

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Space Systems and Architectures Featuring Cross-Platform Compatibility (7)

Author: Dr. Peter Mendham
United Kingdom, peter@star-dundee.com

Mr. Albert Ferrer Florit
University of Dundee, United Kingdom, aferrer@computing.dundee.ac.uk
Prof. Steve Parkes
University of Dundee, United Kingdom, sparkes@computing.dundee.ac.uk

STANDARDISED SENSOR AND ACTUATOR INTERFACES WITH SPACEWIRE-PNP

Abstract

SpaceWire is rapidly becoming a *de facto* communications standard within the space industry. SpaceWire represents a suitable point of convergence for data communication onboard spacecraft due to its simplicity, speed, low-power and reliability, providing the basis for interoperability between devices and components from different manufacturers and organisations. True interoperability of SpaceWire devices is not possible without the standardisation of various functions offered by the draft SpaceWire-PnP (Plug-and-Play) standard.

SpaceWire-PnP offers a number of benefits to SpaceWire networks including a standard method for discovery and verification of SpaceWire networks as well as configuration mechanisms for key network features. The standardisation offered by SpaceWire-PnP increases the potential for hardware and software reuse which creates a market for commercial-off-the-shelf components; a market which is accessible to smaller organisations with expertise in key niche areas, such as instruments and actuators.

This paper reviews the progress made on SpaceWire-PnP giving an overview of the protocol as a context for further discussion. The focus of the paper is the Generic Data Source and Sink service, incorporated into SpaceWire-PnP. This service provides a small number of highly flexible mechanisms suitable for sourcing data (such as from an instrument) and sinking data (such as to an actuator) in a standard manner. These mechanisms can be used to provide an arbitrary number of sources and sinks in a simple hardware device. The paper examines how each mechanism operates, both at a device and system level, indicating how the service leverages existing standards and well-established, widely available IP. A practical scenario is also presented to help place the service in context.

The paper concludes by considering the role that these Generic Source and Sink SpaceWire-PnP services have to play in the wider context of improving system interoperability and fostering a wider market in off-the-shelf components and systems.