PROPOSED SOIS PLUG-AND-PLAY ARCHITECTURE AND RESULTING REQUIREMENTS ON SPACEWIRE MAPPING

Session: SpaceWire Networks and Protocols

Long Paper

Stuart D. Fowell

SciSys UK Ltd,
Clothier Road,
Bristol,
BS4 5SS,
UK

Chris Taylor

European Space Technology Evaluation Center,
2200 AG Noordwijk,
The Netherlands

E-mail: stuart.fowell@scisys.co.uk, chris.taylor@esa.int

This paper describes the proposed Plug-and-Play architecture of the Spacecraft On-board Interface Services (SOIS) area of the Consultative Committee for Space Data Standards (CCSDS), and the resulting requirements on the mapping of SOIS onto SpaceWire.

As part of the standardisation process for SOIS, a subnetwork neutral architecture has been defined. Mappings of this to capabilities of specific subnetworks, e.g. SpaceWire, MIL-STD-1553B and CAN, are then defined, allowing amongst other benefits for satellite architectures to be re-used across different busses. The first set of standards are currently being reviewed by the various Space Agencies and the mappings to different subnetworks being defined.

However, these standards only address a static or top-down configured communications architecture. It has been identified that the SOIS architecture needs extending to support “plug-and-play” concepts.

Firstly, this paper will define a number of use cases for “plug-and-play”, so as to reach a definition of the term “plug-and-play” in the scope of SOIS and to derive requirements that must be met by the SOIS Plug-and-Play architecture.

Secondly, this paper will propose a tentative SOIS Plug-and-Play architecture, based on initial analysis of the use-cases and consideration of existing plug-and-play technologies, e.g. USB 2.0, IEEE 1451, 1-wire as well as proposals such as those already made for SpaceWire.

Finally, this paper will propose draft requirements of the mapping of the SOIS Plug-and-Play architecture onto SpaceWire.

It is hoped that this paper will generate debate and feedback on the SOIS plug-and-play initiative that will, of course, be gratefully received and taken into account.