A TOOL FOR PERFORMING SPACEWIRE NETWORK AND FDIR ANALYSIS FOR THE MARC PROJECT

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Short Paper

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ABSTRACT

The Modular Architecture for Robust Computing (MARC) mini-project is analysis an ESA GSTP funded project being undertaken by Astrium UK, SciSys, and SEA. MARC is aimed at developing a decentralised onboard computing strategy and architecture which uses a reliable SpaceWire network as its communication backbone. The MARC system relies on a "health check" SpaceWire message exchange strategy to implement a hierarchical FDIR mechanism. The later is managed by using a specially developed offline SpaceWire network and FDIR analysis software application which is referred to as the MARC FDIR analysis tool.

The MARC FDIR analysis tool is conceived as an off-line application which would be run during the design phase of a system based on MARC. The tool is used to analyse the suitability of a given MARC SpaceWire network, in terms of its throughput and latency, to meet the system requirements. The tool is also used to enable the user to run fault injection as well as Fault Detection, Isolation and Recovery (FDIR) scenarios. The tool will then generate the FDIR and configuration tables associated with these FDIR scenarios. The resulting tables are ported to, and used as part of the MARC on-board 'FDIR manager' and 'Configuration Manager' software. These two on-board services form an integral part of the Generic Fault-tolerant Software Architecture (GenFAS) software framework being developed by SciSys under the same MARC mini-project.

This paper will describe the implementation and application of the MARC FDIR analysis tool to the MARC system and other similarly related SpaceWire network based systems.