

Modeling and Simulation (M&S) Operational Training Data Concept Plan



(Version 1.3 – 23 Sep 2022)

FOREWORD

This plan focuses on how to implement the effective collection, curation and employment of data as a strategic asset for optimizing M&S enabled Training and Readiness. By approaching this as a collective among the Air Force (AF) M&S Training enterprise, we can more effectively share costs, and provide information for knowledgeable decisions across Air Force Modeling & Simulation functional areas. This plan is the first step to establish the Air Force's strategic framework for transforming to a data-driven organization – one that values and leverages data as a strategic asset in all missions and operations to achieve warfighting advantage at the speed of operations.

The current objectives of this plan are to create a Community of Interest (COI) that synchronizes Major Commands (MAJCOM) M&S data owners' and M&S process owners' efforts to establish visibility and accessibility of their datasets. Air Force Agency for Modeling and Simulation (AFAMS) is the Implementing Agent of this Data Concept Plan and I recommend the MAJCOM COI work with AFAMS to meet the Department of the Air Force's (DAF) strategic goals of Visible, Accessible, Understandable, Linked, Trusted, Interoperable and Secure (VAULTIS) data.



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1.0 Introduction

1.1 Background:

The United States Air Force (USAF) relies on widespread and diverse M&S capabilities to accomplish its mission sets. USAF employment of M&S has grown significantly since the 1990's, but development and implementation efforts have been localized rather than unified. In other words, USAF communities have developed and/or acquired singular M&S applications in isolation, sometimes redundantly or exclusively, to advance their particular missions. .

Finding and using data suitable for a specific training exercise, task, or application **that may reside outside of an organization** is a non-trivial, time-consuming, and often expensive activity. In many instances, training data that is found is sub-optimal, and requires the consumer to rely on expert knowledge to assess (determine fitness for use), access, and transform the desired data to meet the intended need. Current data preparation processes are labor intensive, cannot support training critical timelines, and are unsustainable in a dynamic training environment.

1.2 Problem Statement:

The Department of the Air Force (DAF) policy “Enterprise Data Sharing & Data Stewardship” (DAFi90-7001) states that “data will be visible and accessible to Department of the Air Force entities except where constrained by law, regulation, security classification, guidance, or policy”. Currently, M&S lacks an enterprise-wide technical and procedural process for discovering, retrieving, and transforming available and appropriate training data necessary to support operational force training, exercises and activities. There have not been consistent data governance policies (on coordination) and data standards (formats and protocols) informed by inputs from all levels of operations (strategic, operational and tactical) which are so important to ensuring that synthetic training environments from all of the services are able to interface and interoperate.

The DAFi90-7001 specifically instructs the data stewards to control and provide oversight of their data assets to supply users with high-quality and easily accessible data. However, as M&S enterprise currently stands, it is difficult for developers and users of synthetic training applications to discover and gain access to the data required to meet their mission objectives.

1.3 Approach:

To rapidly produce relevant and integrated training data products – that can support the evolving live, synthetic, and blended training requirements – the M&S Training enterprise requires a comprehensive and coherent approach to establish the ability to provide on-demand data and data services.

Move the data system used for synthetic training from a monolithic community of excellence model to a common data centric architecture. In this effort, the M&S community will develop sharable datasets that can be used to stimulate all simulations and eliminate duplication of

efforts across the USAF and USSP. Develop the synthetic training component of the DAF Data Fabric by using the tools available in the Big 6 data platforms for the synthetic training use case. More information about the Big 6 data platforms, which are Envision, BLADE, ELICSAR, SIGNUS, UDL, and VAULT, can be found on the DAF/CDAO SharePoint site (<https://usaf.dps.mil/sites/13057/CND/Shared%20Documents/PhaseIII/23/DAF-Data-Platforms.aspx>).

1.4 Assumptions:

The following assumptions were used in developing this Concept Plan:

- Organizations who develop and use synthetic training environments have begun assessing their training data per the DAF Data Maturity Assessment model. This model is based off the Federal Government Data Maturity Model and consists of six maturity areas, four factors and five levels. (<https://community.max.gov/x/paUzfw>)
- The initial focus of this effort is on Unclassified/Controlled Unclassified Information M&S training data. Once Unclassified/Controlled Unclassified Information is proven, the efforts will be vectored to Classified data to support the entire ecosystem.
- M&S training data is defined as the common data set required to stimulate synthetic training environments and a standardized set of outputs to facilitate analytics.
- This M&S training data Concept Plan is using the phased approach directed by the DAF I-Plan. It seeks to make data visible and accessible (VA) as the foundation for the rest of VAULTIS as shown in **Figure 1**. All other parts of DoD VAULTIS will be developed in subsequent phases.

