Developing a Process for M&S Standards Management within DoD

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ABSTRACT

Modeling and simulation (M&S) standards support a common technical framework and common services. They enable interoperability, reusability and increased capability in a cost effective manner. As such, a management process for M&S standards is necessary to coordinate and enhance ongoing standards development efforts in the Department of Defense (DoD), other government agencies and industry.

To strengthen the use of M&S in DoD, DoD Directive 5000.59 established policy, assigned responsibilities, and prescribed procedures for the management of M&S. A technology critical to the M&S Standards project is the M&S Standards and Methodologies (MSSM) that enables the execution of the program.

This paper will address some of the activities required to develop the processes necessary for the DoD to effectively manage the many different standards that are used for M&S. It will include a brief description of the primary stakeholders and plan objectives, provide a framework for discussing standards, and discuss current processes in standards development. This paper will also detail the use of the DoD Standards Vetting Tool in providing interested DoD M&S community members a method for submitting comments at various points along the development effort.

ABOUT THE AUTHORS

Dr. Amy E. Henninger is currently an Associate Director at the Modeling and Simulation Coordination Office (OSD/AT&L) managing a portfolio that includes M&S standards, VV&A, and education. She's worked as an analyst, developer, researcher and manager on a variety of DoD M&S programs for over 20 years. Henninger is formerly an Adjunct Faculty Member for the M&S Graduate Program at the University of Central Florida and has written over 40 papers on a variety of topics (e.g., neural networks, autonomous agents, multi-agent systems, embedded training systems, analytic methods for uncertainty, games for training, and performance metrics for intelligent systems). She holds six university degrees culminating in a Ph.D. in Computer Engineering.

Dr. Margaret L. Loper is the Chief Scientist for Georgia Tech Research Institute's Information Technology & Telecommunications Laboratory. Margaret has more than twenty years of experience in M&S. Her technical focus has been on parallel and distributed simulation and she has contributed to the areas of temporal synchronization, simulation testing, and simulation communication protocols. Margaret's past projects include leading the standards study team for the Live Virtual Constructive Architecture Roadmap study and simulation cloning research for Deep Green. She earned a Ph.D. in Computer Science from the Georgia Institute of Technology, a M.S. in Computer Engineering from the University of Central Florida, and a B.S. in Electrical Engineering from Clemson University.

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1.0 INTRODUCTION

According to the Department of Commerce (2004), strategic standardization is important to the US economy. Standards are a critical issue for competitiveness in global markets, as they can facilitate international trade, or they may impede access to foreign markets. The Department of Defense's stake in strategic Information Technology (IT) standardization is rooted in the fact that a strong defense is based upon a strong economy, and that a strong economy depends upon maintaining global competitiveness.

Some of the technical and programmatic benefits of standards include: information access, compatibility and interoperability, variety reduction and quality/reliability (Tassey, 2000). With respect to information access, standards can provide evaluated scientific and technical information. For example, in the construction industry; the latest research, from concrete handling to earthquake protection, is evaluated and incorporated into standards. The construction crews and engineers who use these standards can thereby exploit advanced technical information without independent knowledge of all of the recent research. Compatibility and interoperability standards may provide agreed-upon interfaces so that systems can operate with parts from different producers. Examples are commonplace and include nuts and bolts, railroad gauges, electrical plugs and outlets, and interoperability standards for computer and telecommunications systems. Variety reduction standards may limit the number of possible variants of a product or process. Such reductions lead to economies of scale and can also stimulate economic growth. Standardizing the size of a bread slice, for example, led not only to an economy of scale for commercial bakers but also to inexpensive toasters and plastic sandwich bags. Finally, quality and reliability standards may define some acceptable level of performance.

The Department of Defense Modeling and Simulation Coordination Office (M&S CO) was established by the Department of Defense (DoD) at the direction of Congress "…to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments and to establish guidelines and objectives for [the] coordination [of] simulation, war gaming and training…." (SAC, SR101-521) and "…to develop interoperability standards and protocols for existing and future war games, models, simulators, and training devices …" (HASC/SASC Conference Report, 1991). DoD Directive 5134.01 assigned authority for establishing M&S standards and protocols to the Under Secretary of Defense (Acquisition, Technology and Logistics). In April 2004 the Defense Standardization Program Office (DSPO) established the "Modeling and Simulation Standards and Methodologies (MSSM)" standardization area and designated the M&S CO as its Lead Standardization Activity (LSA). Previously, Service and DoD modeling and simulation (M&S) standards activities had been ongoing, but not coordinated as a unified effort.

This paper presents foundational material relevant to the development of a DoD M&S Standards Management Process. This includes some of the relevant policy and guidance, a review of the standards lifecycle, and an examination of some of the attributes of standards development organizations that are important to the development of a standards management process. While the material is factual, no definitive conclusions are drawn, as the process is still in development. Thus, the paper serves as compilation of relevant information intended to generate ideas and elicit feedback from user community on direction for maturing the program and its requisite processes.

