IAF SPACE SYSTEMS SYMPOSIUM (D1)
Technologies to Enable Space Systems (3)

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IRAS - NEW TECHNOLOGIES FOR LOW COST SATELLITES

Abstract

To persist in the future of space business low cost satellites which can be produced in high quantities in less time are mandatory. In the project “IRAS” (Integrated Digital Research platform for Affordable Satellites), new technologies are investigated and developed to significantly lower the cost and production time for satellite components. To achieve this, additive manufacturing techniques using polymeric, metallic, and ceramic material are combined with multifunctional and bionic structures, resulting in lightweight, cost-efficient and integrated structures. New propulsion technologies are also considered within this project as well as the implementation of off-the-shelf components from other sectors such as automotive electronics.

Knowledge gained regarding new materials, research data, and test results are collected in a newly developed database using a novel digital Data Management System (DMS). This is presently undergoing integration into a Digital Concurrent Engineering Platform (DCEP) to enhance collaboration between project partners. Within IRAS, a 3-level-concept of digital cooperation has been developed with the uppermost level represented by the DCEP and the middle level being the digital DMS. The third level is then the physical level consisting of the aforementioned technological developments, hardware, and integration.

This paper presents the concept of a new collaboration platform bringing engineers together in a novel way without a need for physical proximity. This concept also details how new technologies can be combined to develop multifunctional structures. An example of this is the integration of cables directly into additively manufactured satellite structures. These new developments are integrated in a technology demonstrator satellite, SOURCE (Stuttgart Operated University CubeSat for Education and Evaluation).