Master Thesis

Agile Systems Engineering – Combining of Approaches

Fachhochschule

Motivation:

Systems Engineering is well known to provide an approach as well as modelling techniques (e. g. SysML) for building large and complex systems. In recent years agile methods got more and more attention in research and development teams, using also Systems Engineering approaches. Thereby different approaches have been defined to combine both worlds together [see for example Douglass – Agile Systems Engineering Elsevier 2025]

In this Master Thesis the comparison of existing agile systems engineering approaches should be done. Especially it should be evaluated how different disciplines like mechanical engineering, electronical engineering, and software engineering can cooperate. Thereby the thesis should define how to attach modelling approaches from the three disciplines (e. g. UML, CAD-Models) to SysML based modelling and how the feedback loops for iterative development with non-agile development should look like.

Tasks:

- Definition of agile Systems Engineering and a running example
- Define approach to link discipline specific models (e. g. UML, CAD, Matlab-Simulink) to SysML models with respect to agile development (e. g. User Stories)
- Define an approach for combination of agile teams with non-agile teams with respect to
  - Feedback loops
  - Integration (Testing)
  - Release Planning

Requirements:

- Study Programs: Digital Technologies, System Engineering and Engineering Management
- Knowledge on Systems Engineering beneficial

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