IAF SPACE SYSTEMS SYMPOSIUM (D1)
Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

Author: Mr. Jan-Christian Meyer
Berlin Space Technologies GmbH, Germany

ANALYSIS OF SPACE ENGINEERING PROCESS OVERHEAD FOR DESIGN CHANGES AND IMPLICATIONS FOR A NEW SATELLITE BUS CONCEPT

Abstract

The paper presents an investigation into the engineering processes at Berlin Space Technologies to derive conclusions about process overhead for changes in the design of satellites and satellite subsystems.

In a satellite engineering process, the hardware-related work only represents a fraction of the effort related to a given engineering challenge. Namely, also the following steps form part of the work: solution concept identification and trade-off, interface coordination with related disciplines, documentation, testing and validation.

In the industrial environment, this process overhead may vary depending on the complexity of the task, the heritage of an existing product, the experience of the team members implementing the solution, and the type of customer receiving the solution. For example, the documentation overhead would be higher if a solution is implemented for an external customer compared to an internal one. Some of the design changes evaluated include:

- Exchange of electronic parts by parts of other vendors (of identical functionality) in existing products
- Software or firmware changes on existing products
- Changes in the mechanical design of a satellite

Project managers (unless very experienced) typically lack the technical insight to realistically estimate the required effort for a particular task and thus are reliant on input from the technical team. This input will come with the above-mentioned uncertainties. Better understanding these uncertainties will thus have a direct impact on the quality of project planning.

This knowledge is applied to an evolved satellite bus concept in order to enable it to be customised for different payloads with as small of an overhead as possible.