An ISO standard for Product Support data interoperability

ISO 10303-239 edition 3
Product Life Cycle Support (PLCS)

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Co-leader of AP239 ed3 project

Forewords

The Aerospace and Defence industries investment in interoperability standards
- Target: "a consistent set of standards" (Ref ASD SSG Through Lifecycle Interoperability Report)
- On-going projects: AP242 edition 2, JT edition 2, CAX IF, PDM IF, Benchmarks
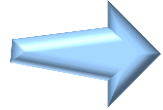
Why?
- Digitalisation
- Move to the service paradigm
- Legal constraints

This investment is shared with other industries, incl. Automotive
- Need of a common approach and governance of interoperability standards.

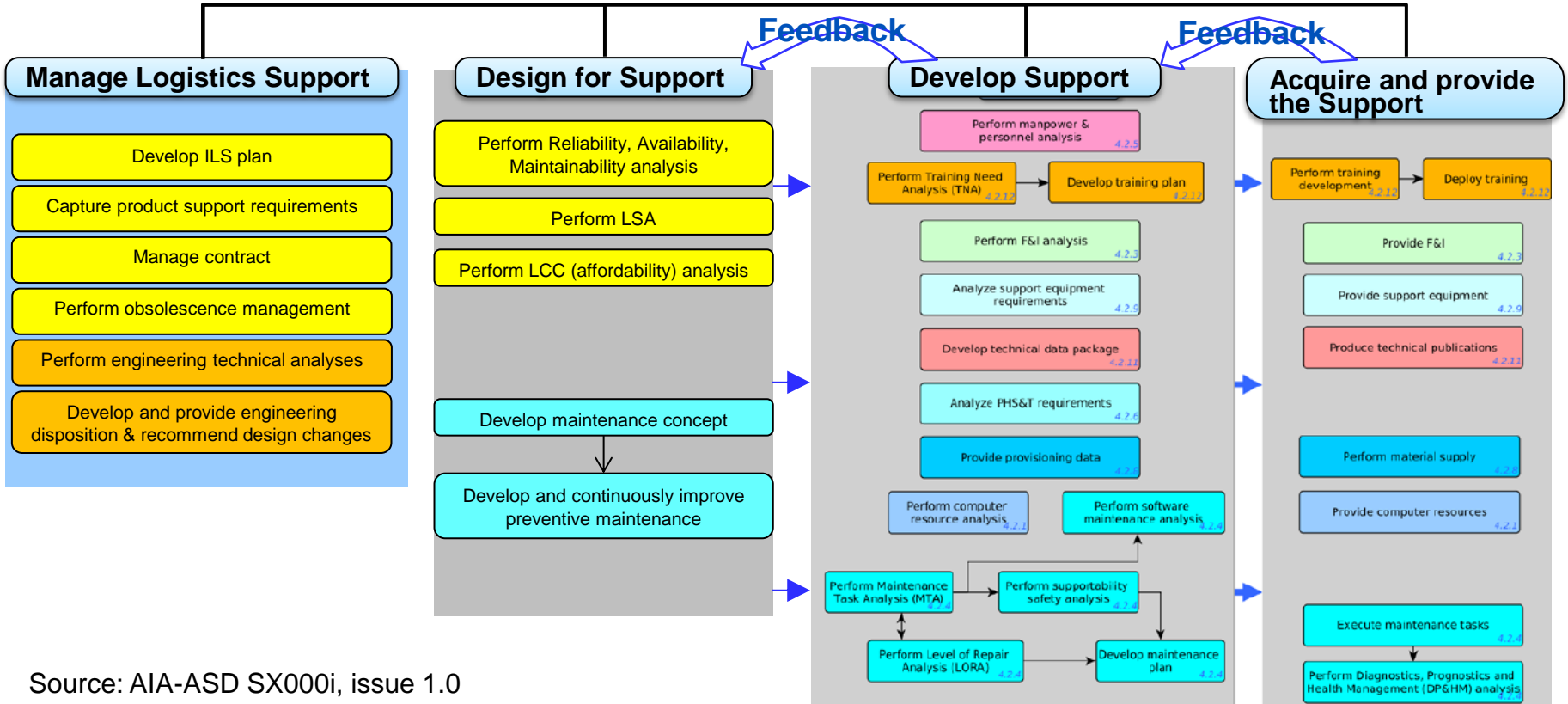This PLCS project is part of this global approach.
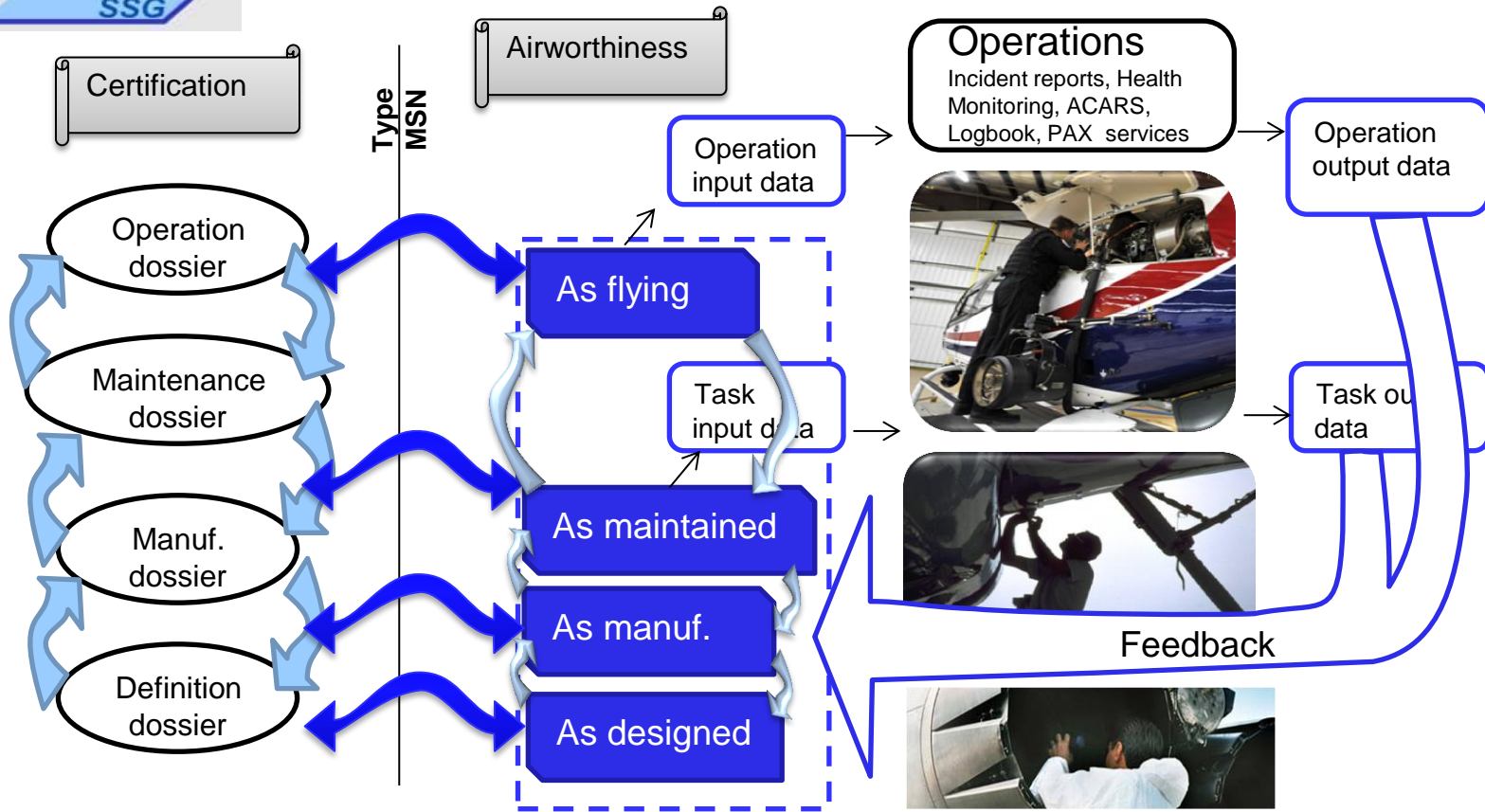
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Context