1.1 Major Government Program Interfaces

Within the DoD, there are two types of standards organizations. The first develops and maintains defense standards; the second manages the application of standards. The M&S CO also manages major standards interfaces with North Atlantic Treaty Organization (NATO) and Partnership for Peace nations. These major interfaces are further explained in the following sections.

1.1.1 DoD Interfaces

The development and maintenance of standards falls under the Defense Standardization Program (DSP). (10 U.S.C. § 2451-2457) The purpose of the DSP is to champion standardization throughout the DoD to reduce costs and improve operational effectiveness. This is done by identifying, influencing, developing, managing, and providing access to standardization processes, products, and services for warfighters, the acquisition community, and the logistics community.

Standards under the DSP are cataloged in the Acquisition Streamlining and Standardization Information System (ASSIST) database, open to registered users. The use and application of standards is the role of Program Managers, Program Executives and Service Acquisition Executives who oversee developments and acquisitions. (Pub. L. 109-364) Standards and specifications used by programs are cataloged in their Technical Architectures.

For the DSP, and as the MSSM LSA, the M&S CO participates in the development and maintenance of standards. Defense standards developed under the cognizance of the M&S CO are cataloged in the ASSIST database.

Within the IT area of responsibility, the DoD Information Technology Standards Committee (ITSC) has been established to oversee the Technical Architecture for the Global Information Grid. (10 U.S.C. § 2223) The ITSC is chaired by Defense Information Systems Agency (DISA) and has members from the organizations shown in Figure 1.1-1. The technical architecture is published by the ITSC as the DoD Information Technology Standards Registry (DISR). Because the architecture is so complex, the ITSC has subdivided the DISR into functional areas under the cognizance of Technical Working Groups (TWGs). The M&S CO has been assigned the leadership of the M&S TWG. Figure 1.1-2 illustrates M&S CO's relationship to these various bodies.

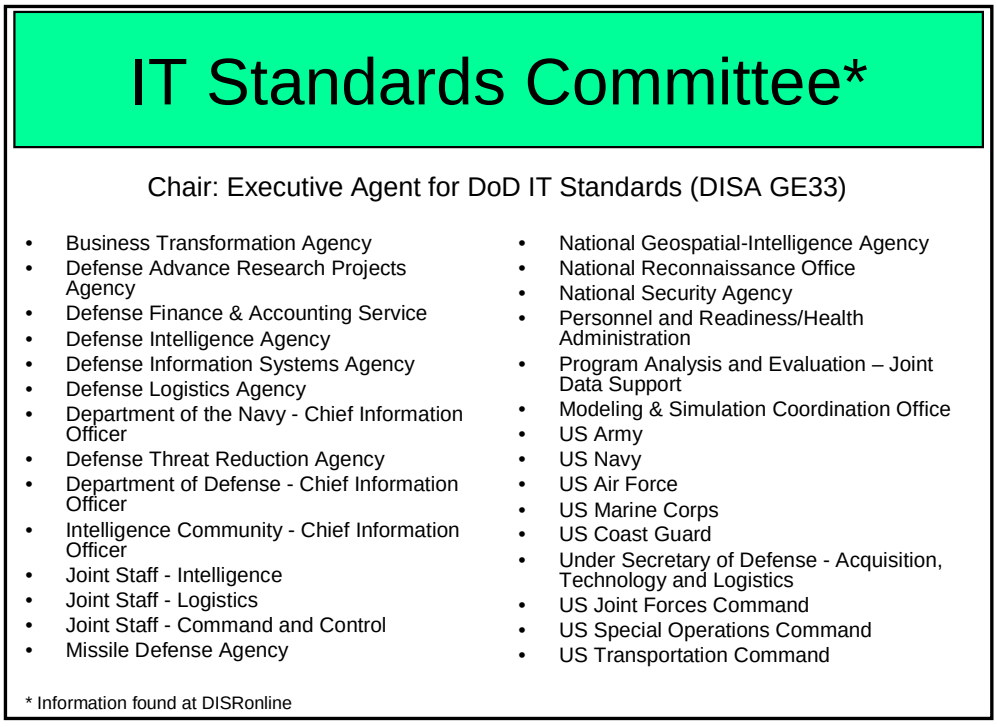

Figure 1.1-1
DoD IT Standards Committee Membership

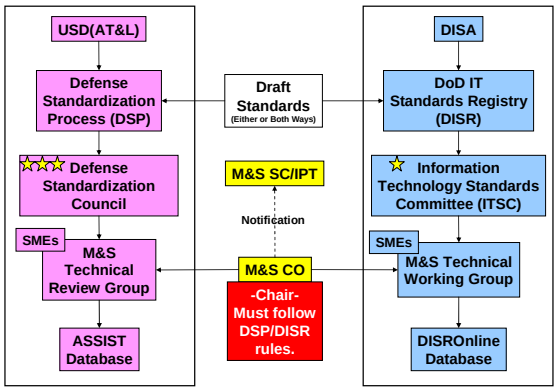

Figure 1.1-2
Relationship of DoD Standards Bodies

The DoD established the M&S Steering Committee (M&S SC) to govern, guide, and oversee matters relating to M&S. In August, 2007, the M&S SC published the "Strategic Vision and Goals" which identified the goal of providing standards to promote reuse and interoperability. The 2008 DoD Modeling and Simulation Corporate and Crosscutting Business Plan determined there was a need for an M&S Standards Management Process. In response to this need, the M&S SC developed High Level Task S-C-1, M&S Standardization Process, which tasked M&S CO with developing the M&S Standards Management Process.

