# The M&S Community of Interest:
# Technical Collaboration Across the Enterprise

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## ABSTRACT

The Modeling and Simulation (M&S) Community of Interest (COI) was established and chartered in 2004 with a set of Operating Guidelines that follow DoD guidance, as described in the Net Centric Data Strategy and the Guidance for Implementing Net-Centric Data Sharing. In 2010, a DoD M&S Enterprise Data Strategy was developed to plan for future challenges regarding M&S data and provide efficiencies for M&S across the Department. This strategy provides overall vision, guidance, and policy recommendations needed to achieve governance and management of M&S enterprise data issues facing the Department today, and the M&S COI is a main component of the strategy. The M&S COI is a collaborative group of M&S data users whose mission is to make M&S data and data-related tools & services viable and visible to the Components and Communities enabled by M&S. The M&S COI will provide a collaborative forum to advise, educate, and influence the wider Defense community on M&S Data issues. In addition, an M&S Enterprise Data Action Plan is under development for advancing the strategic objectives of interoperability and reuse for M&S, and the M&S COI will be a main driver for these implementation activities.

This paper presents a discussion of the M&S COI and the revised and updated set of Operating Guidelines it will follow. The M&S COI structure and implementation is also presented, which consists of persistent working groups and technical teams that focus on technical level enterprise data issues. An important aspect of the M&S COI is to foster collaboration among other active and effective DoD COIs, as well as collaboration across other organizations within the defense community. The M&S COI structure also includes expedient working groups and stakeholder forums that are part of the overall collaboration effort for specific project-focused or short-term efforts involving M&S enterprise data.

## ABOUT THE AUTHORS

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## INTRODUCTION

### Background

In June 2004, the Modeling and Simulation (M&S) Community of Interest (COI) was established by the Director, Defense Modeling and Simulation Office (DMSO) through coordination with the Office of the Assistant Secretary of Defense for Networks and Information Integration (OASD(NII)). A set of Operating Guidelines were developed to charter the M&S COI, following guidance and policy that is described in the DoD Net-Centric Data Strategy (NCDS) (DoD CIO, 2003), Data Sharing in a Net-Centric DoD (ASD(NII), 2004) and the Guidance for Implementing Net-Centric Data Sharing (ASD(NII), 2006). The NCDS describes a vision for a net-centric environment for the DoD and seven overarching data goals for achieving that vision:

- Make data visible.
- Make data accessible.
- Enable data to be understandable.
- Enable data to be trusted.
- Support data interoperability.
- Be responsive to user needs.
- Institutionalize data management.

These DoD CIO documents address the concepts of (1) a Community of Interest to address organization and maintenance of data, (2) Metadata for discovery of data assets, and (3) Enterprise Services to help realize a net-centric environment for the searching, sharing, and retrieval of tagged data. The net-centricity vision is to leverage all data as either enterprise assets or community assets. The intent is to decrease private data and increase enterprise and community data in order to enable increased discovery, sharing, and reuse of commonly usable data, and COIs help achieve this. A COI is "a collaborative group of users that must exchange information in pursuit of its shared goals, interests, missions, or business processes and therefore must have shared vocabulary for the information it exchanges," as defined in the NCDS.

## Mission

The M&S COI is an important aspect of implementing the DoD M&S Enterprise Data Strategy (McGroder and Lashlee, 2011). The M&S COI is a collaborative group of M&S users and stakeholders whose mission is to:

*Make M&S data and data-related tools & services visible and accessible to the Components and Communities enabled by M&S; align M&S data with the DoD Net-Centric Data Strategy; and provide a collaborative forum to advise, educate, and influence the Department on M&S enterprise data issues.*
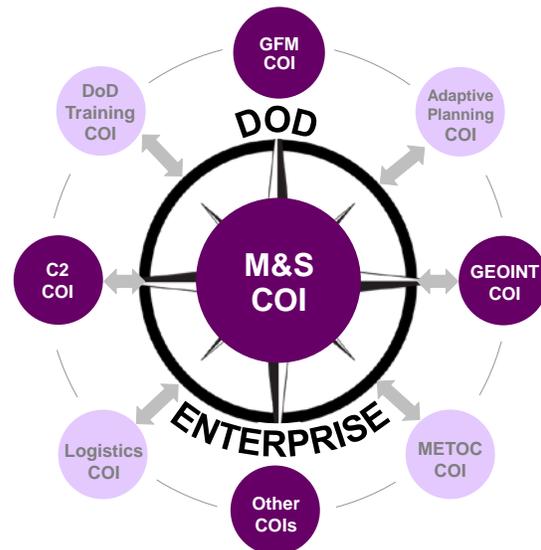