- Product support: an Integrated Logistics Support perspective

- Beyond Product Support: Through Life vision

- Existing standards landscape

- The challenge: an "interoperable" Product Support standard

- The ISO AP239 ed3 project

Product support: an Integrated Logistics Support perspective

Manage Logistics Support
- Develop ILS plan
- Capture product support requirements
- Manage contract
- Perform obsolescence management
- Perform engineering technical analyses
- Develop and provide engineering disposition & recommend design changes

Design for Support
- Perform Reliability, Availability, Maintainability analysis
- Perform LSA
- Perform LCC (affordability) analysis
- Develop maintenance concept
- Develop and continuously improve preventive maintenance

Feedback **Feedback**

Develop Support
- Perform manpower & personnel analysis 4.2.5
- Perform Training Need Analysis (TNA) 4.2.12 → Develop training plan 4.2.12
- Perform F&I analysis 4.2.3
- Analyze support equipment requirements 4.2.9
- Develop technical data package 4.2.11
- Analyze PHS&T requirements 4.2.6
- Provide provisioning data 4.2.8
- Perform computer resource analysis 4.2.1
- Perform software maintenance analysis 4.2.4
- Perform Maintenance Task Analysis (MTA) → Perform supportability safety analysis 4.2.4
- Perform Level of Repair Analysis (LORA) 4.2.4 → Develop maintenance plan 4.2.4

Acquire and provide the Support
- Perform training development 4.2.12 → Deploy training 4.2.12
- Provide F&I 4.2.3
- Provide support equipment 4.2.9
- Produce technical publications 4.2.11
- Perform material supply 4.2.8
- Provide computer resources 4.2.1
- Execute maintenance tasks 4.2.4
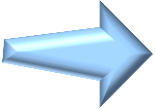- Perform Diagnostics, Prognostics and Health Management (DP&HM) analysis 4.2.4

Source: AIA-ASD SX000i, issue 1.0

Beyond Product Support: Through Life vision

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Existing standards landscape

Logistic Support, ASD industries

Defence

- Army Regulation 700-127 Integrated Logistics Support, 27 September 2007
- British Defence Standard 00-600 Integrated Logistics Support for MOD Projects
- Federal Standard 1037C in support of MIL-STD-188
- IEEE 1332, IEEE Standard Reliability Program for the Development and Production of Electronic Systems and Equipment
- MIL-STD-785, Reliability Program for Systems and Equipment Development and Production, U.S. Department of Defense.
- MIL-STD 1388-1A Logistic Support Analysis (LSA)
- MIL-STD 1388-2B Requirements for a Logistic Support Analysis Record
- MIL-STD-1629A, Procedures for Performing a Failure Mode, Effects and Criticality Analysis (FMECA)
- MIL-STD-2173, Reliability Centered Maintenance Requirements, U.S. Department of Defense
- DoD Instruction 5000.02, Operation in the Defense Acquisition System
- NATO ALP-10, Guidance on Integrated Logistics Support for Multinational Armament Programmes

Civil Aviation

- MSG-3 Operator/Manufacturer Scheduled Maintenance Development
- Spec 104: Guidelines for Aircraft Maintenance Training
- Spec 105: Guidelines for Training and Qualifying Personnel in Nondestructive Testing Methods
- Spec 106: Sources and Approved Parts Qualification Guidelines
- Spec 119: Continuous Monitoring of Maintenance Instructions

Space

- NASA Policy Directive 7500.1D, Program and Project Life-Cycle Logistics Support Policy
- ECSS-M-70A Space Project Management - Integrated Logistic Support

Existing standards landscape

Logistic Support data

AIA-ASD Specifications

- STE100 Simplified Technical English / International Specification for the preparation of maintenance documentation in a controlled language
- S1000D International specification for technical publications using a common source database
- S2000M International specification for materiel 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
- SX000i International guide for the use of the S-Series Integrated Logistic Support (ILS) specifications
- SX001G Glossary for the S-series ILS specifications
- SX002D Common data model for the S-series ILS specifications

SAE

GEIA-STD-0007 Logistics Product Data

ATA e-Business Specifications

- Spec 2000: E-Business Specification for Materiels Management
- iSpec 2200: Information Standards for Aviation Maintenance
- Spec 2300: Data Exchange Standard for Flight Operations
- Spec 42: Aviation Industry Standards for Digital Information Security
- Common Support Data Dictionary (CSDD)
- Spec 100: Manufacturers Technical Data
- Spec 101: Ground Equipment Technical Data
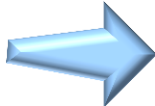- Spec 1000BR: Civil Aviation S1000D Business Rules

