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Mission Engineering Modelling & Reporting: Lessons from Model Based Capability Design

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ABSTRACT

Key to the effective employment of Model-Based Systems Engineering (MBSE) is the ability to communicate the rich information contained in the model to stakeholders. This paper provides insights and examples for effective reporting of digital Mission Engineering models, drawing on lessons learned from similar approaches.

Mission Engineering is the application of formal approaches to plan, analyse, organise, and integrate current and emerging system/operational capabilities to achieve desired effects. It is used to examine missions for several purposes, including identification of capability gaps, needs and solutions.

Mission Engineering practitioners will define missions, timeframes and capability states to examine, then model system functional and physical architectures to provide structural and behavioural representations to facilitate mission analyses.

The Unified Architectural Framework (UAF) provides a standardised enterprise architecture framework, is being adopted by the United States Department of Defense and has been demonstrated as an effective and consistent means for the digital engineering implementation of Mission Engineering.

The Whole of Systems Analytical Framework (WSAF) provides a digital engineering approach to Capability Design within the Australian Defence context. There is significant cross-over between the application of WSAF and the Mission Engineering process, and the lessons learnt from its application can be applied to the adoption of Mission Engineering.

A key component of the WSAF is a suite of report generating tools, that supplements the MBSE environment, enabling the modelled information to be consistently reported and presented in a form readily understood by decision makers (i.e. Capability Definition Document).

This paper examines the reporting principles employed on WSAF, how these can be applied in the Mission Engineering context and demonstrates the adaption of these principles in reporting UAF-based Mission Engineering architectures and analyses.

The authors provide insights and practical examples based on their experience in developing and applying MBSE-based reporting.

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