

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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AN APPLICATION OF MODEL-BASED SYSTEMS ENGINEERING TO AUSTRALIA'S FIRST
COMMERCIAL SPACE LAUNCH FACILITY: ARNHAM SPACE CENTRE

Abstract

The success of Australia's first commercial space port heavily relies on the performance of many interconnected systems that deliver a space launch capability. Deep understanding of the Australian space regulatory framework, multiple user requirements, effective integration between systems, and interoperability with the outside world are critical to the success of a space launch capability. This paper presents a novel structured approach to dealing with the complexity and unstructured information required to provide the deep understanding that will deliver a space launch capability. Employing a Model-Based Systems Engineering (MBSE) approach to elicit, capture and analyse the Australian space regulatory framework and its impact a space launch capability provides a rigorous and effect method. Using, as an example, the operations of the Equatorial Launch Australia's launch capability, 12 degrees south of the Equator in East Arnhem Land, demonstrates the effectiveness of an MBSE approach. With a model-based approach, system specifications and designs are traceable to the regulatory framework, so when changes to the design or framework are required the impact can be immediately determined. The chosen approach is an extension of the Whole-of-Systems Analytical Framework (WSAF) that has been used successfully to capture the capability definition of several high-profile Australian defence projects. The resulting knowledge captured in the descriptive model has been more useful than traditional documentation due to the rigour information structure captured in a multidimensional, navigable format. Observed benefits from employing this approach to support high-level decision making are discussed, as are lessons learned from undertaking this initial implementation project.