Figure 1. Collaboration among DoD COIs

A major focus is to increase technical collaboration within the DoD Enterprise, where the M&S COI will work with multiple existing DoD COIs that have missions and data related to M&S, such as the Global Force Management (GFM) COI, the Geospatial Intelligence (GEOINT) Standards COI, and the Command and Control (C2) Interoperability COI. Figure 1 portrays the collaboration concept for DoD Enterprise-wide activities. The M&S COI and these COIs (in violet) are already active and effective in their

domains, meaning they are currently working on data sharing issues and are able to affect changes related to operational requirements and program objectives. These COIs on the four compass points (violet) are especially important to initial efforts within the M&S COI in the near term for current projects, while all COIs shown are for collaboration over the longer term. This DoD Enterprise collaboration can also grow beyond these COIs, to include other COIs still forming or proposed and other organizations within the Defense community.

**Scope**

This paper focuses primarily on the COI concept of the data vision, and how the M&S COI is implemented in order to bring about the necessary collaboration for M&S data, metadata and data-related tools and services across the DoD Enterprise in addition the M&S Enterprise. The paper also presents information on the updated M&S COI Operating Guidance, which addresses current M&S management in the Department, organizational changes within the OASD, Acquisition, Technology & Logistics (AT&L), and new aspects of the COI and its roles, responsibilities, and procedures. It has been updated to reflect a broader, more expansive concept for the M&S COI that includes outreach beyond M&S towards further collaboration with stakeholders across DoD. A major extension to the structure of the COI is introduced, through establishment of the Data Management Working Group (DMWG), as well as updated procedures for other working groups, technical capability and integrated product teams, and stakeholder forums.

## M&S DATA CHALLENGES

Currently, there are several critical issues regarding M&S data generation, discovery and sharing. Typically, each community and Service independently develops their own M&S data within their area of responsibility. The end results of this are that it ends up being too costly for the Department, too time consuming to build, and when built, it is very difficult to find the data or it is not accessible. Often, the data is not shared, not enhanced, and not correlated. And once the data is used, whether for a specific experiment, operational test, or training event, it is not reused across the communities. Generating simulation-ready data from disparate datasets takes considerable time and money, and is on the critical path to successful M&S execution. The M&S COI should be used to help address these problems and limitations of current practice.

There is also a critical need to discover M&S data, tools, and services for enabling their effective reuse and

for reducing duplicative M&S efforts in the DoD. Visibility, accessibility, and interoperability are keys to optimizing the investment of billions spent each year by the DoD on M&S. The mantra of reuse has been known and communicated for some time now, but since M&S asset reuse is not as effective or frequent as it could be, the potential benefits are still not being realized across the DoD Enterprise, or even the M&S Enterprise.

A DoD M&S Enterprise Data Strategy was developed by the Modeling and Simulation Coordination Office (M&SCO) in 2011 in order to better address these and other challenges. This strategy is centered on five overarching goals to address enterprise-level issues regarding M&S data, that is, data supporting and resulting from modeling and simulation (Figure 2). These goals cut across policy, governance, management, production, standards, tools, and services that are all related to data affecting the M&S Enterprise.

The M&S Enterprise is the portion of the DoD Enterprise that is enabled by M&S, which refers to M&S across a broad set of defense community organizations: the DoD, other defense and intelligence related federal agencies, defense research laboratories, plus the defense industry and academic institutions that support defense. The scope of the M&S Enterprise specifically includes the Components within DoD: the Office of the Secretary of Defense (OSD), the Military Services: Army, Navy, Air Force, and Marine Corps, plus the Joint Staff and the Combatant Commands (COCOMs). The M&S Enterprise also covers the seven communities that DoD recognizes as highly enabled by M&S, which is an organizing framework used by DoD for M&S governance and management: Acquisition, Analysis, Experimentation, Intelligence, Testing, Training, and Planning communities.

