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LEVERAGING THE CREATION OF A MODEL BASED SYSTEMS VIRTUAL TESTING
ARCHITECTURE FOR SPACE APPLICATIONS

Abstract

Digital transformation and virtual testing environments are gaining interest as digital systems become more prominent and integrated in the engineering world. Techniques that enhance the design, validation, and verification of a system by creating a Digital Testbed lead are being used in many different industries to improve project efficiency and quality while reducing cost. An RFLP (Requirements – Functional – Logical – Physical) based system modeling approach is developed to bring system considerations earlier in the design process. A virtual testing architecture was created to model an unmanned surface vehicle's performance throughout the entirety of its life cycles through Model Based Systems Engineering. This environment acts as the system diagram, assists with requirements tracking and verification, and integrates with models that describe the behavior of system layers. Techniques learned from this project contributed to better requirements tracking and verification, integrated models to describe system behaviors at various levels, and transformed a structural model in SysML to an analytical model in Modelica via the SysML/Modelica Plugin. This paper introduces examples of potential space-based projects that could benefit from a virtual testing architecture, how to employ this structure, and provide students and professionals efficient methods for leveraging these techniques.