1.1.2 International Interfaces

The M&S CO is also the DoD's point of contact for coordinating M&S activities with NATO and Partnership for Peace nations, The Technical Cooperation Program (TTCP), and other international Allies. This includes arranging for participation in on-going NATO study groups and technical activities that support the DoD Strategic Vision to promote interactions between DoD and international partners. Importantly, this includes serving as the lead for the NATO US Delegation to ensure consistency in US participation in the NATO M&S Standardization Agreements (STANAGS). The purpose of the NATO standardization activities is to enhance interoperability and to contribute to the ability of Alliance forces to train, exercise and operate effectively together, and when appropriate, with forces of Partner and other nations, in the execution of their assigned tasks. This is done by initiating, harmonizing and coordinating standardization efforts throughout the Alliance and providing support for standardization activities.

The M&S CO is involved in supporting the TTCP Joint Systems and Analysis Group as members of the Technical Panel for M&S. This panel focuses on a variety of issues that are critical to the future success of computerized modeling and simulation within individual Member Nations and within Allied coalitions using M&S. These coalitions rely on common architectures to improve interoperability, a driving factor for having internationally recognized standards. The importance of activities of the Technical Panel to the national security of TTCP Nations is growing as computerized models and simulations become more powerful, more capable, and more applicable to a wide range of uses. Standards are necessary to capture the increased capabilities and make them easily available to other member nations.

1.2 Major Program Objectives

Given responsibilities to the three major interfaces (DSPO, ITSC, and International) described in Section 1.1, the standards management process must be designed such that it successfully meets the requirements of these organizations:

- Manage the MSSM Standardization Area in accordance with DoD 4120.24-M, *Defense Standardization Program (DSP) Policies and Procedures*.
  - Coordinate the review and adoption of standards in other Standardization Areas that are utilized in support of M&S efforts.
  - Coordinate the Modeling and Simulation standardization efforts among the Services, Joint Forces Command (JFCOM) and other DoD Components.
  - Maintain liaison with non-Governmental standards bodies that sponsor standardization documents that are utilized for M&S applications.
- Manage the M&S TWG in accordance with Standard Operating Procedures for the ITSC, IT Subcommittee Chairs (ISCs), and TWGs. (DISA, 2007)
  - Recommend the disposition of M&S standards listed or proposed for listing in the DISR
  - Coordinate the disposition of standards in other technical areas that are of interest to the M&S community
  - Represent M&S interests on other TWGs
  - Publish a M&S Standards Profile detailing the recommended application of standards listed in the DISR that are used for M&S applications

  - Staff ITSC action items of interest to the M&S community
- Develop, coordinate, promulgate and maintain NATO M&S STANAGS

Another objective important to the standards management process is the development of a framework that informs the investment process. For example:

- When should the enterprise invest in standards?
- In what standards should the enterprise invest?
- What kinds of tools or services are required for different kinds of standards?
- How does one identify the return on investment for a standard at the enterprise level?

Critical to informing these decisions is an understanding of a standards lifecycle.

2.0 STANDARDS LIFECYCLE

2.1 Development

Although development is the first step in the standards lifecycle, it must be preceded by motivation. This motivation usually comes from users, i.e. it's driven by market (user) need vs. developer desire. Users' needs may include the cost benefits of a competitive market and interoperable solutions. Wireless Fidelity (wifi) (IEEE 802.11) and the Universal Serial Bus (USB) are good examples of meeting these needs in the hardware market. A European business traveler in the United States has to acquire an electrical plug converter for his/her laptop, but can reasonably expect to share files with US colleagues on a thumb drive, and to connect to the Internet anywhere a wifi hotspot is advertised. Although developers' business models usually prefer proprietary solutions that capture the market, users' need for interoperability and a competitive market usually override this preference over time. Small, niche players are the exception to this market rule because they can't afford to attempt to capture the market, nor can they usually afford to maintain interoperability with all the major developers in the market.

Most successful standards are developed in areas where viable, competing technical solutions exist vs. a simple desire for a standard where technology is immature. This is primarily because a solid experience base is key to making technically viable decisions throughout the standards process. In the absence of technically viable solutions, these decisions must be based on the best guesses of the developers. Not only can this lead to early and significant rework to the standard due to a lack of foresight about technical issues, but it also means that no technical argument has more credible weight than any other.