| **M&S Data Goals** |
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| **1.** Standards, architectures, networks, and environments that promote M&S data accessibility and a culture of sharing. |
| **2.** Policies that promote sharing, appropriate use, and reuse of M&S data. |
| **3.** Production, management, and governance of M&S data. |
| **4.** Tools and services for accessible and trusted M&S data. |
| **5.** Workforce skilled in the production, management and use of M&S data. |

Figure 2. Data Goals for M&S

As part of a sound action plan to implement this M&S Enterprise Data Strategy and achieve these data goals for the M&S Enterprise, as well as specific underlying objectives, the intent is to leverage the COI concept for

M&S as a way to further enable collaboration, visibility, and sharing of M&S data, tools, and services throughout the wider DoD Enterprise. An M&S Enterprise Data Action Plan is also under development, and the M&S COI should be involved in many of the underlying implementable actions. It is clear that the updated M&S COI structure, roles and responsibilities, and operating procedures are necessary to ensure the successful implementation of a more expanded COI to provide solutions to M&S enterprise data issues faced by the Department today and in the future.

## M&S COI SCOPE

The M&S COI is currently designated as both active and effective, for its COI status, as registered on the DoD Metadata Registry (MDR). For a COI to be considered active, it means that it is actively working on data sharing problems. To be effective means that it is able to effect changes in operational requirements and/or program objectives, that is, Operational Requirements Documents (ORDs) and Program Objective Memorandums (POMs) are being affected.

In the development of COIs, the scope and focus of its working groups (WGs) and technical teams needs to be considered. The guidance on COIs define the concepts of institutional and expedient groups. An institutional COI or WG is persistent in nature, and the intention is for the group to remain in place for the long-term, or as long as technical enterprise-level data issues need to be addressed. An expedient COI or WG is usually focused on a more short-term problem or task, or it is focused on a specific funded project, and it will remain in place until the project is concluded or the problem is solved. For example, expedient groups have been used at times for pilot demonstrations that created short-term teams dedicated to a "proof of concept" problem. So, the M&S COI is expandable and dynamic; working groups or teams may be established and disestablished within the COI as needs arise. To be clear, the M&S COI itself is an institutional, persistent COI that is dedicated to long-term collaboration for data sharing, data management, and data reuse and interoperability.

In order to further advance the COI concept for the M&S Enterprise, the M&S COI DMWG was established with a kick-off meeting held in April 2011. The DMWG is an institutional technical working group with a mission to:

*Focus on persistent M&S enterprise data issues and coordinate M&S data requirements, standardization, management and best practices within the M&S COI and among other COIs.*

The DMWG focuses on data-related technical issues and activities, and they report their progress regularly to the M&S Integrated Process Team (IPT) and M&S Steering Committee (SC), who provide advice and assistance to the USD(AT&L), as well as the M&S COI. Funded projects make use of the DMWG and other working groups, where applicable, for technical products, recommendations, and enterprise-level data issues, to include:

- Technical Issues
- Technical Approaches
- Technical Artifacts
- Deliverables of specific High Level Task (HLT) projects

The DMWG is organized as a set of technical capability teams that are focused on a particular aspect of data management for M&S enterprise data. Initially, the teams align with the areas of data, metadata, and data-related services and tools, with an additional team focused on the specific domain of threat data. The following are the current DMWG technical capability teams:

- o Enterprise Data Team
- o Metadata Discovery Team
- o Enterprise Services and Integration Team
- o Threat Data Team

### DoD M&S Policy

The organization and implementation of the M&S COI follows DoD policy on M&S, with M&S CO taking on the role of leading the COI activities. According to policy (DoD, 2005), the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) is the Principal Staff Assistant and advisor to the Secretary of Defense for all matters relating to M&S, and the M&S CO is the OSD office responsible for supporting the USD(AT&L) in the execution of his M&S responsibilities. In addition, the M&S CO is designated to be the focal point for the coordination of all matters related to M&S (USD(AT&L), 2007). And per DoD guidance (DoD 8320.02-G, 2006), M&S CO has committed to driving the M&S COI to a data sharing solution.

The USD(AT&L) has several M&S responsibilities and functions, with major emphasis on establishing and maintaining the DoD management and administrative structure for M&S, in accordance with the DoD Directive, M&S Management (DoDD 5000.59, 2007). The USD(AT&L) is responsible for developing

policies, plans, and programs to coordinate, harmonize, and rationalize DoD M&S. A major function is to ensure that DoD M&S investments support operational needs and the acquisition process; the development of common tools, methodologies, and databases; and the establishment of standards and protocols promoting interoperability for data exchange, open system architecture, and software reusability.

