US Air Force Research Laboratory Orders 20 Teraflop Rugged Computer System

GE Intelligent Platforms

HUNTSVILLE, AL -- GE Intelligent Platforms announced on January 7, 2014, that it has received an order from the High Performance Systems Branch (RITB) of the US Air Force Research Laboratory (AFRL) Information Directorate (RI) for a HPEC (High Performance Embedded Computing) [1] system that will enable the development and deployment of advanced neuromorphic architectures and algorithms for adaptive learning, large-scale dynamic data analytics and reasoning.

The system takes advantage of NVIDIA GPU [2] accelerators, leveraging the highly parallel nature of the technology to deliver maximum performance. The GE system will provide real-time processing for high bandwidth data derived from RF (radio frequency) sensors. It is designed to support the US DoD's High Performance Computing Modernization Program (HPCMP), and will be used for the development of next-generation radar programs such as Gotcha wide-area SAR (synthetic aperture radar).

The GPU-based HPEC system is housed in a 6U OpenVPX [3] rack mount chassis and is capable of delivering 20 teraflops (20 trillion floating point operations per second) in computing horsepower. The system is scalable and can be expanded to include additional racks and compute nodes.

"GE has long been a proponent of GPU accelerators as the optimum approach to solving the toughest problems facing military organizations today," said Rod Rice, General Manager, Military & Aerospace Products at GE Intelligent Platforms. "GPUs deliver an unbeatable combination of very high performance computing with minimal power consumption and heat dissipation in constricted spaces — characteristics that were key to AFRL awarding GE this order. GE's NVIDIA GPU-based products are helping to provide industry-leading solutions in many high profile programs."

"This embedded system, provides a path forward to apply large scale neuromorphic computing models for Air Force's state-of-the-art ISR platforms and systems," said Mark Barnell, HPS Program Manager, AFRL RITB.

"GPU accelerators enable clearer and faster insights by dramatically accelerating signal and video processing, while minimizing system size, weight and power consumption," said Sumit Gupta, General Manager of Tesla GPU Accelerated Computing at NVIDIA. "When combined with GE's HPEC system, AFRL will have access to unprecedented levels of computing horsepower to tackle even their most demanding computational challenges."

The GE HPEC system is m

odular in design, with each rack comprising five SBC625 single board computers [4] featuring quad core Intel Core i7 processors, and RDMA-capable Mellanox 10 Gigabit Ethernet/ InfiniBand [5] adapters. The single board computers are coupled with modules featuring the latest NVIDIA GPU accelerators based on the NVIDIA Kepler computing architecture, delivering a total of 13,440 cores. Inter-board communication is achieved via GE's 20-port IBX400 InfiniBand switch [6].

GE's High Performance Embedded Computing strategy is backed by a unique Center of Excellence. Opened in 2012, it provides the focus for the future development of ever-more-powerful products and solutions for military/embedded computing. Its primary goal is to support customers such as AFRL with consulting services designed to help them with architecture definition, application development, algorithm development and performance optimization — reducing cost and risk, and speeding time to deployment.

About GE Intelligent Platforms

GE Intelligent Platforms is a General Electric company, headquartered in Charlottesville, VA, and part of GE Energy Management. The company's Military/Aerospace business, headquartered in Huntsville, AL, and Towcester, England, provides one of the industry's broadest ranges of high performance, rugged, SWaP-optimized embedded computing platforms. Backed by programs that provide responsive customer support and minimize long term cost of ownership for multi-year programs, GE's solutions are designed to help customers minimize program risk and cost, and to speed time-to-market. For more information, visit defense.ge-ip.com.

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