



MOSA Alliance Overview and Pioneering Achievements

Ms. Vale Sather

Senior Project Leader

The Aerospace Corporation



Industry Standards Technology Organization (ISTO) Space Systems MOSA Interface Standards Alliance (MOSA Alliance)

An SSC SSIO-Sponsored Standards Development Organization (SDO) Consortium
(<https://www.interoperabilityalliance.org>)

Overview & Pioneering Achievements

26 AUGUST 2026

Major Nathan Gapp, SSC/BZEI
Interim Lead, Enterprise Engineering & Interoperability Standards

Vale Sather (Author), Aerospace
Sr. Project Leader

Gloria Pugliese-Rosillo, Aerospace
Sr. Member of the Technical Staff

Nutshell Overview



ISTO vs. Typical Standards Development

MOSA Alliance Objectives

- Rapid development of MOSA compliant space system standards that will enable interoperability at key system interfaces.
- Collaborating with U.S. and foreign ally Government and industry partners to develop voluntary industry consensus standards.

Typical Standards Development Organization (SDO)

- Example SDOs: IEEE, AIAA, SAE, ISO
- Most SDO Committees are large and include international participation
- The ANSI certified SDOs typically develop standards via a rigorous polling process
 - All members are requested to vote
 - There must be a certain percentage of responding votes
 - Of that percentage of respondent votes there must be another certain percent of yes votes before “consensus” is achieved
- Per Google several years ago, consensus standards typically take an average of three years to develop

ISTO

- Allows more agile standards development methods
- Membership to an ISTO Alliance can be limited
- Participants in an Alliance committee/subcommittee can be limited
- Each committee/subcommittee can tailor their operating rules (e.g., frequency and duration of meetings, meeting agenda, order of discussion - round robin, free-for-all, other)
- Each committee/subcommittee can tailor their definitions for progress (e.g., milestones, definition of done, development method, and schedule)
- U.S. Citizen Only and/or classified Standards committees needing cleared participants will be permitted, when necessary
 - The ISTO has no visibility into classified committees or their products but trusts Aerospace and Government SETAs to uphold the MOSA Alliance Bylaws, which the ISTO Program Office approved.



Agile Methods for Standards Development

- The ISTO MOSA Alliance Committees are developing portions of Standards in six-month sprints.
- Committees determine the scope of their standard based on the objective(s) set by the Stakeholder Advisory Council
- Committees deliver minimum viable products (MVPs) at the end of each sprint.
 - Committees determine how many MVP deliveries there should be
 - Committees prioritize the content of each MVP
- Each MVP is a product that can be put on contract.
- Each committee consists of the minimum number of people with the right skill sets to get the job done.
 - Entails value balancing of the number of Government Team SMEs

Approximate development times:

- Review/Recommend (existing) Interoperability Standard: 2 – 3 months.
- Tailoring Guide (for an existing Standard): 12 - 18 months (2 – 3 MVPs).
- (New)Standard for a standardized interface: 18 – 24 months (3 – 4 MVPs).
 - Supplemental Guides might be developed prior to, or after, the Standard to better define the context in which the Standard should be applied.
 - Guides are typically completed in a single six-month sprint.

Alliance Organizational Structure





**** MOSA Alliance Product Development Process: First Steps**

- The Government (via the Stakeholder Advisory Council) sets the objective for each committee
- The Committee's first step is to determine whether there are any existing Standards that can satisfy the objective.
- If the answer is yes, the Committee must determine whether to recommend the Standard for use as-is, or tailored.
- If the answer is tailored, the Committee's job is to develop a tailoring guide for the existing Standard.
- If there are no existing Standards that can meeting the objective set by the Government, the Committee's job is to develop a Standard that will.



Current MOSA Alliance Members

Executive Board/ Stakeholder Advisory Council

- NASA
- NRO
- SSC
- ESA (non-voter)

Additional Government Agencies

- AFRL
- DARPA
- NRL



COLLINS AEROSPACE | PRATT & WHITNEY | RAYTHEON



Industry Participants

- Aalyria
- AirBorn
- Amazon Leo
- BAE Systems
- Blue Origin
- Boeing
- General Dynamics Mission Systems
- HartSCI
- Kepler
- Kratos
- Lanteris
- Lockheed Martin
- Loft Federal
- Mynaric
- Network Innovations U.S. Government
- Northrop Grumman
- Optimal Satcom
- RTX
- Telesat
- Tesat
- Viasat

Challenges in Developing Standards for MOSA



Mission Assurance vs. Interoperability Standards

- Most Standards are mission assurance standards which codify industry best practices.
- No analyses are needed to develop mission assurance standards – just “grey beards” to agree and capture their lessons learned.
- A MOSA Alliance Standard for a standardized interface entails developing a new interface that currently does not exist. **
 - Therefore, analyses are required to ensure technically accurate specifications.
 - Followed by prototyping for verification and validation of the new standardized interface.

