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A Methodological Approach to Digital Engineering Adoption and Implementation for Organizations

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Abstract : As systems continue to become more complex and the interdependencies of processes and sub-systems continue to grow and transform, the need for a comprehensive method of tracking and linking the lifecycle of the systems in a digital form becomes ever more critical. Digital Engineering (DE) provides an approach to managing an authoritative data source that links, tracks, and updates system data as it evolves and grows throughout the system development lifecycle. DE enables the developing, tracking, and sharing system data, models, and other related artifacts in a digital environment accessible to all necessary stakeholders. The DE environment provides an integrated electronic repository that enables traceability between design, engineering, and sustainment artifacts. The DE activities' primary objective is to develop a set of integrated, coherent, and consistent system models for the program. It is envisioned to provide a collaborative information-sharing environment for various stakeholders, including operational users, acquisition personnel, engineering personnel, and logistics and sustainment personnel. Examining the processes that DE can support in the systems engineering life cycle (SELC) is a primary step in the DE adoption and implementation journey. Through an analysis of the U.S Department of Defense's (DoD) Office of the Secretary of Defense (OSD's) Digital Engineering Strategy and their implementation, examples of DE implementation by the industry and technical organizations, this paper will provide descriptions of the current DE processes and best practices of implementing DE across an enterprise. This will help identify the capabilities, environment, and infrastructure needed to develop a potential roadmap for implementing DE practices consistent with its business strategy. A capability maturity matrix will be provided to assess the organization's DE maturity emphasizing how all the SELC elements interlink to form a cohesive ecosystem. If implemented, DE can increase efficiency and improve the systems engineering processes' quality and outcomes.

Keywords : digital engineering, digital environment, digital maturity model, single source of truth, systems engineering life-cycle
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