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THE IMPLEMENTATION OF RISK MANAGEMENT INTO THE CONCURRENT ENGINEERING
PROCESS**Abstract**

This paper is based on the outcome of a diploma-thesis defining the position of Risk Management for DLR Bremen's recently finished Concurrent Engineering (CE) facility. Besides the implementation of standard risk analysis methods like FTA and FMECA, two rather new tasks are described: 'Knowledge Management' and 'Extended/Alternative Mission Scenarios'.

Over the years the documentation of spacecraft development got more and more complex, while the utilization of this gathered knowledge does almost not exist. Especially in a CE setting, where engineers do not have the time to sort through report-libraries looking for information regarding their subsystem, accessing knowledge should be straightforward to not distract from the actual task. The Graphical User Interface of a knowledge database has to provide fast access to information, adapted to the engineers needs, and enable a fluent integration into the soft- and hardware in use. By translating modern capture, organizing and distribution algorithms to the CE environment this paper identifies solutions for an improvement of knowledge capitalization. Keywords for this are tagging & tag-clouds, linked data and change archiving. The implementation of new technologies into the work-flow is the second focus topic. Touch-Screen devices for example offer the chance to digitize calculations or sketches usually done on paper. Once available as a file, the information can then be treated by the algorithms mentioned before.

Research on the evolution of space technologies has shown that many spacecrafts either outperform their mission goals or fail them due to malfunctioning components. While the latter is comprehensibly bad, even the former has an unfavorable characteristic: It is leading to higher overall costs. Both possibilities have in common that they are usually not considered during early planning stages of a mission. This paper proposes a method to incorporate these considerations into the scope of a risk manager during the Phase 0/A systems engineering process. Instead on influencing the spacecraft design, the outcome of the analyses will be an increased awareness related to overachievement, as well as redundant mission scenarios, adapted to possible failures of spacecraft elements based on fault tree scenarios.