Systems Engineering Forum
Virtual Series

Towards a Model-Based Product Development Process from Early Concepts to Engineering Implementation

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Abstract:
Current and future space exploration missions face challenges due to increasing technical complexity, schedule pressure, and development inefficiencies due to discontinuities in the overall system development life cycle. The impacts of these development inefficiencies are exacerbated when larger and more complex trade spaces need to be managed while encompassing the different architecture topologies and implementation options necessary to converge on a more optimal system design. This paper will discuss how Model Based Systems Engineering, specifically digital twin pipelines, can be beneficial to the product development lifecycle in a Model Based Engineering Environment. Such an approach brings modeling earlier into the design cycle, supports more perceptive system architectural and design trades, and systematic qualification. Maintaining a consistent set of system models that evolve with the maturity of the design provides an integrated and collaborative development environment that will inform detailed requirements derivation and implementation decisions towards a more capable and efficient system design.