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DIGITAL ENGINEERING INFORMATION EXCHANGE MODEL FOR SPACE MISSIONS ARCHITECTURE: A CASE STUDY OF A CUBESAT MISSION

Abstract

A Digital Engineering Information Exchange supports an exchange of digital artifacts between system engineering entities (INCOSE). Such entities might include processes, models, and organizational elements associated with space missions design. Reducing complexity and errors, as well as improving efficiency are critical capabilities associated with a digital transformation of space missions design and delivery. In our work we propose an approach to manage a digital engineering information exchange through the DSM-based approach (Eppinger and Browning 2012). Applied to space systems architecture, the method allows keeping track of the information exchange throughout the product development. Such information includes the core entities and relationships of CubeSat's subsystems. This would integrate systems engineering (MBSE) approaches and PLM methods. In our paper we apply the proposed approach to a CubeSat mission design (Kaslow et al. 2016). One of the forms of utility of proposed approach is the ability to engage a quantitative assessment of the most critical interfaces between CubeSat's subsystems. In our paper we demonstrate how such evaluation can be performed. Another utility of the proposed approach is that it facilitates a digital information flow through different product lifecycle stages. A proposed approach might serve as an effective method to reduce complexity associated with different ontologies in different design tools. Ultimately, it allows engaging digital tools in concurrent engineering environment.