two specifications might encounter interoperability issues of which the user is not necessarily aware.

Though with the publication of SX002D the interoperability of the different specifications is greatly enhanced, the natural evolution of specifications might imply that not all specification issues are fully interoperable with each other. This is especially true for those specification issues that were published before the common data model was developed.

Purpose

The purpose if SX003X is to provide an interoperability matrix that allows the user to select a set of S-Series specifications that are fully interoperable with each other or, if certain program restrictions prevent such selection, to be fully aware of the interoperability limitations between two specification issues.

SX003X specification development

The development work was initiated in 2015. The following companies and organizations contribute to the work:

- Airbus Defense & Space   Germany & Spain
- Boeing   United States
- ISS   United States
- Isselnord   Italy
- LOGSA   United States
- O'Neil & Associates   United States
- Rolls-Royce   United Kingdom
- Saab AB   Sweden

SX003X draft 0.1 is expected to be published in Q4 2015.

Ten-liner

SX003X - Interoperability matrix for the S-Series of ILS Specifications provides the interoperability mapping between the different specifications and issues, highlighting potential interoperability conflicts between the specifications, thus allowing to identify potential migration problems between two specification issues and potential interoperability problems between different specifications.

The usage of SX003X is intended to assist in the selection of different S-Series specifications for their application in a new program and to evaluate the impact of migration of one specification from one issue to another one issue.

 SX003X draft 0.1 is expected to be published in Q4 2015.

Web-site

Free download of the interoperability matrix will be available at www.sX000i.org.

12 S1000X, S2000X, S3000X, S4000X, S6000X - Input data specifications

Introduction

S1000X, S2000X, S3000X, S4000X and S6000X will become international specifications that define the input data required by S1000D, S2000M, S3000L, S4000P and S6000T, respectively.

The title of S1000X is for example "Input data specification for S1000D".

Sn000X will give rules and guidance for the mapping of elements and attributes from the source data model/schema to the target data model/schema based on the glossary SX001G and the common data model SX002D. The source and target functionality and data schema requirements will be uniquely identified.

The data provided by a source system can have a related "triggering event" for availability. Thus, Sn000X must also include some kind of process description. In addition, the order of data receipt from the different source specifications/systems can be important. In this case, the order relationship and interdependence of the data must also be defined in the mapping requirements.

Purpose

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. The definition of these required input data is not limited to the S-Series of specifications but must include any source necessary to create the respective deliverables.

Sn000X specification development

The development work for S1000X was initiated in October 2014. The work for the other Sn000X specifications was not yet started.

The following companies and organizations contribute to the S1000X work:

- Alenia   Italy
- Airbus Defence & Space   Germany
- Airbus Helicopters   Germany
- BAE Systems   United Kingdom
- FBC   Austria
- Isselnord   Italy
- ISS   United States
- NAVSEA/DoD   United States
- NSPA/NATO   Luxemburg
- O'Neil & Associates   United States
- Saab   Sweden

Draft Issue 0.1 of S1000X is planned to be published by the end of 2015.

Ten-liner

- Sn000X defines all required input data for the respective specification in a standardized way.
- The source and target functionality and data schema requirements are uniquely identified.
- 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.
- The source and target data model/schema is based on the common data model in SX002D.
- Schemas are provided to support the transfer of information from the source systems.
- To assist implementations in different projects and/or organizations, business rules and business rule decision points are also provided.

Website

Free downloads of S1000X, S2000X, S3000X, S4000X and S6000X are planned to be available at www.s1000d.org, www.s2000m.org, www.s3000l.org, www.s4000p.org and www.s6000t.org, respectively.

13   ASD-STE100® - Simplified Technical English

Introduction

ASD-STE100® (European Community Trade Mark No. 004901195) is an **International specification for the preparation of maintenance documentation in a controlled language**. A controlled language is a form of language with special restrictions on grammar, style and vocabulary usage.

It was developed in the early Eighties (as AECMA Simplified English) to help the users of English-language documentation to understand what they read. ASD-STE100 (STE) provides a set of Writing rules and a Dictionary of controlled vocabulary.

The Writing rules cover aspects of grammar and style; the Dictionary specifies the general words that can be used. These words were chosen for their simplicity and ease of recognition. In general, there is only one word for one meaning, and one part of speech for one word. In addition to the specified general vocabulary, STE accepts the use of company-specific or project-oriented technical words, as long as they fit into one of the categories listed in the specification. Control of any additional specific vocabulary is, of course, the responsibility of companies or projects.

Purpose

The main purpose of this specification is to make technical texts easy to understand by all readers.

The international language of many industries and of the aerospace industry in particular, is English, and English is the language most used for writing technical documentation. However, it is often not the native language of the readers (or even of the authors) of such documentation. Many readers have knowledge of English that is limited, and are easily confused by complex sentence structures and by the number of meanings and synonyms which English words can have.

The major benefits of adopting STE are:

- Maintenance optimization: controlled grammatical structures and vocabulary - on which STE is based - have the purpose of producing texts that are easily understandable and, consequently, reduces errors during the maintenance tasks. Therefore, the correct usage of STE gives the operators instructions that are technically correct and unambiguous, leading to maintenance optimization and safety improvement.
- Wide applicability: although STE was originally designed for the aircraft industry, it can be used in other areas, such as land and sea vehicles, as detailed in S1000D. In addition, STE is also widely used in other industries outside its intended domains or aerospace and defense (eg, medical, automotive, software, passenger trains, engineering, manufacturing, translations and language services). There is also a growing interest within the academic world.

STE specification development history

In the late 1970s, the Association of European Airlines (AEA) asked the European Association of Aerospace Industries (AECMA) to investigate the readability of maintenance documentation in the civilian aircraft industry. AECMA asked the Aerospace Industries Association (AIA) of America to assist in this project.

STE development work was initiated in 1983.

The specification was first released in 1986 as the AECMA Document, PSC-85-16598. Subsequently, several changes, issues and revisions were released up to the present Issue 6. The Specification is fully owned by ASD, Brussels, Belgium. As such, STE is not a part of the S-Series but fully support it.

The STE specification is maintained by the ASD STEMG consisting of representatives from ASD member countries and non-ASD member countries. The STEMG was originally formed in 1983 as a working group to develop AECMA Simplified English and subsequently, in 2004, when ASD was created, the group changed its name to the STEMG. The STEMG reports to the ASD Product Services Specification Group (PSSG).

Ten-liner

STE is a set of Writing Rules (Part 1) and a Dictionary of controlled vocabulary (Part 2).

The writing rules regulate the use of words, layout, sentence length, and how to write warnings, cautions and notes. There are 65 writing rules in STE included in nine sections:

- Section 1 - Words (17 rules)
- Section 2 - Noun phrases (3 rules)
- Section 3 - Verbs (8 rules)
- Section 4 - Sentences (4 rules)
- Section 5 - Procedures (5 rules)
- Section 6 - Descriptive writing (8 rules)
- Section 7 - Warnings, cautions and notes (6 rules)
- Section 8 - Punctuation and word counts (11 rules)
- Section 9 - Writing practices (3 rules)

The dictionary has sufficient words to express any technical sentence. The words were chosen for their simplicity and ease of recognition.

The current specification is Issue 6, 15 January 2013.

Web-site
Free download at www.asd-ste100.org