Department of Defense (DoD) Digital Engineering Fundamentals

The following are digital engineering fundamentals. Each one expresses core activities that an organization (enterprise or program) should incorporate or consider throughout the life cycle to realize the benefits derived from the goals described in the 2018 DoD Digital Engineering Strategy.

1. Organizations should establish and follow formalized plans, methodologies, and accepted standards for the development and use of models as a continuum throughout the life cycle, including interaction across other models. Organizations should integrate these activities into the programs' plans and schedules. Models and all digital representations, including simulations, should mature as the knowledge of the missions and/or systems evolves.

2. Organizations should define and establish Authoritative Sources of Truth (ASOT) for the intended engineering and stakeholder activities. Definitions should include but not be limited to location, format, organization, traceability, pedigree, provenance, data rights, and acceptable uses. The ASOT should be used to access, share, and exchange models and data so they may be used in support of engineering activities and to form digital artifacts.

3. Organizations should establish a governance methodology for the ASOT across all engineering domains and stakeholder roles and responsibilities to include but not be limited to data protection, access control rules, data traceability, data quality, and acceptance criteria to establish data trust and model credibility.

4. Organizations should establish and sustain a Digital Engineering Ecosystem (DEE) that interconnects the infrastructure, environment, and methodology (process, methods, and tools). The DEE should enhance the capability to collaborate across organizations, engineering disciplines, and physical locations.

5. Organizations should develop and/or leverage existing enterprise-level resources to establish and sustain a secure DEE. This includes adequate computing and IT infrastructure, model, data, and simulation interoperability; and the configuration and security management of data using digital engineering/model and simulation (DE/MS) processes and methods that help solve the Department's hardest analytical problems.

6. Organizations should foster an environment that supports innovation and should establish a systematic DE/MS maturation approach to drive continuous improvements in the establishment and use of the DE/MS in practice and promotes continuous prototyping and experimentation.

7. Organizations should understand the digital knowledge, skills, and abilities needed for each occupational discipline. Organizations should train or acquire their personnel appropriately to address the knowledge gaps and expertise needed.

8. Organizations should identify DE/MS knowledge transfer and personnel exchange opportunities (e.g., mentoring, apprenticeships, industry sharing forums, best practices, success stories, etc.) to mature the workforces' DE/MS knowledge, and accelerate digital transformation within the enterprise.

9. Organizations should build leadership advocacy for DE/MS initiatives, set organizational goals, establish quality expectations for the workforce, and quantitatively assess the digital engineering value being realized.

Terms and Definitions

Digital Engineering: An integrated digital approach that uses authoritative sources of systems' data and models as a continuum across disciplines to support lifecycle activities from concept through disposal. *DAU Glossary*

Digital Engineering Ecosystem: The interconnected infrastructure, environment, and methodology (process, methods, and tools) used to store, access, analyze, and visualize evolving systems' data and models to address the needs of the stakeholders. End-to-end digital enterprise. *DAU Glossary*

Digital Artifact: An artifact 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*

Authoritative Source of Truth (ASOT): An entity such as a person, governing body, or system that applies expert judgment and rules to proclaim a digital artifact is valid and originates from a legitimate source. *DAU Glossary*

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