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Abstract

Current conceptual aircraft cabin architecture trade-off studies are traditionally done manually and are extensively based on experience and heuristics. This paper emphasizes that there is a need for formal methods to support the systematic analysis and evaluation of mechanical aircraft cabin architectures. Mechanical interfaces including their functional description act hereby as key integration data, and it is shown how tolerance management methods can be used as milestone for such an engineering analysis. Due to the multi-domain product data, which has to be considered – i.e. geometry data, physical data, functional data, tolerancing data, and assembly process data – the need for an abstract and formal modelbased approach is described. Using these frame conditions, an implementation using a graph-based design language is proposed. A so-called ‘cabin design language’ in UML (Unified Modeling Language) is developed, offering multiple data visualizations in order to support design analysis and evaluation.