SERESSA 2022

Radiation Hardening by Software: Advanced FDIR and Redundancy Concepts with COTS in Space

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Abstract:

Redundancy concepts in combination with advanced Fault Detection, Identification and Recovery (FDIR) software is a promising approach for improving reliability in spacecraft hardware. In the CubeSat mission UWE-3 this concept provided seamless operations for 6.5 years, despite only commercial of the shelf components were employed. UWE-3 on its polar LEO encountered significant SEU but due to internal redundancy switching from of the OBDH operations always continued without any interruption.

Short Bio:

Dr. Stephan Busch is computer scientist and aerospace engineer in the academic and industrial sector and has more than 15 years of work experience related to research, development and project management in the field of small satellite systems. During his professional career at Fraunhofer Ernst-Mach-Institute EMI, Center for Telematics ZfT and University of Würzburg, he managed and implemented various small satellite missions during all phases from initial concept to successful in-orbit operations. During PhD studies his research focused on robust, efficient and flexible designs for innovative, small and cost-efficient satellite technologies.

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