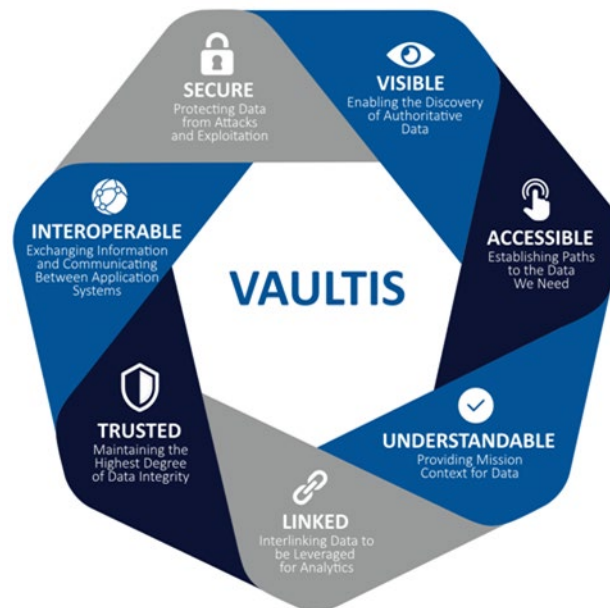


Figure 1. DoD and DAF VAULTIS

- No duplication of effort will occur. All existing data platforms will be considered before designing new capabilities and all cataloging capabilities will integrate with existing capabilities as part of the DAF Data Fabric.
- Data Security will comply with all DoD and DAF requirements and integrate with DAF Data Fabric.
- The data vignette and use case developed within the Community of Interest will have a set of key deliverables – e.g., common data and metadata models, required coding and programming and digital technology requirements in order to ensure mission success.

1.5 Scope:

This Concept Plan focuses on operationally relevant M&S training data, specifically the framework and resources essential to accomplishing each MAJCOM’s operational training objectives as well as our allies and partners where appropriate. The M&S Operational Training organizations included in this Concept Plan are Air Combat Command, Air Education and Training Command, Air Force Global Strike Command, Air Force Materiel Command (in particular, AFMC’s AF Life Cycle Management Center (AFLCMC), and the Air Force Research Laboratory (AFRL)), Air Force Special Operations Command, Air Mobility Command, Pacific Air Forces, United States Air Forces in Europe, Air Force Reserve Command, Air National Guard and AFAMS.

