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SPACEWIRE ON OPS-SAT CUBESAT - FROM CONCEPT TO OPERATIONS

Abstract

ESA's OPS-SAT satellite offers a unique platform for new operational and experimental ideas in the satellite and CubeSat context. OPS-SAT provides in its 3U structure a wealth of different payloads such as S-band transceiver, X-Band transmitter, CCSDSEngine protocol translator, fine ADCS, camera, optical receiver and SDR receiver. A powerful system-on-chip dual-core ARM processor platform with integrated FPGA supplements the system to control all these payloads and facilitate onboard data processing. The experimental mission has high demands for a fast and reliable communication system to enable reconfiguration and data acquisition. This led to SpaceWire as an internal bus system between the processing platform and the CCSDS engine protocol translator device, connecting S-band and X-band radio interfaces. This paper explains the evolution from requirements and concept to SpaceWire's ongoing successful operational use on CubeSat platform in the OPS-SAT mission, utilising the reconfigurable FPGA. It also addresses the details, features and pitfalls of the current implementation.