ISO

- ISO 10303-239 - Product Life Cycle Support (PLCS) edition 2
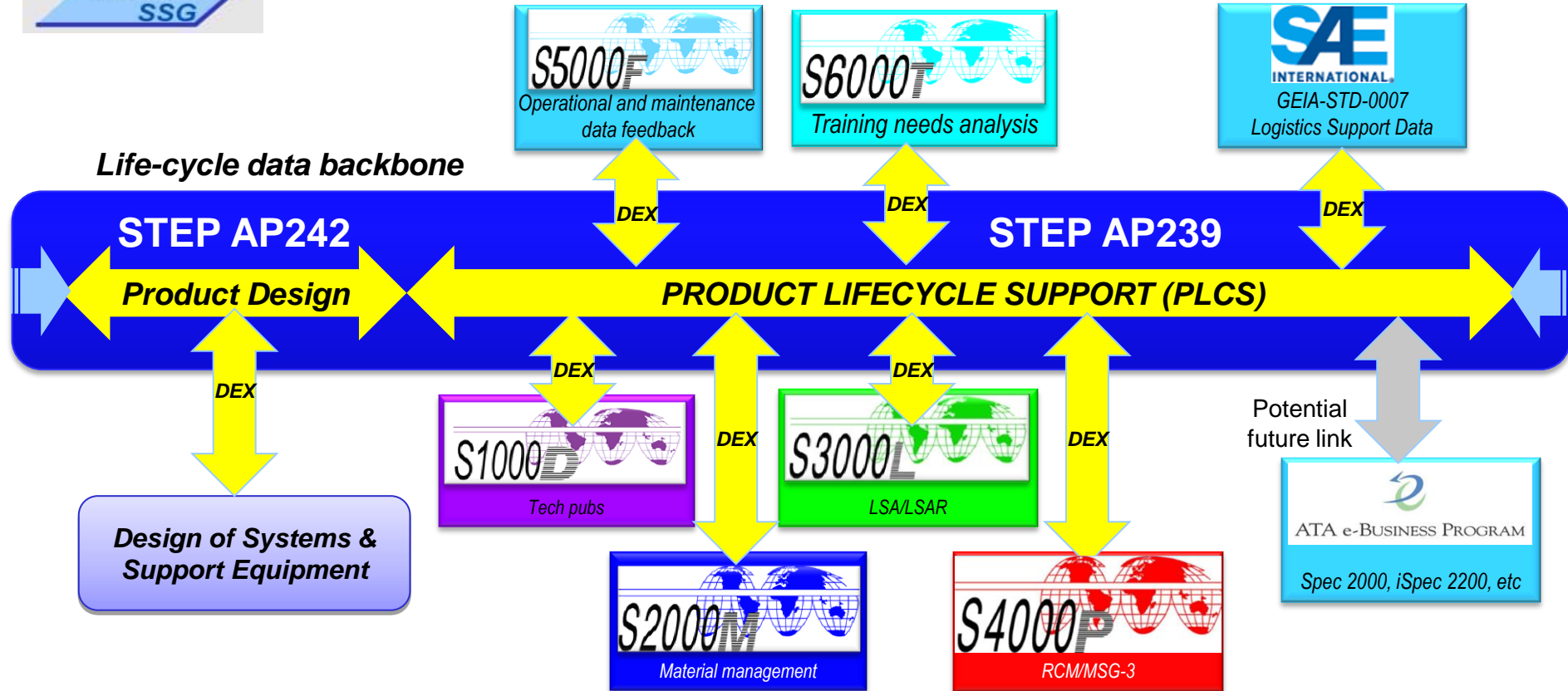- DEXlib (DEXs, ISO 10303-28 XML Schema)

