

EVOLUTION OF THE MARC SPACEWIRE AND POWER DISTRIBUTION ARCHITECTURE FROM CONCEPT TO TESTED HARDWARE

Session: SpaceWire onboard equipment and software

Short Paper

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ABSTRACT

The paper describes the evolution of the Modular Architecture for Robust Computing (MARC) system from the initial design concepts to the developed and tested system hardware. The key design decisions to achieve the modular SpaceWire and power distribution network architecture are described with the supporting rationale.

The MARC concept is for a modular processing system that is interconnected by a SpaceWire network. The SpaceWire network can be expanded to include new functions and to provide duplicate paths to achieve the level of redundancy and performance needed for a particular mission. The modules in the MARC system make extensive use of the ESA RMAP IP Core.

The MARC system has been designed using the ATMEL AT697F processor and routers. The ESA RMAP IP Core is used for all module network interfaces. The Star Dundee SpaceWire brick is used as a component in the test hardware for stimulation and monitoring.

The network and power architectures are based on established spacecraft redundancy concepts and provide tolerance to single point failures. The MARC hardware has been tested and the capabilities, facilities and test results are summarised.