Also according to DoDD 5000.59, it is policy that M&S management shall develop plans and programs that pursue common and cross-cutting M&S tools, data, and services to achieve DoD's goals. These goals shall be achieved by promoting visibility and accessibility of models and simulations; leading and guiding investments in M&S; assisting collaborative research, development, acquisition, and operation of models and simulations; maximizing reuse and interoperability; maximizing efficiencies and effectiveness of M&S; and supporting DoD Communities that are enabled by M&S. The mission, objectives, and operating guidelines of the M&S COI are in line with the DoD policies that govern M&S management, as well as the roles and responsibilities of the USD(AT&L) and the M&S CO.

**M&S COI STRUCTURE AND ORGANIZATION**

As noted earlier, the M&S COI was established and structured according to DoD guidance in the NCDS and the guide to COI implementation. The current M&S COI structure diagram is very similar to the template provided by the CIO as DoD guidance for establishing a COI and presenting during a kick-off meeting (DoD CIO, 2007).

The USD(AT&L) is the governing authority for the M&S COI, and the M&S CO Director serves as the Chair of the M&S COI. Also, the communities enabled by M&S, the Services, and others serve as stakeholders. The M&S COI operates under the USD(AT&L) with advice and assistance from the M&S IPT and the M&S SC. The M&S COI contains enterprise-level institutional working groups, currently including the Data Management Working Group and the Joint Training Terrain (JTT) Integrated Product Team (IPT). The M&S COI also contains expedient and/or project-focused groups. These are the Stakeholder Forums that may be formed for specific HLTs, plus any additional working groups as needed. The currently established structure is shown below in the diagram in Figure 3.
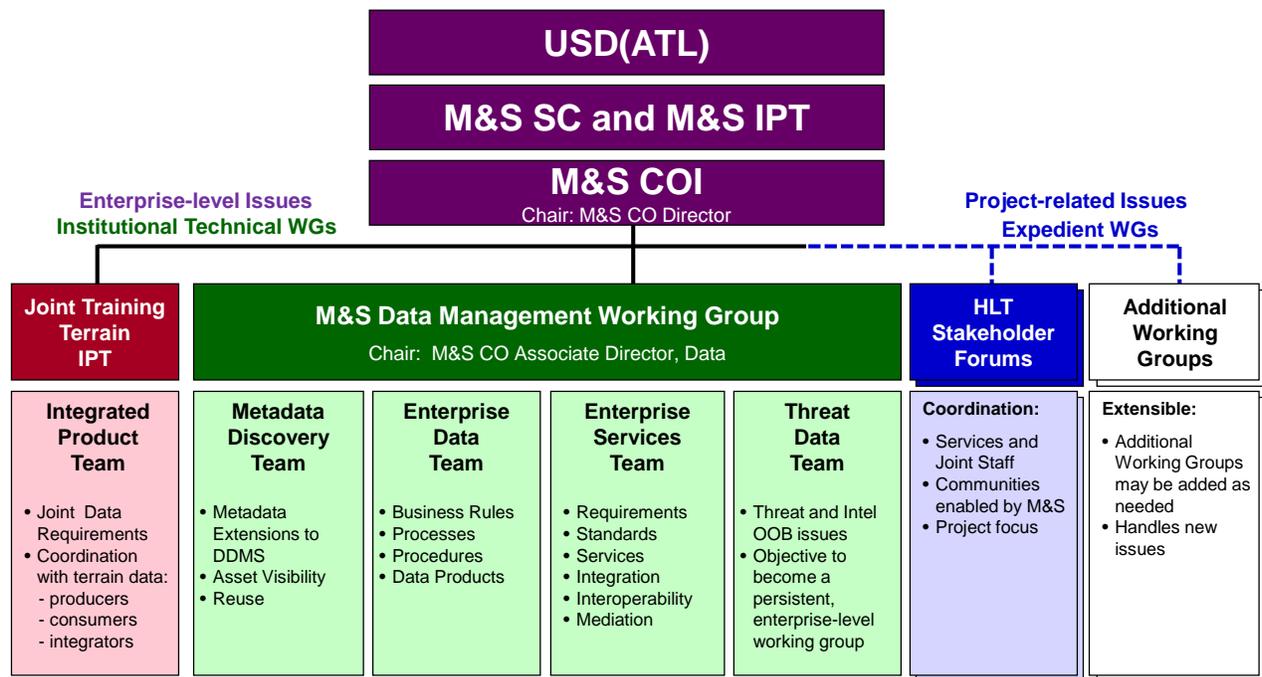


