

Abstract ID-077

ENRICHING MECHATRONIC V-MODEL BY ASPECTS OF SYSTEMS ENGINEERING

Iris Graessler, Julian Hentze

University of Paderborn - Heinz Nixdorf Institute, Germany

Iris.Graessler@hni.upb.de ; Julian.Hentze@hni.upb.de

Keywords: Systems Engineering, V-Model, Mechatronic Development,

Summary: V-model of mechatronic engineering process provides a methodological approach to support cross-domain engineering of mechatronic systems [VDI2206]. Until now it does not explicitly include elements of Systems Engineering, an interdisciplinary approach to realize complex technical systems meeting time and cost goals [INCOSSE 11].

Due to increased claims and requirements on mechatronic products, implementing Systems Thinking incorporated within Systems Engineering into mechatronic V-model has means of increasing effectiveness and efficiency of mechatronic product engineering processes. Systems Engineering focuses on the beginning of the whole product engineering process. Requirements and needs of the product are defined at an early stage. Following Systems Engineering approach, topics and requirements are not only considered from the view points of single domains, but also from an overall system perspective in every stage of the development process. This helps to satisfy requirements, needs and wishes of customers and all surrounding stakeholders [Bla08, INCOSSE11, ISO15288].

The resulting high effort for planning, modeling and analyzing at an early stage pays off many times during the project's runtime. As efforts are shifted from late to early phases of product engineering, management commitment to the new approach is a decisive precondition. Further, a new role perception of project management is needed. Besides classical role of a project manager, so called Systems Engineers are needed in order to put Systems Engineering into industrial practice [Bla08, She96].

In this contribution, a model based approach of integrating Systems Engineering into the mechatronic V-model is presented and the essential new role of a Systems Engineer is discussed. Referring to the resulting extended V-model in each step of mechatronic engineering process and putting the role of a Systems Engineer into practice, risks in product engineering are reduced and all stakeholders including the customer are satisfied.

References

- [1] [Bla08] Benjamin S. Blanchard – System Engineering Management, 2008
- [2] [INCOSSE11] INCOSSE - Systems Engineering Handbook(v.3.2.2), 2011
- [3] [ISO15288] IEEE International Standard– Systems and software engineering – System life cycle processes, 2008
- [4] [She96] Sarah A. Sheard – Twelve Systems Engineering roles, 1996
- [5] [VDI2206] Verein Deutscher Ingenieure – Design methodology for mechatronic systems, 2004