

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Engineering - Methods, Processes and Tools (2) (4B)

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MODEL-BASED SYSTEMS ENGINEERING (MBSE)—WHAT GOOD IS IT? LESSONS LEARNED
ON SMALL SATELLITE PROJECTS

Abstract

Model-based systems engineering (MBSE) is at the cutting edge of systems engineering. MBSE provides a unique means to capture, connect and communicate the various architectures that comprise complex systems. Collectively, the authors have decades of experience applying MBSE to real-world space challenges. Some of this experience will be distilled to focus on small satellite mission and system design applications. The paper begins with an overview of MBSE, what it is, what it is not. The paper then goes on to highlight the key advantages of MBSE over traditional, paper-based methods of systems engineering. Recent specific cases studies for application of MBSE are then highlighted beginning with a desk-top educational cubesat system—EssentialSAT. Details of its design, implementation, verification operations system model are highlighted. Application for model-based design reviews—vastly decreasing the time it takes to perform formal reviews—are described. Further examples focus on MBSE applications to various on-going small satellite projects highlighting the challenges of application across a diverse set of stakeholders. The paper concludes with a summary of lessons learned and guidelines for other organizations looking to apply MBSE their satellite projects.