Figure 3. The M&S COI Structure

## Data Management Working Group

The DMWG is focused on data management in the areas of data, metadata, and data-related services and tools. The individual technical capability teams work at the technical level for each of these areas, but necessarily need to coordinate across all teams for obvious interrelated and overlapping functions.

The Enterprise Data Team handles enterprise data issues as well as data products that are HLT deliverables. The Metadata Discovery Team handles issues of M&S asset visibility and reuse, focusing on discovery metadata and the extensions necessary for M&S and related domains, e.g., Geospatial extensions to DoD and M&S metadata specifications. The Enterprise Services and Integration Team works in multiple areas involving data-related tools and services for M&S and coordinates any work involving DoD enterprise data services. These multiple areas include requirements, standards, services, integration, interoperability, and mediation involving M&S data. The Threat Data team handles Threat data and Intelligence Order of Battle (OOB) issues. There is potential for this team to later become a persistent, enterprise-level working group of the M&S COI.

## Joint Training Terrain (JTT) Integrated Product Team (IPT)

The primary purpose of the Joint Training Terrain (JTT) Integrated Product Team (IPT) is to collect, validate, and prioritize requirements across the community to support accurate digital representation of terrain and features in computer models and simulations. Although there are many differing applications and requirements, the commonality of data sources and terrain modeling tools lends itself to common investment strategies. Defining, organizing, and prioritizing future requirements will reduce redundancy and enhance data providers and tool developers' ability to provide useful and cost effective products. A secondary purpose is to collect, disseminate, and coordinate work from existing digital terrain working groups among a larger audience. The establishment of this team as part of the M&S COI is an opportunity for existing groups and work centers to discover parallel efforts and leverage the work being done across the Joint Modeling and Simulation Training Community. This team will do the technical work and coordination necessary based on the requirements of the users. These users will be solicited on what tools and methods best promote open exchange among this community.

## HLT Stakeholder Forums

Stakeholder Forums for specific HLTs are comprised of the M&S IPT and SC Leads that support the goals of the HLT project and have claimed a stakeholder interest.

## M&S COI Extensions

The M&S COI is extensible and scalable, with the option for creation of additional working groups as needed. The original DoD CIO concept of a COI allows for expansion, where new working groups and teams may stand up as needed (or stand down as the case may be), for current or planned collaboration and sharing efforts, and for specifically funded projects that have a short-term duration.

## M&S COI OPERATIONS

### Membership

According to DoD Guidance, COI participation should be Cross-Component, Cross-Service, Cross-Agency, and Multi-National, with the intention to be inclusive in order to address an information sharing mission or challenge. The membership of the M&S COI comes from a broad range of organizations in these categories that are involved in M&S for the Defense community. With the M&S CO Director as Chair of the M&S COI, many major organizations within DoD should provide representatives as members of the M&S COI. These include the Component M&S Organizations: the Army Modeling and Simulation Office (AMSO), the Navy Modeling & Simulation Office (NMSO), the Air Force Agency for Modeling and Simulation (AFAMS), and the Marine Corps M&S Management Office (MCMSMO). Also, since operational representation is very important, membership should include representatives from the Combatant Commands as well as other Service offices. In addition, various Defense and Intelligence agencies can provide members. Organizations represented on the M&S SC and M&S IPT are important stakeholders and can provide members. While not an exhaustive list, these additional categories of participants and organizations can also provide members to the M&S COI:

- Participants from:
  - Other DoD COIs
  - Other Military and Government Agencies

- o Industry
- o Academia
- o International Partners
- o Others as deemed appropriate by the Chairs.
- M&S Developers and End Users
- M&S Data Producers, Consumers, and Integrators
- Subject Matter Experts in M&S

**Roles and Responsibilities**

As stated, the role of the M&S COI Chair is represented by the M&S CO Director. The Chair establishes mission-specific success criteria and informs the M&S IPT and the M&S SC of COI activities. His responsibilities also include the promotion of policies and best practices for M&S data sharing, and he ensures appropriate collaboration with other DoD COIs. The Chair also participates in DoD COI Forums when they occur.

