Assessment of Commercial Sustainment Standards for Defense Applications

Pursuant to Senate Report 117-130, page 201, the accompanying S.4543 the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023

Product Support
March 2024

The estimated cost of this report or study for the Department of Defense is approximately $225,000 FY23-24 for DoD labor. Generated on 2024Feb22

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Congressional Requirement

Senate Report 117-130, page 201, the accompanying S.4543 the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023 requests the Under Secretary of Defense for Acquisition and Sustainment to provide a briefing on assessment of the feasibility and advisability of potential adoption and implementation of the S-Series* suite of specifications by the Department. Such briefing shall include consideration of best practices and lessons learned from industry groups, as well as international partners and allies with experience in adoption and implementation of the S-Series.

* The S within S-Series represents each of the “S” specifications

Key Takeaways

S-Series Specifications; Seven independently developed specifications within the suite.

- SX000i - Integrated Product Support (overarching guidance and data model)
- S1000D - Technical Manuals
- S2000M - Material Management (Supply Support & Provisioning)
- S3000L - Logistics Support Analysis
- S4000P - Preventative Maintenance
- S5000F - In-Service Feedback
- S6000T - Training Analysis and Design

Feasibility of DOD Adoption of the Specifications

- Adoption of the standards is feasible with substantial effort by the Department to address immaturity of the specifications and develop workarounds for the specification gaps.

Advisability of Adoption of the Suite of S-Series Specifications

- Broad application of S-Series specifications, in their current state, is not advisable for adoption/implementation.
- Utilization of S1000D and S6000T is occurring with various Service programs. The remaining specifications lack sufficient maturity for immediate DoD adoption.

Recommendation

- Services continue a measured/phased approach for adoption/implementation as each S-Series specification matures.
- Establishment of a joint Service management working group for each specification with representation on a government-industry working group.
- Revisit this study in two years after block release updates of the Specifications.

S-Series Background

The cancellation of the DoD standards after the release of National Technology Transfer Advancement Act (NTTAA) of 1993 resulted in the development of the S-Series Product Support specifications by European industries. The S-Series allows industry stakeholders to leverage a common architecture and core data model, which enables common product support processes across a system's life cycle.

- European military community was reliant on the cancelled US Military standards for their contracts.
- European AeroSpace Security and Defence (ASD) Industry Association developed S-Series specifications to become self-deterministic vice reliant on DoD.
- Minimal input was attained from the United States and European Governments.
- US based Aerospace Industries Association (AIA) joined with ASD to provide significant input into the development process.

Through coordinated maturation activities, these specifications are becoming more integrated and harmonized across the S-Series suite, including maturity of the Common Data Model for all specifications.

If successfully implemented**,** the S-Series approach could enable interoperability, reduce complexity, enhance collaboration, and reduce reliance on proprietary tools and processes, while supporting use of digital threads.

Assessment Approach

- S-Series Working Group (May-Dec 2023)
  - Consisted of ODASD(PS) and Service representatives from Air Force, Army, and Navy.
  - Reviewed each S-Series specification to identify strengths and weaknesses.
  - Compared each with SAE International standards currently in widespread use.
  - Identified and analyzed barriers to adoption (gaps) and way forward to successful implementation.
- Participated in forums where S-Series specifications were discussed and compiled feedback from Industry Stakeholders and International Partners and Allies.
- Coordinated brief through Services (February 2024).

Services' Perspective

KEY THEMES

- All the S-Series specifications are maturing at various levels.
- S1000D (Technical Manuals) is the most mature and considered a best practice.
- S1000D adopted by all Services; implementation at various levels within the Services.
- Navy/Army actively working Use Cases in support of S6000T (Training Analysis) and S1000D (Technical Manuals).
- None of the Services have implemented the remaining specifications.
- Services will implement S-Series specifications once sufficiently mature.

BARRIERS TO IMPLEMENTATION

- Lack of maturity of the Common Data Model.
- Lack of business rules for most of the S-Series specifications.
- Ambiguity in the specifications creates issues for contract deliverables.

WAY FORWARD

- Retain use of SAE International standards until the S-Series specifications are mature enough to implement.
- Develop pilot implementations prior to adoption.
- Moving towards more comprehensive implementation of S1000D across all programs (Several implementations already underway).
- Navy looking at potential to adopt S6000T for programs using S1000D.

Source: S-Series Working Group Service Representatives

S1000D Use Case

All Services

- **Business Rules:** Must be created to fully use the S1000D specification.
- **Technical Maturity:** Common Source Database (CSDB) is unique to S1000D.
- **Cost:** Significant costs to develop and mature S1000D.
  - Business Rules: Army $10M invested over 10-year period; annual support $200,000.
  - Training: Navy invested $450,000 per class for each S-Series specification.
  - Common Source Data Base: Air Force invested $1.04M to build; annual support $400,000 per program.
- **Time to Implement:** Services working to make specification workable over 20-year period. Modifications and updates still being made.

Services must conduct additional analysis to determine the total cost of implementing S1000D. Those costs could potentially be used as a baseline for estimating costs to implement the remaining specifications.

