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GAME-CHANGING SPACE SYSTEM INTERFACE APPROACH WITH STANDARD POTENTIAL AND SPACE ECO-SYSTEM IMPACT

Abstract

The upswing of innovative and commercial NewSpace ventures and general space industry trends suggest a move towards higher lot sizes of systems, subsystems and components, thus, series production. Moreover, on-orbit servicing (OOS) and active debris removal (ADR) have become hot topics in the space arena with potential pradigm shifts in the long-term - all the way to space exploration. At large, these developments and concepts will be enabled by cooperative design and plugplay (PnP) principles, which in turn are centered around standardized interfaces per se - as well as modularity.

Modular concepts and standardization of space infrastructure elements have been investigated for decades are now gradually becoming a reality as the CubeSat revolution has shown in the first step. Standard interfaces are considered instrumental enablers for new dimensions of flexibility and entirely new space systems, operations and business in particular.

The paper addresses these issues from multiple angles based on the patented and multi-functional intelligent Space System Interface "iSSI" as self-standing solution and standard option (while developed in the course of the German DLR-funded iBOSS program). Following an introductory snapshot of the technological and functional key features, different applications and utilization potential is highlighted in a suggested market segmentation along associated benefits and applicable businesses. Furthermore, selected economic and business aspects including cost-benefit and economy-of-scale, production engineering and manufacturing drivers and lessons learned, as well as business development routes and models improving the MAIT and service value chain are presented.

The unique iSSI commercialization partnership (combining university research, space startup and sound manufacturing industry with longstanding background in space, automotive and aeronautics) aims at a new USB-in-space-like standard to enhance projects and enable new business of users and customers across the global space sector. Hence, a new space in and for traditional space and NewSpace.

The authors have longstanding experiences, background and visibility in the global commercial space arena with involvement in multiple innovative new business endeavors, comprising dedicated expertise in space commercialization and innovation, new business creation and finance, international partnerships, commercial prototyping and series manufacturing.