*DMWG*

The M&S CO Associate Director for Data serves as DMWG Chair. In this role, he represents the M&S COI Chair on the DMWG and assists the M&S COI Chair in promoting policies and best practices. The DMWG Chair also promotes data sharing and participation with the other DoD COIs, and provides technical advice and assistance to the project stakeholder forums made up of M&S SC and IPT members. Major responsibilities are to plan, conduct and report DMWG activities, and to provide guidance to other institutional working groups. The DMWG Chair also conducts technical reviews of artifacts produced by the capability teams.

*DMWG Technical Capability Teams*

*Enterprise Data Team*: This team coordinates the M&S COI with other COIs and with the DoD CIO Enterprise Data Team. It is also involved in the M&S Enterprise Data Strategy and assessing the progress of the HLTs implementing this strategy. The team also advises the HLTs on all M&S Enterprise Data issues.

*Metadata Discovery Team*: This team manages metadata requirements, in order to enable discovery of M&S Data, and coordinates data discovery activities with HLTs and other DoD metadata efforts. The team also socializes and maintains the data terminology in the M&S Glossary. The ultimate purpose is to determine the best data discovery technology solutions.

*Enterprise Services and Integration Team*: This team coordinates HLT activities with the DoD CIO and with DoD enterprise services activities. The team determines existing and emerging enterprise services for HLTs to leverage. It also advises HLTs on compliance with the DoD Net-Centric Services Strategy (NCSS).

*Threat Data Team*: This team manages Threat data and Intelligence Order Of Battle data issues. It coordinates Threat data integration into data production activities for M&S, as well as determines the tools suitable for this integration. The team also coordinates M&S data needs with the appropriate Intelligence Agencies.

*HLT Stakeholder Forums*

The M&S IPT Lead for a HLT serves as the corresponding HLT Stakeholder Forum Lead. In this role, he represents the M&S SC HLT Lead within the M&S COI and provides HLT project guidance, and he provides technical requirements to and reviews technical recommendations from the M&S COI. The Stakeholder Forum leads also are responsible for the reviews and approval of HLT deliverables.

**Operating Procedures**

The M&S COI operating procedures are similar to the M&S SC and M&S IPT operating rules, as described in the Draft DoD Modeling and Simulation Management Operating Rules (DoD, 2008). In order to conducting effective working group and technical team meetings, the standard meeting outline will be used and a business agenda will be set for each meeting. The M&S COI DMWG generally meets four to six times a year for technical interchange with the M&S stakeholders. The Technical Team meeting frequency will be determined by the team leads.

For transacting business at these meetings, the standard protocols for issue presentation, discussion of the issue, and decision on the issue will be used. Decisions will not be arrived at by voting. Arriving at a decision will be made based on a review of the majority view and minority review of the issue, with the Chair making a final recommendation.

The DMWG will have administrative support for conducting meetings and recording of the meetings' proceedings. The DMWG also has support to facilitate coordination on RDG HLT artifacts, deliverables, and other requirements as resources permit.

## SUMMARY

The M&S Community of Interest was established and chartered in 2004, and is currently active and effective in the M&S Enterprise. The structure, organization, and governance of the M&S COI are grounded in DoD M&S Policy. DoD Enterprise COI Guidance from the Net-Centric Data Strategy and related documents informed the establishment, as well as the updated structure expansion that includes the Data Management Working Group and HLT Stakeholder Forums. In order to move forward towards efficient solutions in the areas of M&S data, metadata, and data-related services and tools, the M&S COI will work towards increased technical collaboration, both within the M&S Enterprise, and across the DoD Enterprise. This wider collaboration needs to include outreach to other existing active and effective DoD COIs, as well as other important stakeholders in the broader defense community. Since the M&S COI has defined roles and responsibilities, inclusive membership, and documented operating guidelines and rules, the intent is communicate this to a broad audience and encourage further participation and new membership. An important point is that the M&S COI is evolving, and it follows the original intent of the COI concept, An expansion in membership and an addition of highly focused working groups and teams is welcome and encouraged in the M&S COI, in order to bring about solutions for M&S enterprise data issues for the Department, today and into the future.

## ACKNOWLEDGEMENTS

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