OASIS

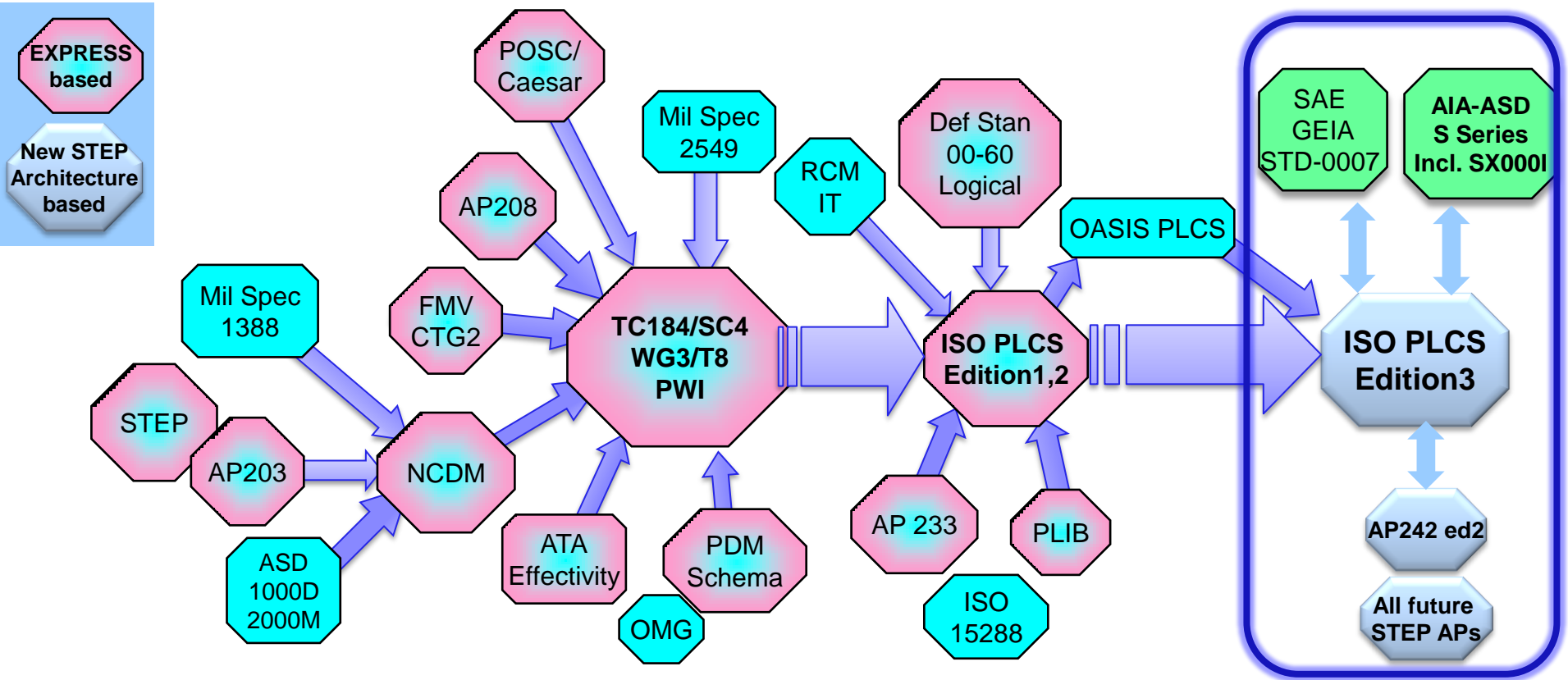- Product Life Cycle Support Version 1.0 (PLCSlib, PLCS PSM)
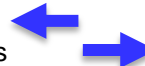
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Challenge: an interoperable Life-cycle Support standard

Life-cycle data backbone

S5000F — Operational and maintenance data feedback

S6000T — Training needs analysis

SAE INTERNATIONAL — GEIA-STD-0007 Logistics Support Data

STEP AP242 — *Product Design*

STEP AP239 — *PRODUCT LIFECYCLE SUPPORT (PLCS)*

DEX

Design of Systems & Support Equipment

S1000D — Tech pubs

S2000M — Material management

S3000L — LSA/LSAR

S4000P — RCM/MSG-3

Potential future link

ATA e-BUSINESS PROGRAM — *Spec 2000, iSpec 2200, etc*

History
Towards a consistent set of standards

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➡ The ISO AP239 ed3 project

ISO new work item

Form 4: New Work Item Proposal

Purpose and justification of the proposal*

Realization of an efficient Integrated Logistic Support, by integration of the different logistic disciplines, covering all aspects of supportability over the entire life cycle of a product. In particular AP239 Edition 3 intends to ensure the full support of ASD-AIA ILS S-series specifications based on information needs identified by ASD-AIA ILS DMEWG, and GEIA-STD-0007.