There are many definitions of "open standard." OMB Circular A-119 states:

> "voluntary consensus standards" are standards developed or adopted by voluntary consensus standards bodies, both domestic and international. These standards include provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a non-discriminatory, royalty-free or reasonable royalty basis to all interested parties.

Because governments recognize the strong market advantage adoption that one developer's technical approach may convey, legal constraints such as anti-trust laws drive most commercial standards development organizations to similar processes for achieving openness and fairness. Processes that generally apply in open standards development include:

- An authoritative body establishes policies, procedures and processes, and ensures they are followed.
- Membership in the standards development process is not unduly restrictive.
- Voting rights are uniformly and fairly applied.
- At each stage of development, members are allowed to comment and given sufficient time to do so.
- Consensus, but not unanimity, must be achieved.
- The standard is made readily available (with or without license fee).

Within this process framework, a group of technical experts convene to develop the actual standard. This usually involves several rounds of drafting and commenting on drafts, followed by a more rigorous balloting process. Throughout the process, the goal is to achieve consensus, but not unanimity; the latter being nearly impossible. Much of the process framework is intended to ensure that consensus is achieved fairly, i.e. that everyone's position is heard and considered, but that the standard reflects the position of the majority without coercion of the minority or collusion.

Of course, standards development processes are not uniformly the same. Some organizations, such as the Internet Engineering Task Force, require the demonstration of implementations compliant with the proposed standard prior to standardization. Some

convey voting rights on organizations such as corporations or countries, while others convey voting rights on individuals. Institute of Electrical and Electronics Engineers (IEEE) supports both voting models, but not within a single standards development activity.

Periodic review and update are key to ensuring continuing currency and efficacy of standards, so some standards organizations enforce periodic review on their standards, usually several years. At the end of the period, the group of technical experts must reconvene to perform this function, hopefully in less time and with less effort than the original development process.

2.2 Vetting

Vetting is the process by which an organization decides whether or not to adopt a standard once it's approved by the standards development organization. This decision would typically be based on factors such as belief in the technical efficacy of the standard, and recognition and acceptance that the market will no longer accept proprietary products (as described in section 2.1).

For small organizations, vetting and adoption may be a single process, i.e. the people responsible for making the vetting decision are the same people responsible for implementing adoption, and the two processes flow together.

In some areas, particularly commercial standards, vetting may be synonymous with participation in the development, i.e. the organization depends on its technical contributors to perform technical vetting as part of their participation in the technical development process. The decision to adopt was made as a precursor/gating condition to the decision to participate in development. Because participation in development requires a commitment of funds to pay for the time of the technical experts, and possibly to develop a compliant implementation, the organization implicitly makes the vetting decision prior to development rather than lose their investment. Of course, if the development process takes a direction the organization thinks is antithetical to their interests, they may withdraw from development.

2.3 Adoption

Once an organization has vetted a standard and decided to adopt it, an adoption plan is developed. This planning is central to the adoption process. In almost no organization can adoption be a swift process, although as with all change, it's usually easier for smaller organizations.

At a minimum, adoption must include promulgation of the decision to adopt the standard. In a commercial organization, this likely includes announcement of the decision and plans to the organization's customer base. Recall our premise that standards adoption is driven by market demand. Therefore, in such a market, the announcement to adopt the new standard would be expected to have a positive effect on the organization's users.

The adoption plan should take into account the cost and schedule to migrate products to the new standard. Organizations that actively participate in the standards development process, especially if they are involved in the demonstration of a compliant implementation, will almost certainly be in a better position to transition more rapidly. There is also the need to continue support of the existing user base because adoption will have an impact on them as well, regardless of whether they desired adoption of the standard. While available resources tend to drive the rate and extent of adoption, these are offset by urgency of customer demand.

In large, distributed organizations such as the DoD, adoption may include several ancillary activities:

- Formal decision process and notifications as we'll see in section 4.0
- Education on functionality and applicability of the standard
- Decision process/cost benefit analysis of adoption by different programs that takes into account program lifecycle and ripple effects to related programs

2.4 Application

Application is where "the rubber meets the road," the actual process of putting the standard to work. In small software organizations, application may be as straightforward as announcing the adoption plans and directing the software engineers to use the standard in the next design and development iteration. Of course, for hardware developers, manufacturing changes may be necessary.

Assuming our premise about the market driving standards, developers should begin to see migration of sales away from proprietary products and toward standards-based products. Unfortunately, in a commercial market, such a shift may be hard to discern because many factors may impact buying decisions. Fortunately, in organizations like the DoD, such a shift

is often reflected in requirements in Requests for Proposals and contracts. In either case, successful application almost certainly must include ancillary processes such as:

- Development and promulgation of documentation
- Customer/user support, e.g. a help desk and/or wiki
- Additional education and outreach activities including participation in technical forums
- Advertising of products and services compliant with the standard

Finally, only through the application process can the experience be gained to keep the standard current (see section 2.1)

3.0 NON-GOVERNMENT STANDARDS BODIES

Non-government standards bodies are the primary source for standards used by the DoD. As such it is important to understand the two primary types of non-government standards bodies, what is an open standard and how stakeholders perceive them, and the types of standards in existence today that are prevalent in the IT industry.

