# PROVIDING GUARANTEED PACKET DELIVERY TIME IN SPACEWIRE NETWORKS

**Session: SpaceWire networks and protocols**

**Short Paper**

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**ABSTRACT**

SpaceWire interconnections are used in many systems with maximal packet delivery time constraints. We consider some mechanisms for ensuring this feature in the frame of this standard, without updating the basic standard document.

Delivery time for a  packet depends on the packet length, SpaceWire links transmission rate, which could vary from 2 to 400Mbit/c, on the SpaceWire interconnection topology, on arbitration algorithms and buffering schemes in routing switches.

In the SpaceWire standard the packet length is unrestricted. To work with time constraints we are to set limits for packet length. We can set constraints on maximal packet length in a particular system, in particular nodes of the interconnection to ensure required packet delivery time.

Then the guaranteed packet delivery time could be provided if the maximal packet transmission time for every switch is guaranteed and number of transit switches is fixed. To have a definite number of transit switches we can design appropriate interconnection topology and specify required paths for the packets by appropriate routing tables in the routing switches.

We analyze characteristics of real-time packets delivery using the time-division transmission  with global time-slots in SpaceWire interconnection. It is to be based on time-codes distribution mechanism in the SpaceWire standard. We estimate accuracy of global synchronization with time-codes in different interconnection topologies, its skew and jitter. Margins for time-slot specification are considered. Methods for terminal nodes distribution over the time-slots for packets transmission are considered. Interference of packets from different time-slots inside a multi-hop interconnection is estimated.