
Deterministic Ethernet ASICs for the Orion MPCV

Application Specific Integrated Circuits (ASICs) Based on TTEthernet Ready for First Orion Test Flight

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TTTech, technology leader in robust networked safety controls, announces that the radiation tolerant Ethernet backbone ASICs, developed by Honeywell Aerospace and based on TTTech's TTEthernet switch and end system chip IP cores, are ready for the first NASA Orion Multi-Purpose Crew Vehicle test flight later this year. These ASICs are core components of the On-board Data Network (ODN) and enable the design of advanced integrated system architectures for human-rated space flight.

The ODN is a large multi-hop, redundant backbone network used for communication between vehicle management, avionics, power data units, and other major systems in Orion MPCV. The ODN will also interface to Orion's European Service Module (ESM).

These ASICs merge the core TTEthernet chip IP from TTTech with Honeywell IP to create a space radiation hardened version of TTEthernet referred to as TT-GbE (Time-Triggered Gigabit Ethernet), which offers fully deterministic networking performance, gigabit bandwidth, and robust bandwidth partitioning for complex integrated architectures.

"We are pleased with the opportunity to support Honeywell, Lockheed Martin, and NASA programs with advanced networking solutions based on mature and open Ethernet industry standards," says Larry Yust, Director Technical Sales for TTTech North America. "TTEthernet networks maximize the system flexibility by allowing the system architects to select different traffic classes and QoS based on the application needs. Any mix of the three traffic classes can be used to create a partitioned scalable network, where the operation of critical traffic is guaranteed not to be affected by non-critical traffic. This simplifies the design, integration, verification and maintenance of advanced Ethernet-based integrated systems that mix time-, safety- and mission-critical functions with non-critical functions".

TTTech provides compatible COTS switches and network interface cards to the Orion program partner labs for integration, testing, verification, and simulation.

The Deterministic Ethernet network based on Time-Triggered Ethernet (SAE AS6802) was selected by Lockheed Martin after several extensive Orion architectural trade studies which evaluated approximately 30 different technologies and standards. The focus of those trade studies was on technology maturity, system cost and size as well as weight and power (SWaP) optimization. Capabilities such as robust time synchronization, which supports fully deterministic communication for safety-critical applications, were key characteristics that led to the selection of TTEthernet for the Orion vehicle network. Another reason were the multiple traffic classes, which support command, status, audio and video.

TTEthernet and TT-GbE have been identified by the NASA Avionics Steering Committee in the 2013 Flight Avionics Hardware Roadmaps as foundational technologies for future space missions.

About TTTech Computertechnik AG

TTTech Computertechnik AG is the technology leader in robust networked safety controls. The company's solutions improve the safety and reliability of networked electronic systems in the transportation and industrial segments. Our product portfolio offers best-in-class certifiable products according to IEC 61508, ISO 26262, EN 13849, DO-254 and DO-178B requirements.

TTTech customers win as they deploy dependable networks and real-time controls more efficiently and profitably. Benefits include shorter time-to-market due to re-use of proven architecture, higher integration with reduced cost, ease of system integration, and obsolescence management as well as highly scalable and modular open real-time architectures.

More information about TTTech is available at www.tttech.com

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