3.1 SDOS and SSOs

A standards organization is any entity whose primary activity is developing, coordinating, promulgating, revising, amending, reissuing, interpreting, or otherwise maintaining standards that address the interests of a wide base of users. There are two general types of standards organizations: standards developing organizations (SDO) and standards setting organizations (SSO).

SDOs are formal organizations accredited to develop standards using open and transparent processes. Examples include the International Organization for Standardization (ISO) and the IEEE. SSOs refer to organizations that set what the market perceives as standards. The term "recognized SSO" refers to any SSO recognized directly or indirectly by a government entity. Consortia is the term used for SSOs that are not recognized SSOs. Examples of a "recognized SSO" include the World Wide Web Consortium and the Internet Engineering Task Force.

3.2 Open Standards

Open standard is another term often used when discussing standards. An Open Standard is more than just a specification; the *principles* behind the standard and the *practice* of offering and operating the standard are what make the standard Open. It is important to understand the principles and practices in the evolution of open standards as this is the primary source for standards adopted by the DoD. The open standards processes used by SDOs and SSOs ensure that the standards adopted by the DoD will be universally accepted by industry, academia and government agencies. The term "open standard" may be seen from perspectives of its stakeholders (Krechmer):

- Organizations representing the standards creators consider a standard to be open if the creation of the standard follows the tenets of open meeting, consensus and due process.
- An implementer of a standard would call the standard open when it serves the market they wish, it is without cost to them, does not preclude further innovation (by them), does not obsolete their prior implementations, and does not favor a competitor.
- The user of an implementation of the standard would call a standard open when multiple implementations of the standard from different sources are available, when the implementation functions in all locations needed, when the implementation is supported over the user-planned service life, and when new implementations desired by the user are backward compatible to previously purchased implementations.

There are numerous definitions of an open standard by national standards bodies (Wikipedia). The definition by Krechmer lists ten requirements that enable open standards:

1. Open Meeting: all may participate in the standards development process.
2. Consensus: all interests are discussed and agreement found, no domination.
3. Due Process: balloting and an appeals process may be used to find resolution.
4. Open IPR: how holders of Intellectual Property Rights (IPR) related to the standard make available their IPR.
5. One World: same standard for the same capability, world-wide.
6. Open Change: all changes are presented and agreed in a forum supporting the five requirements above.
7. Open Documents: committee drafts and completed standards documents are easily available for implementation and use.
8. Open Interface: supports proprietary advantage (implementation); each interface is not hidden or

controlled (implementation); each interface of the implementation supports migration (use).

9. Open Access: objective conformance mechanisms for implementation testing and user evaluation.
10. On-going Support: standards are supported until user interest ceases rather than when implementer interest declines.

3.3 Types of Standards - De Jure, De Facto, and Proprietary Standards

There are three basic types of standards in existence today and prevalent in the IT industry: De Jure, De Facto, and Proprietary. It is important for the standards adopted by the DoD to be universally accepted and readily available.

De Jure

De jure standards are those that have been defined or endorsed by legal or official committee or standards body. De jure standards may be in widespread use (such as the metric system) or a specification awaiting implementation or adoption. De jure standards all share one common property: they are documented and vendor neutral. (TechEncyclopedia, de jure standard) De Jure standards are the primary type of standard adopted by the DoD.

De Facto

A De facto standard is widely used, but not endorsed by a standards organization and is usually established by market share. Microsoft Windows is a de facto standard, as well as both the Netscape and Microsoft Web browsers. De facto standards are widely used and recognized by the industry as being standard, even though they have not been "defined", researched and prescribed by a standards setting organization. (TechEncyclopedia, defactostandard) The DoD may support the use and build systems that utilize De Facto standards.

Proprietary

Proprietary standards belong to an entity that exercises control over the standard are characterized by the fact that someone owns them and can put restrictions on users' access and use. The gaming industry is an example of proprietary standards. Standards within a single vendor or a small group of vendors may be established, but interoperability across the entire gaming industry is restricted. The primary purpose of proprietary standards is to gain market share by forcing users to stay within a single vendor's product line. Unless it is critical to the operational use of a system, the DoD does not use a proprietary standard.

The three types of standards are not orthogonal. There are cases where the lines between the types of standards may become blurred or combined. An example of blurring the lines between de facto and proprietary standards is the two "standards" for High Definition DVD formats. Each standard is supported by a group of vendors and the formats are incompatible. The expectation is that one of the proprietary standards will become the community de facto standard for digital video recording, much like the battle some years ago between VHS and BETA formats. An example of combining types of standards is the Balistic Missile Defense benchmark environment used by the Missile Defense Agency (MDA). The MDA simulation community created an environment for its developers to benchmark new algorithms and components. The environment, considered an MDA standard, is based on the proprietary MatLab environment. Thus MDA has created de facto standards which use proprietary standards as its foundation.

