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

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## MODEL-BASED SAFETY ANALYSIS (MBSA) METHODS IN AEROSPACE APPLICATIONS

**Abstract**

Complex sophisticated systems are advancing at a perpetual rate in different aerospace industries. Classic safety analysis methods are now considered inefficient to handle complex aerospace systems. Model-Based Safety Analysis (MBSA) is a new evolving approach in which system and safety engineers share a common system model created using a model based development process. The model is created by extending the system model with a fault model as well as relevant portions of the physical system to be controlled. Thus such tools are used to automate some of the required system safety analysis. There are various types of MBSA used in aerospace industry for example one type which encloses the failure into the system design directly and another which develops a fault model separately from the system model, thus combining both independent models for safety analysis. The trade off between the accuracy of results and the complexity of analysis govern the used type of MBSA. Utilization of such tools may prevent catastrophic accidents as will be shown. Our work introduces a new Methodology of MBSA. The approach will combine various concepts such as directed graph traversal, event lists and Constraint Satisfaction Problems (CSP). The tool is based on Object Oriented programming and the components are abstracted to its failure logic and relationships of connected components. Quality and Quantity analysis can be executed including time dependent failures (fatigue). The tool shall be tested on various flight control systems including the famous Wheel Brake System. The various tests will be analyzed and a comparison between other tools is represented. In conclusion, a comparison of various MBSA tools and where they can be used efficiently in aerospace industries will be represented.