

SPACE SYSTEMS SYMPOSIUM (D1)  
Innovative and Visionary Space Systems Concepts (1)

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THE ADVANCED STUDY GROUP – A GERMAN AEROSPACE CENTER (DLR) INITIATIVE FOR  
DESIGNING BREAKTHROUGH SPACE CONCEPTS

**Abstract**

The paper gives a status report about the latest developments within the Advanced Study Group (ASG), which was founded by the Institute of Space Systems (Bremen) at the German Aerospace Center (DLR) in 2010. The main goal of this think tank is to identify, evaluate and develop so called breakthrough or disruptive space concepts. Similar to ESA's Advanced Concept Team (ACT), the ASG is investigating long-term and visionary space concepts, innovative design techniques and working methods. Furthermore, different spin-in technologies of terrestrial applications are analysed for a possible adaptation in the space sector. The ASG is organized by the department of System Analysis Space Segment (SARA), which is the institute's concept development group of phase-A studies.

The ASG utilizes the new Concurrent Engineering Facility (CEF) on site. This laboratory allows a team of space engineers and scientists from different disciplines to efficiently design space systems and missions on a study level. The CEF is equipped with the latest multimedia applications (e.g. Smart Boards, touch screens, videoconference systems) in order to support the complex nature of designing a spacecraft system concept.

There are two development steps within the ASG. In a first approach (which is also called nano study) a team of three engineers are evaluating the initial idea. The nano study usually takes between 4-6 weeks and begins with various brainstorming sessions. Further objectives are besides a general technical feasibility study, a preliminary technology literature survey, an identification of relevant experts in the field and a first visualization of the concept. In the next phase (called micro study) the team size increase up to 6-8 engineers. During this work phase, which usually takes between 1-2 weeks, an initial set of system requirements is evaluated, trade-offs are worked out and a preliminary SWOT-Analysis (Strength-Weakness-Opportunity-Threat) is performed. The outcome of this study phase is then evaluated by a designated advisory board in order to decide further research steps.

The paper gives an overview of the ASG group structure, the used design and development methods and future research directions. Furthermore, a presentation of already performed studies is given.