4.0 PROCESS FOLLOWS PRACTICE

Figure 4.0-1 brings information from Sections 1, 2, and 3 together by illustrating roles and functions of standards management over the lifecycle of a standard used in the M&S community. Classically, a user identifies the requirement for a standard and develops some kind of prototype implementation. If developing an open standard, this baseline implementation is presented to a standards development organization to shepherd through an open standards process. The result of this step is the creation of a de jure standard. On the other hand, if developing a Military Standard (MIL-STD), this would be sent to DSPO for development.

Once a standard is developed by an SDO or SSO, the ratification process consists of an evaluation of whether procedures were followed properly. While the DoD is primarily interested in adopting de jure standards, sometimes it is important to adopt de facto standards to ensure interoperability of systems. In this case, the standards life cycle would start with the nomination of an existing standard, rather than the development of a new standard. On the way to encouraging the adoption of the standard, however, one of the DoD program interfaces (e.g., DSPO, ITSC, NATO) will go through a formal vetting process. If it's an M&S standard or if it's a standard related to M&S, the M&S CO will

coordinate that vetting process for the DSPO, ITSC, or NATO.

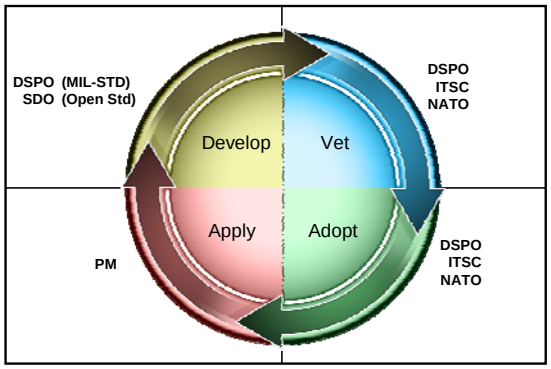

Figure 4.0-1.
Standards Lifecycle

If the vetting process results in the standard being adopted, then the standard gets represented in some database. As discussed in Section 1.1.1, for DSPO this is the ASSIST database and for ITSC this would be the DISR on-line. NATO would adopt it as a STANAG or as part of the NATO M&S Standards Profile. Oftentimes, with adoption comes the responsibility to supply some kind of transition plan.

Finally, application of the standard is always the responsibility of the Program Manager.

The next section in the paper discusses the tool that will be employed by M&S CO to support the vetting process.

4.1 Vetting M&S Standards in DoD

Standards vetting within the DoD is a continually evolving process. Initially performed by the different Services, it has evolved into a common process using a common tool.

4.1.1 Standards Vetting History

Military standards are not new; the process for vetting those standards has evolved over the years. The latest method for standards vetting involves using automated tools to provide a documented process to ensure that all interested participants have the ability to participate in the vetting process.