Minimize the cost and the delay of development of interfaces based on AP239 :

* Ease the understanding of the standard.

* Facilitate the mapping with business specifications (in particular with the AIA/ASD ILS Suite and the GEIA STD 0007) by providing high level business objects (template concept).

* Propose simpler and performance implementation methods of AP239, based on main stream technologies, taking into account lessons learnt from AP242, OASIS PLCS PSM/PLCSlib, ASD DMEWG, DoD requirements in GEIA-STD-0007 rev C.

A normative XML schema is the priority – based on the core model (and related derived XSD) of the new STEP architecture, across all STEP APs.

Web based implementation methods (SOA services and linked data/OSLC) shall be developed in addition to P21 and XML methods.

Note: whatever the implementation method is, the underlying core data model is unique and independent from the implementation technology.

Ability for manufacturing Industries and their customers to manage design, product and service information throughout the product lifecycle, including rigorous configuration management and the long term retention of information, where the data is 'created once and used many times', by ensuring interoperability of AP239 ed3 with other STEP APs (incl. AP242), and providing unambiguous implementation methods within the common new STEP architecture.

Contribute to a reliable and harmonized ISO/TC 184/SC 4 information model through the product life cycle and across domains thanks to the finalization of the harmonization between AP 239 and AP 242.

White Paper developed
With contributions from A&D trade associations and Defense bodies (U.S. DoD, UK MoD, French DGA, Swedish FMV, Norwegian DLO).
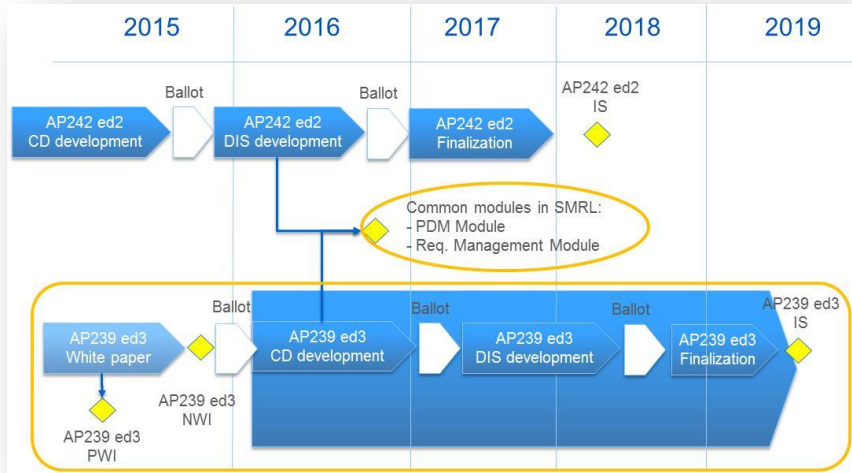
Ballot successful (January 2016):
- Supported by 10 countries
- 7 of them participating
  (with experts nominated)

Supporting associations:

The STEP AP239 ed3 project

Planning

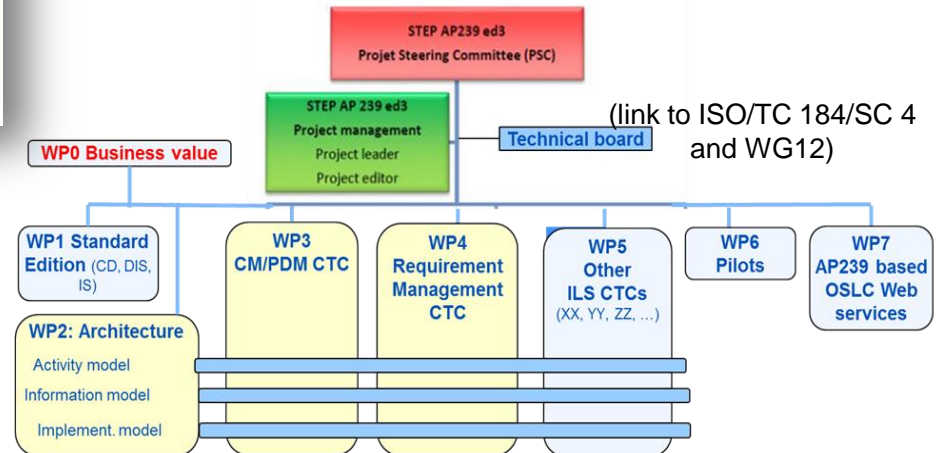**Technical organisation**

(link to ISO/TC 184/SC 4 and WG12)

