

# Flexible Model-Based Simulation as a System's Design Driver

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**Abstract** Complex systems traditionally involve partners from different companies with their own domains of expertise. During design stages, these partners need to exchange pieces of information and to debate around architectural and implementation choices. Model Driven Engineering for System Engineering simplifies system knowledge sharing, while simulation provides sound results to drive debate. As a consequence, gaining a flexible and dynamic tool that models and simulates the architecture is highly valuable. In this paper we focus on the functional architecture design and analysis steps of the system engineering process. We identify adaptation to existing system engineering process, tool modularity and interaction with models as three grounding principles for a flexible system model simulation tool. We show that meta-modeling and layered architecture for a simulator are enabling technologies for our three principles. We also demonstrate the use of these technologies by implementing a simulation tool in the context of a sea-floor observatory project.

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