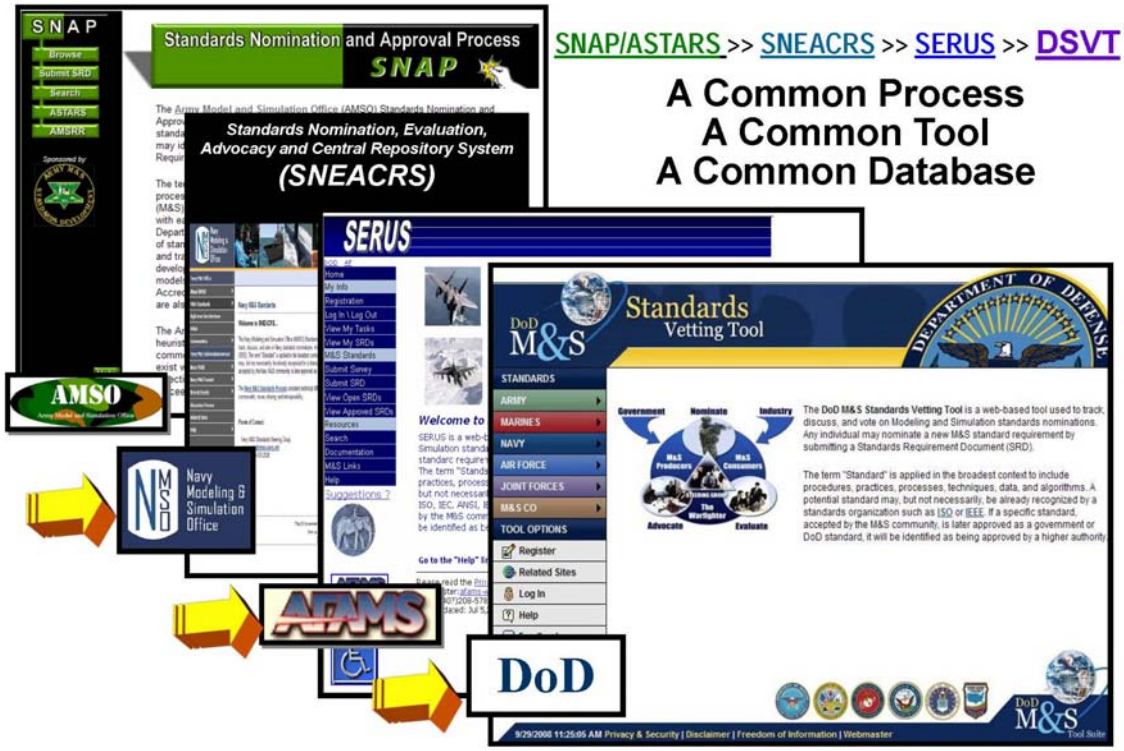

Figure 4.1-1.
Evolution of the DoD Standards Vetting Tool

The automated vetting process was initially a DoD service-specific activity. Each service had their own standards nominating and vetting tool: the U.S. Army had the Standards Nomination and Approval Process/Army Standards Repository; the U.S. Navy had the Standards Nomination, Evaluation, Advocacy and Central Repository System; and the U.S. Air Force had the Air Force Modeling and Simulation Technical Standards Process and Procedures Tool. In 2007, the M&S Steering Committee sponsored a project to develop and implement a common standards vetting process and tool. The result of this project was the DoD Standards Vetting Tool (DSVT) depicted in Figure 4.1-1. (Oates, 2009)

The DSVT can accommodate the vetting of standards for the DoD standards registries as well as documents of interest for a single Service or Component. The tool has initially been partitioned into sections for the four services, JFCOM and M&S CO. Additional domains may be added as needed.

4.1.2 Current DoD M&S Standards Vetting Process

The DoD M&S Standards Process has three fundamental management and coordination concepts; nominate, evaluate and advocate, shown in Figure 4.1-2.

Figure 4.1-2.
DoD Common M&S Standards Program Concepts

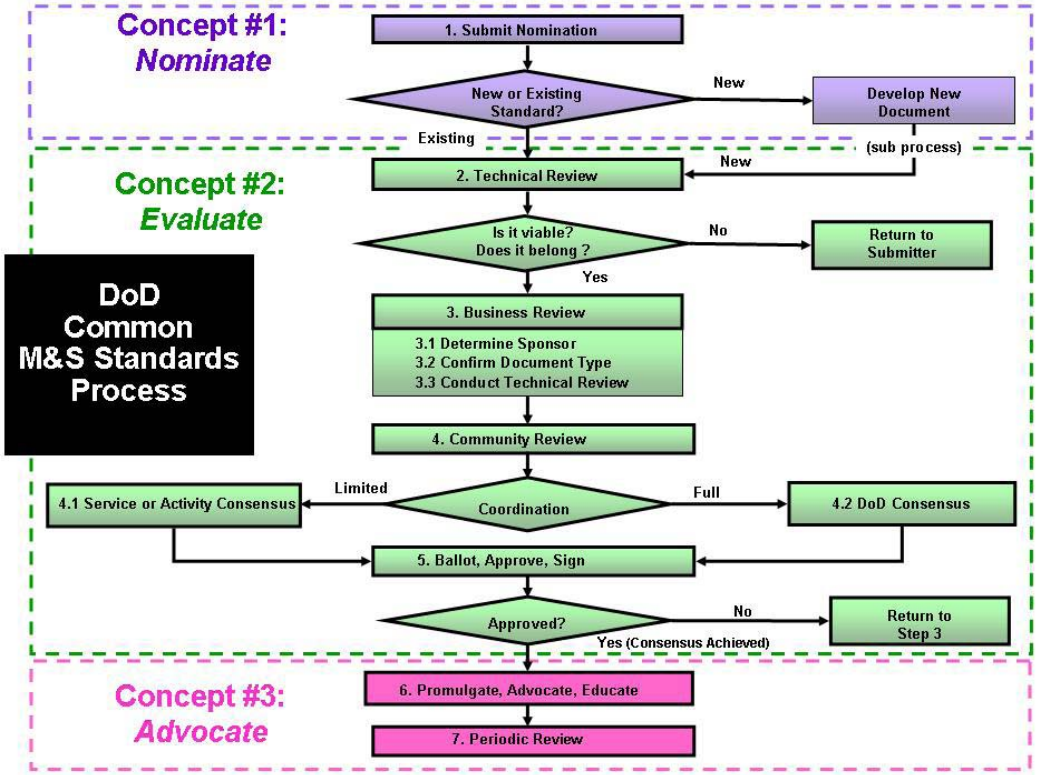

Figure 4.1-3.
DoD Common M&S Standards Process

The DSVT employs a seven-stage standards vetting process that encompasses the three concept elements. The seven stages of the process are briefly described below and depicted relative to the three major concept elements in Figure 4.1-3. (Oates, 2009)

Stage 1: Submit Nomination: A proposed standard is evaluated to determine whether or not it meets the requirements to be nominated as a new standard. The evaluation is performed in order to prevent proliferation of standards and overlapping or conflicting standards.

