

SpaceWire Network Simulator

Session: SpaceWire networks and protocols

Short Paper

Artur Eganyan, Liudmila Koblyakova, Elena Suvorova

Saint-Petersburg University of Aerospace Instrumentation. 67, B. Morskaya, Saint-Petersburg, Russia

E-mail: artfla@rambler.ru, luda_o@rambler.ru, wildcat15@yandex.ru

ABSTRACT

In the paper we present SpaceWire Network Simulator (SpaNSim) which is the further development of SpWNM complex [1]. As the SpWNM, SpaNSim is intended for designing, modeling and analyzing SpaceWire networks of any topologies, and contains the basic models of terminal node, routing switch and link. The SpaNSim is implemented in C++ and based on Qt and SystemC.

Unlike SpWNM, SpaNSim allows the user to create new device models and to write applications for them. A new device model can be implemented on basis of the existing one or without usage of existing models. For example, a new device can be created by changing terminal node links model or by changing the routing switch's arbitration scheme. For fast development, SpaNSim provides a set of ready-to-use functional units, so you can create a new device, connecting them to each other and setting their parameters. Devices and applications are implemented in C, C++ or SystemC language.

In SpaNSim it is possible to add new types of devices. For example, one can implement a bridge binding the SpaceWire network with another ones: MIL-STD-1553, CAN, RS422-485 and so on. Hereby, networks of devices operating on different transmission standards can be implemented and modeled together.

SpaNSim simulates transmission errors at bits level, giving the appropriate model of SpaceWire channel. Also, the network can be analyzed in detail at level of bits, symbols, packets or particular events. For example, you can look all bits transferred through the channel and see which bits were distorted and how it happened; you can analyze propagation of control codes or data packets; you can see where and when some timeouts happened, and so on.

Like SpWNM, for Windows the SpaNSim has the MS Visio plugin for graphical designing the networks. Since the OPNET Modeler program is also intended for graphical designing and analyzing of the networks, in the full paper we compare SpaNSim with this program.

References:

1. "SpaceWire Network Functional Model", Session "SpaceWire networks and protocols", International SpaceWire Conference, Dundee 2007