SPACE SYSTEMS SYMPOSIUM (D1)
System Engineering Tools, Processes & Training (I) (3)

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ASTEROIDFINDER: A PRACTICAL USE OF CONCURRENT DESIGN IN PHASE B

Abstract

The German Aerospace Center (DLR) is pursuing a program of space mission development based on a standard satellite bus (SSB), suitable for missions and applications of different types. This project has the strategic objective of establishing within DLR the capabilities and facilities necessary for satellite development and operations. The spacecraft bus belongs to the "compact" class, having an overall mass of approximately 150 kg and dimensions which allow piggy-back launches into low-Earth orbit. After a review process the payload AsteroidFinder was selected to be the first of such missions. The primary goal of the mission is to search for Inner-Earth Objects (IEOs), a particular class of Earth-approaching asteroids with orbits lying completely within the Earth's orbit.

During Phase 0 and Phase A the AsteroidFinder Project Team made extensive use of the Concurrent Design Principles that are used by the ESA Concurrent Design Facility (CDF). Along with the widely spread CDF Integrated Design Model (IDM) of the ESA CDF these principles proved to be of great value and helped the team to converge to the design solution up to phase A detail level. The AsteroidFinder project team faced the typical challenges a geographically distributed team is confronted with, e.g. communication, configuration control, understanding of requirements etc.

The Astroidfinder team has now entered in the Phase B of the project. Due to the increase in complexity of the design solutions, amount of engineering data being shared and the increase in team members during Phase B, the used of ESA CDF IDM and methodology as such needed to be adapted and improved.

The current paper deals with the lessons learned of this improved engineering process and describes the design methodology used. A comparison is made between the methodology used in Phase 0/A and Phase B, highlighting the major Concurrent Design related differences between the design phases (covering process, method and tools), the "expected" benefits and the impact on the further phases.