**Teaching Space Master Concurrent Engineering**

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**Abstract**

Since 2014 the University of Bremen (Germany), offers the “Master of Space Engineering (SpE)”, a master course geared towards international engineering students. For the past four years, DLR has supported the program through the compulsory module “Space Systems Engineering and Concurrent Engineering”, held at the Concurrent Engineering Facility (CEF) at the Institute of Space Systems in Bremen.

Within this one-week block event, the first few hours are dedicated to a series of lectures covering topics such as Space Project Management and Space Systems Engineering, as well as a brief theoretical introduction to Concurrent Engineering (CE). After that the students are introduced to CE in practice by performing a 4 day simulation of a Phase 0/A CE study. Each of the 15-20 students are assigned (mostly in pairs) to a conventional domain like Power, Structure, Cost or Risk. The Customer domain is represented by the main lecturer, and the team leading is performed by supporting lecturers from the CEF Core Team. At the beginning of the study the students are introduced to the activity with a brief study-scope, which conforms to the standard study-scope documents used in real CE studies in the CEF but with one particular difference: it includes, by design, *a number of insufficient, poorly worded, and/or unnecessary requirements*. This is done in order to force the students to experience the real life situation where insufficient preparatory work and bad requirements impact design discussions (especially in a CE environment). The CEF setting is ideal to introduce students to Systems Engineering and to promote a systems view, allowing them to discover the impact of subsystem-level decisions over other subsystems – and even the overall system – in a highly interactive way. The learning outcome is clear, and the activity has been consistently rated as extremely positive by the students. In 2018 the event was even nominated for the renowned "Berninghausen Prize" for excellent teaching.

This paper describes the experiences and advantages, as well as the difficulties, of teaching Concurrent Design/Engineering at University within a Space Master course.