Stage 2: Technical Review: A proposed standard is evaluated to determine if it is a viable document and if it belongs in this process. A technical evaluation of descriptive data and documentation of the proposed standard is performed using an approved criteria set. Subject Matter Experts are identified as members of the Technical Team reviewing the proposed standard, thus allowing each using organization to build its own network of experts to work the development and evaluation of proposed standards.

Stage 3: Business Review: The internal and informal review of the proposed standard is accomplished in this stage. The proposed standard is further analyzed and reviewed by an associated team to confirm the appropriate document type and conduct a business case review.

Stage 4: Community Review: Community consensus on the proposed standard is achieved during this stage with potential inputs from all DSVT registered users. In addition, based on inputs received early in the review of the recommended level of coordination a full coordination review may be conducted which extends the evaluation to other participating organizations.

Stage 5: Ballot, Approve, Sign: The formal ballot by the voting members is conducted and the final approval of the DoD Component/M&S Office Lead and the designated Approval Authority are accomplished in this stage. Formal ballots are conducted to review recommendations and confirm that consensus has been achieved on the standard. Once consensus has been confirmed, the standard is then approved by the required level of higher authority.

Stage 6: Promulgate, Advocate, Educate: This stage provides visibility on the approved standard by promulgating and advocating the standard and coordinating education in the standard and document to ensure understanding. Emails are sent to all stakeholders about the availability and the approval of a new standard.

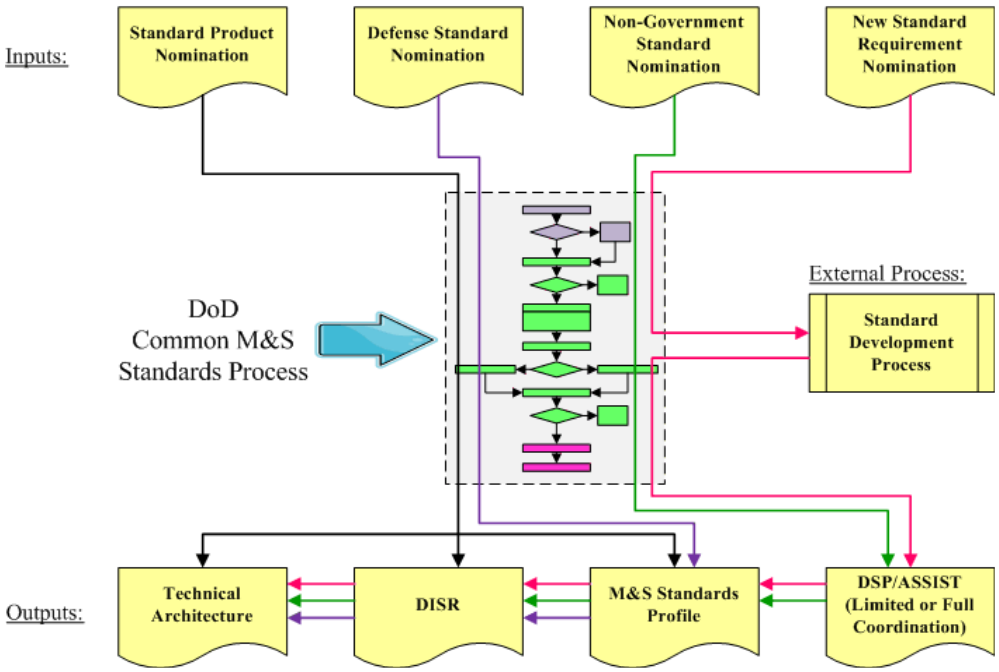

Figure 4.1-4.
DoD Common M&S Standards Process Flow Diagram with Inputs/Outputs

Stage 7: Periodic Review: This stage is conducted to ensure all approved standards remain current and applicable. It is critical that an effective periodic review process is in place to ensure the continued applicability of the document after it is approved and promulgated. A periodic review of the approved standard is performed in order to determine whether the approved standard needs to be reaffirmed, revised or retired.

The DoD Common M&S Standards Process with its inputs and outputs is provided in Figure 4.1-4. This diagram illustrates support to existing DoD standards initiatives and activities (Oates, 2009).

4.2 Summary

Vetting standards in the DoD is not new. Expanding the use of the DSVT will require a slow process of educating the vetting process participants and providing test cases and trial studies to increase the confidence in the tool. By developing a workable process and employing it, the management and the pedigree of the standards vetting process and standards management will improve within the DoD.

5.0 SUMMARY

In developing a solid DoD standards process, we must first ensure we have the policies and procedures in place for the process to work. The DoD is using the standards lifecycle, the standards vetting process, and the common services to improve the management process. We are embracing open standards and enabling international standards to follow efforts in this area. In spite of the challenges of two standards reporting bodies, the M&S CO has made great strides in increasing the visibility of the standards management process both within and outside of DoD.

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