

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

Author: Ms. Karolina Latserus
Skolkovo Institute of Science and Technology, Russian Federation, karolina.latserus@skoltech.ru

Dr. Anton Ivanov
Skolkovo Institute of Science and Technology, Russian Federation, a.ivanov2@skoltech.ru

ANALYSIS AND IMPLEMENTATION OF MBSE APPROACH TO SELECT AN AUTHORITATIVE
SOURCE OF TRUTH FOR SPACE SYSTEMS LIFECYCLE MANAGEMENT**Abstract**

Model Based Systems Engineering (MBSE) approach has proved its efficiency in design of satellites: there are plenty of examples of its successful improvement of system design and validation. MBSE approach provides a mechanism for sequential linking of requirements, logical elements and simulation models and centralizes them in the Authoritative Source of Truth (AST) database. There are now many ways to implement this approach. Focus of this study is to evaluate tools available on the market and make recommendations for their future use. Here we would like to consider two broad classes of space systems: satellites and launch vehicles. Conceptual design of satellites can be successfully performed on the basis of 1D modeling, with some interfaces to detailed 3D analysis. Preliminary design of launch vehicles depends much more on detailed structural and aerodynamics modeling, which comes hand in hand with manufacturing technologies availability and elaboration. That is the reason why launch vehicle enterprises include fast prototyping of key structural parts in parallel with classical systems engineering starting processes such as stakeholders analysis and requirements definition. This approach positively influences the understanding of available design possibilities and system cost budget. Rapid requirements and logical architecture adaptation due to prototyping results analysis causes elements of AST to fall out of synchronization. In this work, we will consider several tools to create AST for our projects: Magic-Draw, ValiSpace and Dassault Systemes 3D Experience. We consider engineering and experimental data management, as well as approach integration to enterprise business processes and planning. The challenge is to represent, connect and update requirements, architecture, behaviour and key parameters of system design and prototyping. Another important aspect is to connect results of simulation and prototyping work. Additionally, this research considers AST fulfilment management and approval processes.