2.0 Vision and Goals

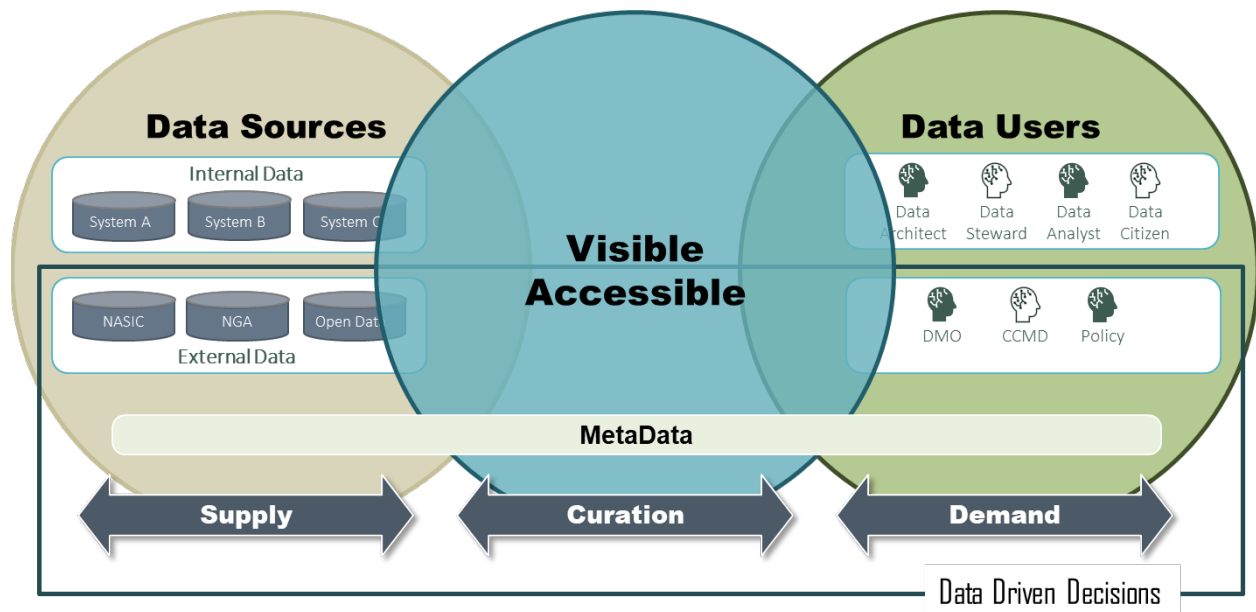


Figure 2. Data Catalog Providing Visibility and Accessibility

2.1 Vision:

The desired end state of this Concept Plan is to achieve the ability to discover, retrieve, integrate, and transform M&S training data across and between the Office of Coordinating Responsibility

(OCR) MAJCOMs. As shown in **Figure 2**, this will link the supply and demand side of data enabling a Data Catalog to support Visibility and Accessibility.

2.2 Goals:

The goals of this Concept Plan are:

- Reduce the time to prepare training data products,
- Minimize the cost to produce integrated training products,
- Improve the quality of sharable training data, and
- Enable coordination of data initiatives.

Authorized users must be able to discover training data that already exists, which should have sufficient metadata to assess its potential for reuse. Authorized users with appropriate access credentials must have the ability to **retrieve** the data online, when practical, or otherwise through timely delivery. They must have the tools and services that allows them to **integrate** data from multiple sources and products, as well as **transform** the data into a form suitable for their application.

The projected roadmap for engagement with COI to initiate implementing efforts (Data Catalog addressing Visibility and Accessibility) is shown in **Figure 3**.

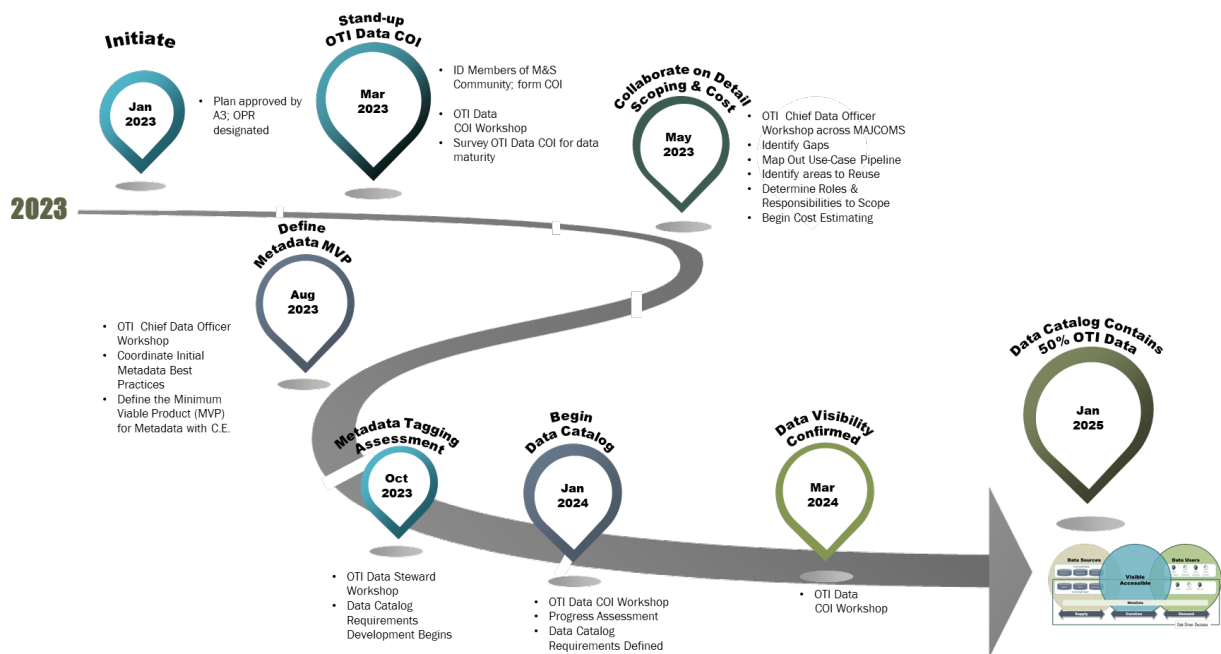


Figure 3. NOTIONAL Projected Roadmap for Engagement with Community of Interest

3.0 Lines of Effort

There are three Lines of Effort (LOE) to implement this Concept Plan and achieve the desired end state: Data Visibility, Data Accessibility, and Process Implementation (See **Figure 4** below).

