

A COMPARATIVE VIEW TO MODEL-BASED SYSTEMS ENGINEERING TECHNIQUE IN SPACE AND AUTOMOTIVE DEVELOPMENT

Carolin Eckl

Institute of Astronautics
Technische Universität München
c.eckl@tum.de

Markus Brandstätter

Alain Pfouga

Josip Stjepandić

Systems Engineering, 3D Product Creation
PROSTEP AG

{markus.brandstaetter;alain.pfouga;josip.stjepandic}@prostep.com

ABSTRACT

“Model-based Systems Engineering (MBSE)” is currently a hot topic at INCOSE. It involves multidisciplinary development based on the usage of models as main artifact. The development of the pico-satellite MOVE (Munich Orbital Verification Experiment) displayed many of the characteristics of a real-world multidisciplinary engineering project. Its components were designed by students from different disciplines involving mechanical engineers as well as software developers. Within the satellite, communication was lead through a central bus between the different components and required expertise and coordination from all of the involved disciplines. An equivalent task of distributing information and energy can be found in automotive engineering: in the wire-harness. In contrast to the satellite bus, it does not distribute centrally created coordination commands, but supports the orchestration between distributed systems.

This paper uses the design of satellite bus systems and automotive wire-harnesses as examples, describes their common pitfalls, explains MBSE and demonstrates how the development of communication systems in both satellite and automotive engineering can benefit from relying on it in early design and concept phases.

KEYWORDS.

Systems Engineering, Model, Model-based Systems Engineering, Complexity

1. INTRODUCTION

The development of most technical products involves specialists from different engineering domains. A modern communication interface, for example, requires both electrical knowledge to transmit signals as well as an abstract understanding of the protocol and the hardware required to send/receive the corresponding signals. Additionally, flexibility, connectivity and performance gains demand this separation into the realms of different domains to be realizable at all. Furthermore, the holistic view and multidisciplinary emerge as important criteria [1] [2].

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