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Author: Mr. Maximilian Henkel
Graz University of Technology (TU Graz), Austria

IMPLEMENTING SPACEWIRE ON OPS-SAT IN-FLIGHT

Abstract

Communication can be considered a core functionality of any satellite. This typically requires data to pass through an interlinked communication chain. On ESA's OPS-SAT satellite the comparably weakest link of the communication chain is the connection to the Satellite's main Experimental Processing Platform (SEPP): The primary link is due to protocol overhead and physical limitations not fast enough to utilize all data rates provided by the frontends. However, there is a faster physical connection available. This work shows the in-flight demonstration of implementing a SpaceWire link on the main processing platform on ESA's OPS-SAT mission. This complements OPS-SAT and its high demands for performant data exchange. The flexibility which made this feasible, is achieved by an in-flight reconfigurable Field-Programmable Gate Array (FPGA). These results show the adaptiveness to new functionality for any phase of the mission, when hardware gets more flexible through reconfigurability. Moreover, we see in-flight FPGA reconfiguration as a potentially strong driver for further innovation in space.