AFAMS will act as the Implementing Agent for the Concept Plan and is designated as the Office of Primary Responsibility (OPR). The MAJCOMs identified in the Scope are designated OCR.

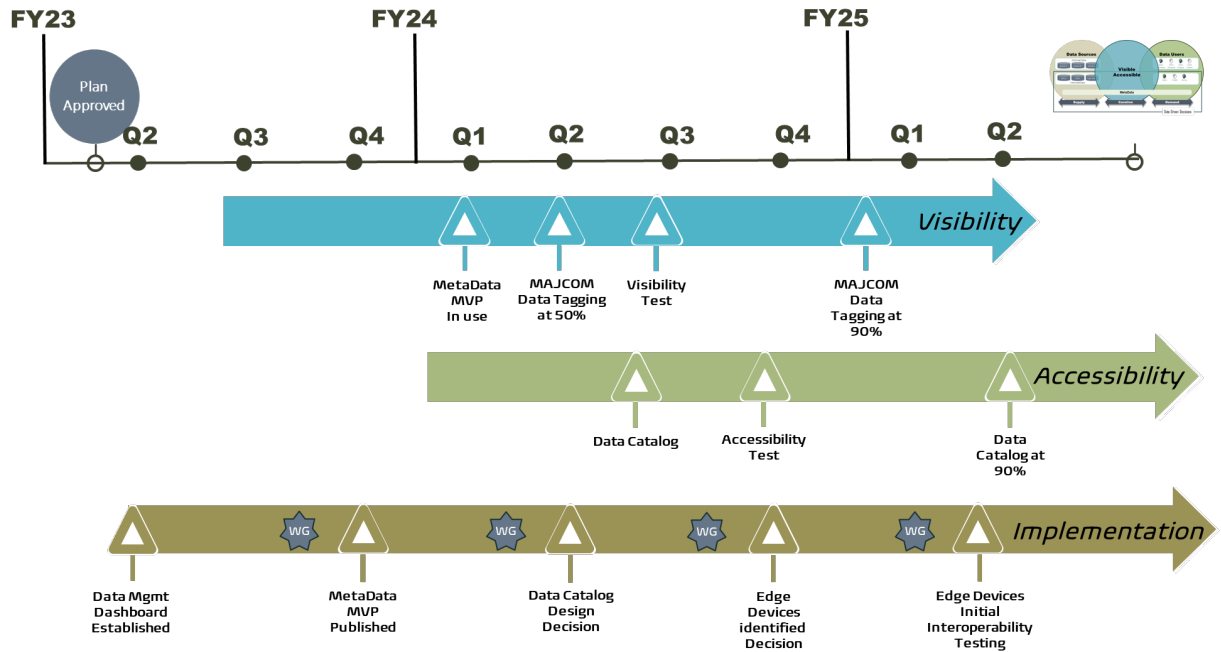


Figure 4. Lines of Effort with NOTIONAL Timeline

3.1 Implementing Agent:

This Data Concept Plan is AFAMS’ response to DAF Data Fabric Memo November 11, 2021 “Data Migration Guidance for Department of the Air Force Enterprise Data Services,” and to the Operational Training Infrastructure 2035 Flight Plan Supplement for Operational Modeling and Simulation (June 2020), Annex D, Tasks 2 (a) and (c) which directed AFAMS to develop guidance to make Operational M&S training data visible, accessible, understandable, linked & trusted IAW AF CDO policy. This Concept Plan is a start towards developing that guidance. On 22 April 2021, the Air Force published AFI 90-7001, *Enterprise Data Sharing & Data Stewardship*. This AFI directs that “Data will be visible by creating and associating metadata (“tagging”), including discovery metadata, for each asset. Metadata standards will comply with applicable national and international consensus standards for metadata exchange. These metadata standards will be in accordance with DoDI 8320.02” (para 1.2.1.1).

AFAMS, as Implementing Agent, is responsible for guiding the coordination efforts of the MAJCOMs to establish visibility and accessibility of their selected training data sets. AFAMS will conduct a series of working group sessions where participants will collectively determine various aspects of the data governance rules for the effort as well as the technical aspects of the LOEs. In addition, AFAMS will work with MAJCOMs to determine the data catalog options from the AF Big 6 Data Platforms.

