

IMPROVEMENTS IN SPACEWIRE TEST

Session: Test, Validation, Integration

Short Paper

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ABSTRACT

During Satellite Integration, recordings are made of the interactions between the various subsystems on the satellite. With slow busses such as MIL 1553 and CAN running at around 1Mbit/s, this was not a great challenge. With SpaceWire speeds one or two orders of magnitude faster, and without the constraint of a single bus, recording SpaceWire traffic is more of a challenge. The new Multi-link SpaceWire Recorder meets this challenge by recording several hundred Mbits/s continuous SpaceWire traffic spread over several SpaceWire links.

The recording can be both time tagged and dated. The time tag is used for analysis of functionality and latencies and the date for archival purposes so that there is no confusion between different recordings. The new Absolute Time Interface acts as synchronization master to any number of other SpaceWire test units, providing them with Time of Year synchronized to an external source – such as UTC from an IRIG reference.

With the move towards SpaceWire Real-Time, there comes a need for test equipment both to generate a variety of Time Codes and to measure their arrival times precisely. The Absolute Time Interface generates such time codes synchronized to an external reference, and its synchronization of an entire EGSE system enables precise measurement of Time Code arrival times and Jitter.

Used together, the Absolute Time Interface and the Multi-link SpaceWire Recorder can record traffic over many links, at many hundreds of aggregate Mbits/s, with recordings being made on several different computers, possibly on different sites. The synchronized time tagging and dating of these recordings makes it possible to inter-relate the different recordings as if they were a single recording on a single computer. Use of a universal time reference, such as UTC, enables data from remote sites taking part in a virtual satellite integration experiment to be merged and analysed.

The paper will briefly describe these and other improvements to the capabilities for commissioning and integrating subsystems and satellites that use SpaceWire.