FFRDCs must play a key role in the development of voluntary consensus standards for new standardized interfaces.

- Voluntary participation by industry in the development of standards means that it is illegal for the Government to direct the participants to do any work.
- The Government cannot direct contractors to do work for free.
- FFRDCs provide the Government with the ability to perform non-proprietary analyses needed for accurate requirements development and to lead commercial industry participants in the development of non-proprietary standardized interfaces.



MOSA Alliance's Biggest Challenges

Achievement of MOSA interoperability is a long-term endeavor

- We need all future programs to use the same standardized interfaces
 - But, space system acquisition timelines, especially for the exquisite capabilities, are long; and, we don't build many

Programs with money seem to have no time or interest in helping to build an "Enterprise" capability

- The benefit to the Enterprise of MOSA is cost and schedule savings on future systems, beyond the first implementer; and, the long-term maintenance phase (not the development phase) of the system lifecycle
 - The Development team who would implement MOSA is often different from the Maintenance team, so the Development team gets no benefit from MOSA for the money they'd need to spend on it.
- No single program wants to pay for prototyping and flying new Standardized interfaces that will also benefit other future programs
 - "Future programs" means cost-sharing is not available now
- MOSA is not optimized for a particular mission

Low TRL Standards need Prototyping**

- Frequently, Enterprise organizations with the responsibility to develop Enterprise Standards or Architectures, have no money to procure, build, and test hardware
 - Prototyping of new interface Standards must rely on Programs of Record being willing to contribute their Study phase money, which is generally given to contractors to prototype their own new and proprietary technologies
- Implementation of MOSA Standards will require redesigns in legacy company product lines, that will increase cost and schedule initially
- The POM cycles are far apart

Myth of Stifling Innovation

- Standardization (focused on interfaces) does not stifle innovation
 - As a general rule, standardization makes it easier for new entrants to compete in an established market
 - Example: The USB port
 - Would the wide variety of devices/capabilities currently accessible by the huge consumer base with USB ports have been possible without the standardized USB port?

Achievements



Pioneering Standards Development Advances

- First SDO to develop Standards for system level standardized interfaces via industry consensus
- First SDO to use Agile methods to accelerate standards development
- First SDO to develop truly digital Standards in MBSE models
- First SDO industry consortium with the ability to develop voluntary industry consensus classified Standards



Digitized Standards in MBSE Models

- Most Standards Development Organizations (SDOs) who claim to have digital standards, have electronic flat files.
 - Facilitates cutting and pasting of requirements into requirements traceability tools like DOORS
- The MOSA Alliance is the first SDO to offer fully digitized Standards in the form of MBSE models.
 - MBSE models enable simulation of the Standard to help users better understand how the Standard could/should be applied.
 - Accelerates the development of digital twins
- An MBSE Model served as the ASOT and publication tool for the development of ISTO Standards MOSA-IF-S-001 and MOSA-IF-S-002
 - Requirement revisions and associated model diagram revisions were made in near real-time, working concurrently with the Committee
- The MOSA Alliance's UX/UI Committee was the first to develop Use Cases (which were captured in an MBSE model) and used to
 - Determine the scope and content of their Standard, and
 - Prioritize the order, and content, of their minimum viable product (MVP) deliveries
- The MOSA Alliance's Free Flyer Capture Fixtures Committee used activity diagrams from their MBSE model to ensure the right (recommended) requirements were in the right sections of a modularized supplemental Guide
 - The ConOps Supplemental Guide was formatted in sections by capabilities which would likely be developed by different contractors, and mission phases
- The MOSA Alliance stood up a committee to develop standards for standardization of MBSE models to facilitate the development of future interoperable models
 - Rapid prototype modeling is helping to inform the Standards being developed



Thank you for your time
and interest