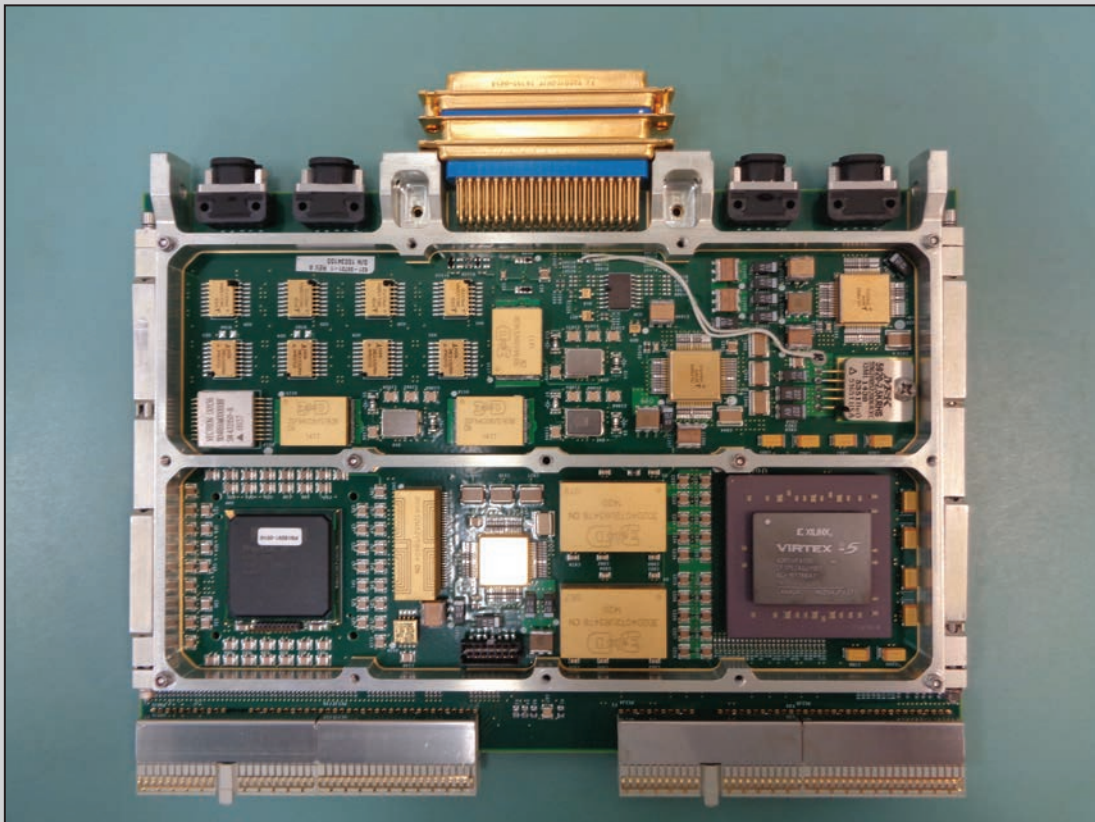
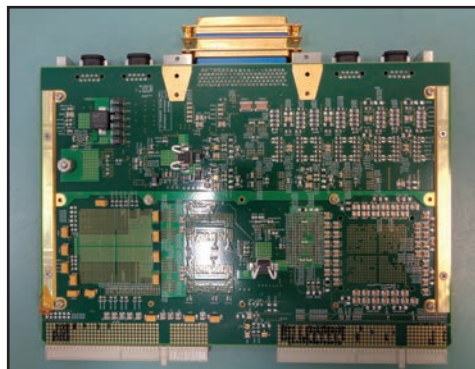


THE MAGELLAN FPGA-BASED RECONFIGURABLE PROCESSING PLATFORM

The Magellan FPGA-based Reconfigurable Processing Platform (FPGA-RPP) is a high performance, reconfigurable and radiation-hardened spacecraft processor board designed for the radiation environments of highly elliptical orbits (HEO), geostationary orbits (GEO), Lagrange points and deep space interplanetary missions.



HIGH PERFORMANCE • RECONFIGURABLE • RADIATION-HARDENED



OVERVIEW

The Magellan FPGA-RPP innovative architecture incorporates a pair of commercial rad-hard multi-core FPGAs with triplemodular redundant logic and autonomous reconfiguration capabilities that allow the RPP to correct errors due to radiation-induced single event upsets while processing for critical spacecraft or payload tasks. The FPGA-RPP hardware provides the capability to run multi-core symmetric or asymmetric multiprocessing, or single core applications depending on the selection of system software. If configured to use the Real-Time Executive for Multiprocessor Systems operating system, the RPP can provide the functionality of automatic load balancing and recovery in the presence of upsets. Integrated fault detection automatically allows tasks to migrate to the other processor without the harshness of a reboot. A prototype of the FPGA-RPP has been tested at the Tri-University Meson Facility proton source and successfully demonstrated an ability to operate in a 100 krad (Si) TID environment and mitigate upsets caused by LET up to 40 MeV·cm²/mg.

Acknowledgement

Magellan Aerospace gratefully acknowledges the support of the Canadian Space Agency, which provided funding for the development of the FPGA-RPP through its Space Technology Development Program.

KEY FEATURES AND CHARACTERISTICS

Mass:	0.84 kg
Power:	17 W (average)
Dimensions (L×W):	23 × 16 cm (excluding connectors)
Processing Core:	Customizable
I/O Interfaces:	(Baseline Gaisler LEON3)
Read/Write Throughput:	cPCI, Micro-D, D-Sub, Spacewire
Total Ionizing Dose (TID):	Up to 4.3 Gbps
Latchup Threshold:	100 krad (Si)
Technology Readiness:	40 MeV·cm ² /mg TRL 5

** Data for prototype. Design optimization for flight possible.*

ABOUT MAGELLAN AEROSPACE

Magellan Aerospace is a global aerospace company that provides complex assemblies and systems solutions to aircraft and engine manufacturers, and defence and space agencies worldwide. Magellan designs and manufactures aeroengine and aerostructure assemblies and components for aerospace markets, advanced proprietary products for military and space markets, and provides engine and component repair and overhaul services worldwide. Magellan is a public company whose shares trade on the Toronto Stock Exchange (TSX: MAL), with operating units throughout North America, Europe, and India.

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