Project kick-off planned in Toulouse,
15-17 June 2016

ISO process:
- NWI: New Work Item
- CD: Committee Draft
- DIS: Draft International Standard
- IS: International Standard

Technical target
Progress / AP239 (PLCS) edition2

- Same **functional perimeter** (ref activity model)

- **Redesign of the information model** based on the new STEP architecture (specific ILS Core Technical Capabilities and shared CTCs)

- Integration of **requested updates** (ISO process, S5000F updates, PLCS PSM issues collected by OASIS PLCS)

- Improve/extend **implementation methods** (P28/XML and openness to new methods like web services and linked data)

- **Multi-layered information model**: based on DEXlib and PLCSlib experience, a template mechanism will be proposed to map customised business objects to the AP239 core information model.

- **Mapping** with **S-Series** specifications and **SAE GEIA-STD0007**

- Use of **Reference Data Libraries** : a common mechanism for using reference data shall be defined for being used by all STEP APs based on new STEP architecture

- **Demonstration on pilots**
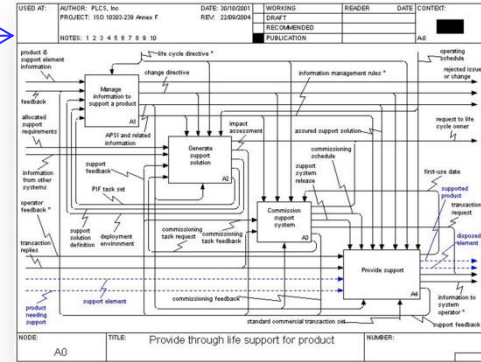
"Provide through life support for product"
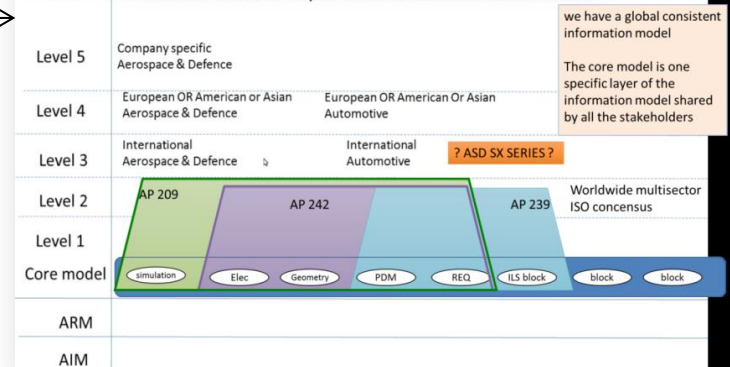
Example exploitation domains
Broad applicability of the AP239 edition 3 standard

Previous versions of PLCS in use

- **Defence**
  - **Air vehicle/system**
  - **Land vehicle/system**
  - **Sea vehicle/system (on- or sub-surface)**
- **Civil aviation**
  - **Helicopters**
  - Aircraft (ATA)?
- Civil shipbuilding?
- Space?

- Automotive (cars, busses, trucks)?
- Rail?
- Process/Energy?
- Pharmaceutical?
- Cosmetics?

Not limitative!

Links

- Through Life-cycle Interoperability report, ASD SSG, here on asd-ssg.org

- International guide for the use of the S-Series Integrated Logistic Support (ILS) specifications, SX000i Issue 1.0, here on sx000i.org

- AIA-ASD ILS specifications here on asd-ssg.org

- STEP AP239 (PLCS) edition 3 website: www.ap239.org (just started)

- STEP AP239 (PLCS) edition 3 White Paper here

- OASIS PLCS specifications here on oasis-open.org

Thank you!

To join the ISO AP239 edition 3 project, contact

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Rick Zuray, richard.s.zuray@boeing.com

Or contact your national standards mirror committee for ISO/TC 184/SC 4.