S6000T Use Case

Navy

- Status:
  - USN Programs of Record are working to adopt S6000T as part of their alignment with Model Based Product Support/Navy-PLM capabilities, which influences:
    - Ready Relevant Learning (RRL) lines of effort for Career-Long Learning Continuum (CLLC) and Integrated Training Content
    - Surface Training Advanced Virtual Environment (STAVE) integrated training content acquisition and development
  - S6000T enables the Rating Career Domain Continuum (RCDC) component by threading manpower & personnel, maintenance planning & management, and training & training support Program of Record (POR) requirements.
- Implementation Factors to Consider
  - Unique gains from implementation
    - The only data specification that standardizes training data and integrates with engineering configuration and Logistics Support Analysis data.
    - Gives Navy the ability to easily identify Fleet-validated training gaps based on new, changed, or ineffectively trained rating-level tasks. It also allows them to rapidly develop corrective courses of action.
    - Not reliant on S1000D, however fully integrated with the use of S1000D.
  - Challenges to successful Implementation
    - Time and testing required to transform from a conceptual data model to physical database.
    - USN Business Rule development.

Source: S-Series Working Group Navy Representative Input

International Partners/Allies

Engagements

Communication

- Nov 2022: Intro to S-Series
  - Hosted by AIA and ASD(S) supported. Target Audience: DASD(PS)
- Apr 2023: IPS Council meeting
- Sep 11, 2023: IPS Defense Interest Group (DIG)
- Sep 12-14, 2023: S1000D & S-Series IPS User Forum
  - Hosted by Aerospace Industries Association (AIA)
- Sep 2023: PSM Workshop Break-Out Session
  - Australian Defense and US
- Nov 2023: NATO meeting
  - ILS guidance lays out options for all including SAE International standards, S-Series or others.
- Dec 11-15, 2023: IPS DIG

DIG Government participants shown above in addition, NATO Allies Spain and Poland

International Partners/Allies Perspective

- **Feedback from International Partners (Governments) and Allies**
  - Global consensus that S1000D specification is an industry and government best practice and broadly adopted.
  - Hesitancy on adoption of the remaining specifications by allies due to low maturity level of the current S-Series specifications (from NATO meetings).
  - Within European community S2000M is utilized for Supply Support information.
    - For many NATO nations, S2000M is primary specification and the only contractual way to procure provisioning and supply support information.
- **International Partners (Government) and Allies Proposed Way Forward**
  - Allies proposed to develop a *MoD/DoD management specification* as part of the S-Series, written by Government for Government use. Purpose is to highlight all the actions required for implementation to include:
    - Governance improvements across all the specifications.
    - Contracting for the specifications.
    - Development of common defense business rules as appropriate for each specification.
    - Common Data Model compliance.
    - Additional common defense requirements as needed.
  - Considering a phased/measured approach on adoption as gaps are addressed within each of the S-Series specifications.

Source: Compilation of comments received from meetings held in 2022-2023

Industry
Engagements

Communication

- Nov 2022: AIA S-Series Training Session
- Mar 2023: Virtual meeting with Lockheed Martin
- April 2023: AIA/ASD IPS Council
- Jul 2023: Met with Lockheed Martin at its facilities
- Sep 12-14, 2023: IPS User Forum
- Dec 2023: AIA/ASD IPS Council
- Monthly United States S-1000D Management Group (USSMG) meetings

Participants*

AIA, ASD, AIRBUS, BOEING, ISS, LOCKHEED MARTIN, RTX, ASI Andromeda Systems Incorporated, GENERAL DYNAMICS, EPS, GENERAL ATOMICS, sopra steria, ONEIL

* This list shows companies where direct contact was made. It is not all inclusive of the meeting participants.

Industry Perspective

Best Practices

- Industry Best Practices and Lessons Learned (Lockheed Martin)
  - Demonstrated S-Series concepts in implementation.
  - Single authoritative source of truth (information).
  - Single Common Source Database from which to develop all Product Support products (to include technical publications, training, and support plans).
- S1000D is considered a Best Practice by Industry
  - Adopted by both Department of Defense and Civilian Aviation.
  - Lessons learned from S1000D provides valuable insight on the process to adopt remaining specifications.
- AIA/ASD S-Series User's Forum
  - Established by Industry with broad international participation; DoD participation for S1000D.
  - Provides collaborative environment to discuss specifications and best way forward to make them suitable for DoD and allies' use.
- AIA/ASD Integrated Product Support (IPS) Council
  - Managing alignment of the S-Series specifications.
  - Established common data model across all specifications (except S1000D).
  - In 2023, added Defense Interest Group (DIG) as a voting member on the IPS Council.

Sources: Compilation of comments from User Forums and Industry training sessions

Path Forward to Support Successful Implementation

- Continue use of the SAE International standards and the adopted S1000D specification until the remaining S-Series gaps are closed.
- Revise governance structure to better reflect DoD equities. (OPR: OSD)
  - Continue to work with governance bodies and individual committees to mature specifications to support DoD requirements.
- Develop a defense management specification, led by the DIG, which highlights actions required for S-Series implementation (Written by government for government use.) (OPR: OSD/DIG)
- Use measured/phased approach for adoption/implementation to take advantage of improvements to each specifications as they are updated to include DoD requirements. (OPR: OSD/Services)
  - Ensure buy-in and engagement from the Services on the use of S-Series as a viable alternative to SAE International standards.
  - Develop detailed cost estimate/schedule for implementation.
  - Develop Plan of Actions and Milestones (POAM) by Services.
  - Updates to policy and training.
  - Ensuring successful implementation requires a joint service management working group for each specification like the United States S1000D Management Group (USSMG).

Recommendation: Re-evaluate the feasibility of study every two years after block release cycles of the Specifications.

Points of Contact

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