Role Based Matrix Area	Model-Based Capability Name	Capability Description
1. Workforce/ culture	MBSE Use Strategy	This is documenting the Digital Engineering/Model Based System Engineering (DE/MBSE) strategy as part of the overall strategy an organization has to provide the system/system-of-systems/enterprise. The concept is that DE/MBSE is used as it benefits the overall work and result.
1. Workforce/ culture	Common DE and MBSE Terminology	A set of lexicon, taxonomies and glossaries with known precedence.
1. Workforce/ culture	Modeling Roles and Responsibilities	Roles and responsibilities may include such modeling roles as: enterprise manager, program/project manager, SE, IT, Modeler, policy maker, contracting, model curator, model manager, model data manager, ASOT configuration manager or others.
1. Workforce/ culture	Modeling Development Skills	More than just modeling tool expertise. This includes expertise in model structure/architecture that supports all subsequent uses.
1. Workforce/ culture	Modeling Use skills	This covers a role that all government or acquirer team members must have to conduct model based acquisition.
1. Workforce/ culture	Modeling-related Training/KSA development	Multilevel training series, including "hands-on" real world(-like) execution.
2. SE Processes/ Methodology	SE Agreement Process	This is a rollup of ISO/IEC/IEEE 15288.1 paragraphs 6.1.1 and 6.1.2. Matrix Users may want to replace this line item with the set of processes that are most important to their application. The stage descriptions may be the same for each process or tailored. Agreement Processes include: ► Acquisition ► Supply
2. SE Processes/ Methodology	SE Organizational Project-Enabling Processes	This is a rollup of ISO/IEC/IEEE 15288.1 paragraphs 6.2.1 to 6.1.6. Matrix Users may want to replace this line item with the set of processes that are most important to their application. The stage descriptions may be the same for each process or tailored. Organizational Project-Enabling Processes include: ► Life Cycle Model Management ► Infrastructure Management•Portfolio Management ► Human Resource Management ► Quality Management ► Knowledge Management
2. SE Processes/ Methodology	SE Technical Management Processes	This is a rollup of ISO/IEC/IEEE 15288.1 paragraphs 6.3.1 to 6.3.8. Matrix Users may want to replace this line item with the set of processes that are most important to their application. The stage descriptions may be the same for each process or tailored. 6.3.1 Project Planning, 6.3.2 Project Assessment and Control, 6.3.3 Decision Management, 6.3.4 Risk Managment, 6.3.5 Configruation Management, 6.3.6 Information Management, 6.3.7 Measurement, 6.3.8 Quality Assurance
2. SE Processes/ Methodology	Model Configuration Management	ISO/IEC/IEEE 15288.1 paragraph 6.3.5. Configuration Management.
2. SE Processes/ Methodology	Model Data Management	ISO/IEC/IEEE 15288.1 paragraph 6.3.6. Information Management.
2. SE Processes/ Methodology	SE Technical Processes	This is a rollup of ISO/IEC/IEEE 15288.1 paragraphs 6.4.1 Business or Mission Analsysisand 6.4.14. Disposal. Matrix Users may want to replace this line item with the set of processes that are most important to their application. The stage descriptions may be the same for each process or tailored.
2. SE Processes/ Methodology	Modeling Stakeholder Requirements	ISO/IEC/IEEE 15288.1 paragraph 6.4.2. Stakeholder Needs and Requirements Definition.
2. SE Processes/ Methodology	Model-Based Verification and Validation	ISO/IEC/IEEE 15288.1 paragraphs 6.4.1 Business or Mission Analsysisand 6.4.14. Disposal.
3. Program/ Project Processes Methodology	SE-driven Model Plan	Modeling is part of the System Engineering Plan or System Engineering Management Plan. It should cover the Information Technology (IT) infrastructure, modeling tools, modeling environments, identify the type and purpose of models and how they are managed.
3. Program/ Project Processes Methodology	Model Based Reviews; Management Program Reviews /MPR(s), Milestone reviews, program reviews, technical reviews, audits	Digital artifacts are the products from the Authoritative Source of Truth, so that as the system models are queried for evidence against the technical review and audit criteria, the system models may be updated. Note that System Models are a type of digital artifact themselves. MPRs recast to reflect model-driven processes and model-based artifacts (e.g., entrance/success criteria based on process objectives as reflected in the views/viewpoints, not doc creation). See ISO/IEC/IEEE 15288.2. See GAO/NSIAD-98-56 Best Practices for information on "Knowledge Points."
3. Program/ Project Processes Methodology	Model Metrics	Having a modeling metrics program to improve the modeling efforts and the target system or enterprise.
4. Model Based Effectiveness	Modeling Integration	System Engineering Model pattern as defined by Object-Oriented Systems Engineering Method (OOSEM).
4. Model Based Effectiveness	Verification and Validation of Models	Model objective examples include: ► Modeling a new concept (e.g., Universal command and control) ► Modeling system, subsystem, and interfaces ► Modeling operational functionality to generate/verify operational requirements ► Modeling a complex algorithm ► Model system V&V processes.
4. Model Based Effectiveness	Modeling Assurance	Per ATR-2018-01074 Rev A from The Aerospace Corporation. Model Assurance Level (MAL)– A measurement system for model value, content and quality. Identifies risk areas related to models and is rated 1-3; 1 has the least assurance.
