

**Title:**

## Streamlining system-safety engineering with digital technologies

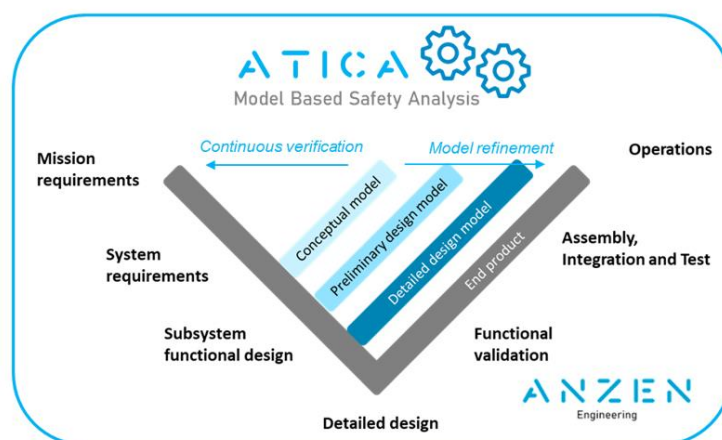
**Abstract:**

The introduction of digital tools into the engineering process of complex systems has enabled significant enhancements all along the design and production phases of such products. One of the paradigms of the new methodologies being implemented is the centralized source of information to gather the data needed along the product lifecycle. Another paradigm of these modern methodologies is the automated verification; implementing queries and tests to verify that the system complies with the objectives set by the different stakeholders.

Leveraging on digital technologies, the state-of-the-art tools being used in the industry allow to master the flows of information between stakeholders, resulting in an overall gain of quality and a reduction of human effort in engineering tasks.

Our work proposes a methodology and toolset implementing a model-based engineering approach to address the safety aspect along the design and production phases of software-defined systems. Based on the two aforementioned paradigms; our method extends the architectural and behavioural models of the system with a new perspective that allows to introduce the safety data and to run automated analysis to verify compliance to the typical quality standards and safety objectives of the mission.

The toolset that will be presented implements various levels of safety analysis tailored to the different layers of abstraction of the systems engineering and software development process, notably operational analysis (extended with the functional hazard assessment, FHA), logical (model checking and fault tree analysis, FTA) and physical architectures (failure modes and effects analysis, FMEA). Our innovative framework simplifies the process of collecting and analyzing the concept of operations, system design and safety data, allowing for a seamless flow of information throughout the entire engineering process, resulting in a more efficient and effective approach to ensuring safety.



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