

SPACEWIRE NETWORKS FOR PAYLOAD APPLICATIONS

Session: SpaceWire networks and protocols

Short Paper

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ABSTRACT

SpaceWire aims at becoming a candidate data-handling network for use onboard spacecraft, which could bring modularity and scalability to future onboard data processing systems. For several years, Astrium gain a strong experience on SpaceWire by leading several R&D studies and by contributing to the development of the main relevant building blocks for future space systems. These studies and developments have made possible a fine characterization of the SpaceWire and demonstrated its strength. However, they have also made more visible some of its weaknesses. For instance, the weight of cables becomes a critical issue when the number of devices to connect increases: the use of routers leads to decrease the number of links but introduces constraints and limits in term of overall data throughput and latency. At this step, the influence of the network topology and communication protocols with respect to connected devices becomes crucial. The initiated studies for increasing the speed of the links participate to this effort but do not solve the issue. Several other ways for improvement need to be explored: new router arbitration schemes with possible management of priorities, new multiplexer devices, implementation of dedicated communication protocols either asynchronous or time-triggered, the development of a methodology and associated tools for network analysis are possible ways for improving the scope of possible future usage of SpaceWire networks onboard spacecrafts.