4. Model Based Effectiveness	Authoritative Source of Truth (ASOT)	The collection of modeling data that represents the target system(s) along with its rationale. https://www.acq.osd.mil/se/initiatives/init_de_def.html Reference NASA-STD-7009 for examples of factors for assessing "Acceptability for Use" and "Credibility of Results."
4. Model Based Effectiveness	Digital Threads	https://www.acq.osd.mil/se/initiatives/init_de_def.html Digital Thread: An extensible, configurable, and component enterprise-level analytical framework that seamlessly expedites the controlled interplay of authoritative technical data, software, information, and knowledge in the enterprise data-information-knowledge systems, based on the Digital System Model template, to inform decision makers throughout a system's life cycle by providing the capability to access, integrate, and transform disparate data into actionable information. (DAU Glossary)

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4. Model Based Effectiveness	Digital Twin	https://www.acq.osd.mil/se/initiatives/init_de_def.html Digital Twin: An integrated multiphysics, multiscale, probabilistic simulation of an as-built system, enabled by Digital Thread, that uses the best available models, sensor information, and input data to mirror and predict activities/performance over the life of its corresponding physical twin. (DAU Glossary)
4. Model Based Effectiveness	Digital Artifacts	Digital Artifact: The artifacts produced within, or generated from, the digital engineering ecosystem. These artifacts provide data for alternative views to visualize, communicate, and deliver data, information, and knowledge to stakeholders. (DAU Glossary)
5. Information Technology Infrastructure	Modeling Tool Access	The access to models based on modeling roles.
5. Information Technology Infrastructure	Model Based Tool Licensing & Access	How well an organization manages tool licenses
5. Information Technology Infrastructure	Collaboration capabilities	Synchronous and asynchronous data-rich collaboration among distributed teams
6. Modeling Tool Construction	Model Management	Model management is responsible for establishing policy and managing the oversight of model collection activities, model valuation, acquisition and strategic model loans, for ensuring the application.
6. Modeling Tool Construction	Distributed Database/Tool interoperability	A fully Federated (or Confederated) data and IT infrastructure that functions as one virtual common database. Includes a standardized interface(s) for other data sources to join the Federation (APIs, wrappers, etc.).
6. Modeling Tool Construction	Model Based Data/Tool Independences	Bifurcation Opportunity: Connecting to non-MBE repositories as well as MBE repositories. One is for sharing data and the other is for sharing model artifacts.
6. Modeling Tool Construction	Inter-Database/Tool Data Item Associations	Capture and manage associations between data items within and between disparate data sources. Associations can be traced between data items regardless of their location.
6. Modeling Tool Construction	Modeling Methods	Methods examples include but are not limited to: ► OOSEM (Object-Oriented Systems Engineering Method) ► STRATA (Vitech) ► Harmony-SE (IBM Rational Telelogic) ► RUP-SE (IBM Rational Unified Process for Systems Engineering) ► JPL State Analysis (SA) ► OPM (Dori Object-Process Methodology) ► OOA/D (Object-oriented analysis and design) ► SYSMOD (Weilkiens Systems Modeling Process) ► VAMOS (Variant Modeling with SysML) ► Alstom ASAP methodology ► Pattern-Based Systems Engineering (PBSE) ► Modeling methods driven by SE objectives/analyses/uses and evidentiary artifacts, includes Library of standardized and frequently used patterns/models/components
6. Modeling Tool Construction	Model Languages	Model Language examples: ► UML – Unified Modeling Language ► SysML – Systems Modelling Language ► SDL – System Definition Language ► STRATA (Vitech) ► Modelica ► LML – Lifecycle Modeling Language ► TOGAF – The Open Group Architecture Framework ► BPEL – Business Process Execution Language ► DoDAF – Department of Defense Architecture Framework ► UPDM – Unified Profile for DoDAF/MODAF ► UAF – Unified Architecture Framework
6. Modeling Tool Construction	Model Libraries	Creating curated model libraries that are added to, retired, loaned, updated, etc.
6. Modeling Tool Construction	User Interface (UI), Viewpoint/Views, and visualization	Viewpoints reflecting SE and user objectives/analyses/needs are defined and standardized. Supports interrogation, navigation, tracing, etc., of data from disparate, heterogeneous data sources (See ISO 42010 for definitions).
6. Modeling Tool Construction	Simulation Capability	GENESYS, Cameo, Sparx EA and Rhapsody all have built in simulation capabilities. Additionally, they all also have the ability to interface with external simulation assets such as MaTLab Simulink.
6. Modeling Tool Construction	Modeling Process quality	Having a quality program that incorporates modeling.
7. Model Use	MBSE Institutional Adoption (e.g., agency, service, center, business unit) for Digital Engineering	The level that MBSE is adopted uniformly across the target organization.
7. Model Use	MBSE Technical Innovation Process	The organization's process to adopt new modeling relevant technology.
7. Model Use	Enabling Technologies	An assessment of how enabling technology is adopted by an organization.
8. Modeling Policy	Intellectual Property (IP)	Determining if the organization has and uses IP policy effectively across the enterprise to maximize transparency while protecting IP.
8. Modeling Policy	Tool Governance	Tool governance is the establishment of policies and continuing monitoring of their implementation to include selecting tool sets, tool extensions and plug-ins, tool environments, tool procurements, licenses, and access.