Design of a Wireless Link for SpaceWire Networks

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Abstract

SpaceWire is a recently developed on-board spacecraft communication protocol which has already been deployed in a number of space applications. In contrast, the IEEE802.11 wireless standard is a mature terrestrial protocol that offers a wide range of services. By combining the two communication protocols a large variety of applications could be implemented in future space missions. Both standards have attributes supporting scheduling, flow control and buffering that can be exploited to provide a communication medium enabling high speed fault-tolerant networks. Converting SpaceWire packets into IEEE802.11 packets presents challenges due to bridging a protocol designed for point-to-point links with a protocol usually operating in an ad-hoc mode.

This paper presents an approach to developing a wireless interface for SpaceWire on-board networks for the purpose of intersatellite communication in satellite clusters [1, 2]. The design tradeoffs for the implementation of a bridge for SpaceWire/ IEEE802.11 data transfer are discussed in the context the Disaster Monitoring Constellation small satellite platform developed by the Surrey Satellite Technology Ltd. [3].

References:

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