INCORPORATION OF THE ESA RMAP IP-CORE WITHIN MARC AND THE BEPICOLOMBO RIU

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Short Paper

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ABSTRACT

The paper describes the incorporation of the ESA RMAP IP Core within the Modular Architecture for Robust Computing (MARC) system and within the BepiColombo Remote Interface Unit (RIU).

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 needed for a particular mission. The modules in the MARC system make extensive use of the ESA RMAP IP Core.

The MARC development system implements the IP Core within Actel PRO-ASIC 3E FPGAs. Both SpaceWire initiator and SpaceWire targets have been incorporated in conjunction with the ATMEL SpaceWire routers to create a modular SpaceWire network architecture. The MARC project's aim is to demonstrate the essential features of a fault tolerant, high availability distributed avionics system.

Two RIUs are currently being developed by SEA for the upcoming ESA BepiColombo mission to Mercury. Each RIU will be used as a stand-alone unit within the BepiColombo Data Management System (DMS) and form the central interface units of the satellite. The RIU will utilise the ESA RMAP I/P core configured as SpaceWire targets and be embedded within Actel RTAX FPGAs.

The paper will summarise the implementation details and the performances achieved within both systems.