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Quality and safety, a challenge for traditional and new space (1)

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PATAS: QUALITY ASSURANCE FOR MODEL-DRIVEN SOFTWARE DEVELOPMENT

Abstract

The quality of software products in safety critical applications, extensively found within the space domain, is a key success factor but also a major cost driver. To ensure high quality of the software product, quality assurance processes with quality models and metrics are applied. With these tools and processes product assurance manager and software developers are able to quantify the quality of the software under development. Within the ESA financed study PaTaS (Product Assurance with TASTE Study), a product quality model with software and model metrics got developed and implemented in an end-to-end model-driven software engineering (MDSE) lifecycle demonstrator.

The goal of this study was to find applicable concepts to maintain quality and dependability levels when MDSE is applied. This requires the definition of connected model and software quality indicators. These indicators were identified and integrated into ESA's reference software product quality model (ECSS-Q-HB-80-04A). The resulting new quality model got incorporated in a model-based software development lifecycle demonstrator. To evaluate this demonstrator and the integrated quality indicators, mission-critical parts of the command and data handling subsystem of a DLR satellite mission got modelled and subsequently coded, to simulate a realistic development scenario. The aim of the activity was to demonstrate the effect of the end-to-end lifecycle in combination with the developed quality model on the final onboard software product.

In this paper, we present the result of the study. The focus lies on the quality model for MDSE and new quality metrics for models, which can be embedded in an end-to-end model-driven product development lifecycle.