The OCR will actively participate in the working groups, identify their selected training data sets to be included in the visibility and accessibility LOEs, and the edge devices accessibility tests. The OCR will retain responsibility for the life cycle management of their data to be used in the effort.

Prior to beginning the Concept Plan, AFAMS will establish a Data Management Dashboard (See **Figure 2** above). The Dashboard will be the effort's collaboration and coordination tool, where the execution progress of this Concept Plan will be posted. The Dashboard is intended to be a repository for all information developed as part of the effort. For example, all meeting read-aheads and outcomes will be kept here, as well as relevant references and white papers. In addition, AFAMS will post a proposed metadata minimum viable product (MVP) on the Dashboard, which will be discussed at the first working group. AFAMS will provide information for accessing and using the Dashboard once established and functional. The Data Management Dashboard and Data Catalog serve separate function. The Data Management Dashboard drives the Data Concept Plans implementation, and the Data Catalog supports data visibility and data accessibility based on metadata.

The effort to organize, coordinate and sustain the LOEs of this Plan will be significant. The Implementing Agent will be required to initiate, coordinate, and establish continuity for the series of working groups identified in the Process Implementation LOE with and between the various MAJCOM OCRs. This will require continuous outreach and coordination efforts by the Implementing Agent staff to ensure the various MAJCOM efforts are informed of progress and lessons learned by all of the OCRs. In addition, the Implementing Agent will require substantial expertise in AF Enterprise data management to guide the individual and overall effort on behalf of the USAF. AFAMS is under-resourced with data management expertise, the COI will work together to identify organizations who can assist with implementation.

3.2 Data Visibility LOE:

The objective of this LOE is to make the COIs selected M&S training data sets visible between the participating and emerging meta-data standards that come out of DoD/CDAO and DAF/CDAO.

LOE Measures of Performance:

- Metadata MVP in use by the MAJCOMs
- MAJCOM Data Tagging achieved for 50% of each MAJCOMs' identified training data within the notional timeline of Q2 of FY24
- Data visibility achieved for and between each MAJCOM within the notional timeline of Q3 of FY24
- MAJCOM Data Tagging achieved for 90% of each MAJCOMs' identified training data within the notional timeline of Q1 of FY25.

3.3 Data Accessibility LOE:

This LOE will result in the COI selected M&S training data sets being accessible by all COI participants, initially using the data catalog. The ultimate goal of this LOE is to have data accessed and used by each community's selected edge devices.

LOE Measures of Performance:

- Data catalog schema in use by each MAJCOM within the notional timeline of Q2 of FY25
- Extract, transform, and load (ETL) started by each MAJCOM for their identified training data within the notional timeline of Q3 of FY24
- Data accessibility achieved for and between each MAJCOM through the data catalog within the notional timeline of Q4 of FY24
- Data catalog has access to 50% of each MAJCOMs' identified training data within the notional timeline of Q2 of FY25

3.4 Process Implementation LOE:

This LOE is key to the success of the Concept Plan and begins within the notional timeline of Q4 of FY22. Participation in the working group sessions will drive the process. Key working group decisions include:

- Makeup of the metadata MVP (schema, data dictionary, etc.) in accordance with the relevant M&S metadata standards within the notional timeline of Q4 of FY23
- Selection of an edge device by each community participant to use shared data by the notional timeline of Q2 of FY25

The result of this collaborative effort will be an understanding of how to make M&S training data visible and accessible for use between MAJCOMs.

4.0 Summary

This Concept Plan focuses on the framework required to meet the vision to enable rapid discovery, retrieval, integration, and transformation of M&S Training data to support operational M&S training activities. While units across the Air Force are assessing their data per DAF Data Maturity Assessment and tagging their data internally, AFAMS will facilitate the MAJCOMs' efforts to establish visibility and accessibility of their selected training data sets. In-turn, the MAJCOMs will actively participate in the M&S Training Data working groups to identify training data sets and meet the visibility and accessibility LOEs. This collaborative effort will demonstrate that data, properly prepared according to common standards and managed, can be used to better support training activities and exercises by reducing preparation time for and increasing the effectiveness of those training activities and exercises. This effort should directly support our ability to train and equip the most elite, combat-ready Air Force possible for rapid expeditionary operations.

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