

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Systems Engineering Approaches, Processes and Methods (6)

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LEAN SYSTEM ENGINEERING TOOLS FOR THE NEW SPACE ECONOMY

Abstract

In recent years the space has become more accessible, thanks to the entry into the sector of private companies, significantly increasing competitiveness. Consequently, the need to adapt to the rapid changes in the industry is leading private companies to implement changes in the design process by making it more streamlined. As a support to the current use of the V-model, the Agile methodology is seen as a viable solution to simplify the process. Agile Scrum is an iterative development process created to arrive at product delivery faster by directly involving customers in the design. The application of Agile, or more in general of what is called iterative and incremental methods, in commercial space programs has been very successful, especially in Cubesat design, and in the private sector. The growing demand for large spacecraft brings, however, the challenge of streamlining the process to a greater level. As additional instrument for lean approach to the system engineering, the Digital Twin seems one of the best candidate. The digital twin has been applied for aircraft engines in real time performance monitoring as well as for the possibility of testing operation on the virtual product before applying it on the physical product. In addition to being used as a diagnostic tool, the digital twin can be seen in a future implementation as a working tool in the design phase, useful for coordinating the team, synthesize documentation and making project progress clearer to all the figures involved. Considering the complexity, duration and size of programmers faced by large companies, the application of Agile combined with Digital Twin can offer room for an improved strategy. In the following work, this synergy will be explored, identifying possible solutions within a case study of a space program focusing on the benefits to risk management, product release and document synthesis.