NEWS RELEASE

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Curtiss-Wright Announces Industry's Highest Performance DSP/FPGA/GPGPU Technology Chain Solution Set for COTS-based ISR/EW Applications

COTS Open Standard ISR/EW Building Blocks Speed and Ease the Development of High Performance Embedded Computing (HPEC) Systems

ASHBURN, Va. – February 28, 2018 -- Curtiss-Wright's Defense Solutions division today announced that following the recent addition of new Xilinx® Virtex™ VU9 UltraScale+™ FPGA and NVIDIA® Quadro Pascal™ GPGPU COTS-based modules, and in combination with its previously introduced industry-leading family of Intel™ Xeon™ D multi-core based DSP modules, it now offers the embedded market's most powerful and flexible building blocks for architecting ISR and EW applications that require TFLOPS of accelerated processing. Curtiss-Wright's open standards based rugged OpenVPX™ and XMC modules greatly reduce the program risk associated with developing complex High Performance Embedded Computing (HPEC) systems. When developed using Curtiss-Wright's OpenHPEC™ Accelerator Suite open standards-based toolset, this complete ISR/EW technology chain enables system developers to more easily and quickly design and deploy the next generation of compute-intensive applications.

Curtiss-Wright already leads the embedded market with the most powerful DSP module available, the CHAMP-XD2, the industry's only dual 12-core Xeon-D processor 6U DSP OpenVPX module. The CHAMP-XD2, along with the 6U CHAMP-XD2M, the industry's first 16-core Xeon Processor D based COTS module to support up to 128 Gbytes of onboard DDR-4 memory (the maximum supportable by the processor), and the 3U CHAMP-XD1, offer the embedded industry's broadest range of Intel Xeon Processor D-based supercomputer-class OpenVPX DSP modules. In May, 2017, Curtiss-Wright announced that it was the industry's first COTS supplier to successfully qualify the full range of conduction cooled CHAMP-XDx DSP

modules to the -40°C to 85°C operating temperature range, ensuring that they are able to deliver unmatched performance in extremely harsh deployed defense and aerospace environments, including an unprecedented ability to mitigate processor “throttling” across the -40°C to 85°C (Level 200) operating temperature range.

Now, with the recent introduction of its Xilinx Virtex VU9 UltraScale+ based VPX3-535 FPGA 3U OpenVPX module, and three NVIDIA Quadro Pascal GPGPU powered OpenVPX modules, including the 12.4 TFLOPS Dual NVIDIA Quadro Pascal P5000 based VPX6-4943 6U OpenVPX processor card, Curtiss-Wright has significantly raised the performance bar, greatly increasing the amount of ISR/EW compute power that can be integrated into a rugged open standards system.

Even better, Curtiss-Wright is also leading the embedded industry in bringing the unprecedented thermal benefits of VITA 48.8 Air Flow Through cooling to advanced COTS DSP/FPGA/GPGPU modules that use today’s highest performance semiconductor devices. In addition to offering traditional conduction cooled variants of these new modules, Curtiss-Wright also offers support for VITA 48.8 AFT on these and other module types, including rugged Ethernet network switch cards.

The Curtiss-Wright ISR/EW Technology Chain Delivers Unprecedented Performance and Flexibility:

Dual Intel Xeon D DSP Module

- **CHAMP-XD2**: 6U OpenVPX Dual processor Xeon D. 8-core or 12-cores of AVX2-based Intel compute architecture per node. Designed for non-throttling performance, the CHAMP-XD2 has four 40 Gigabit Ethernet ports and 32 lanes of PCIe Gen-3 interconnect, ideal for interoperating with GPGPU and FPGA modules.

Intel Xeon D DSP Module

- **CHAMP-XD1**: 3U OpenVPX processor Xeon D. 8-core or 12-cores of AVX2-based Intel compute architecture. Designed for non-throttling performance, the CHAMP-XD1 can handle a 25W XMC thermal load, ideal for hosting a GPGPU or FPGA-based XMC.

Intel Xeon D DSP Module with Extended Memory

- **CHAMP-XD2M**: 6U OpenVPX processor Xeon D. 16-cores of AVX2-based Intel compute architecture. 128 GB DDR4 @ 2133 MT/s (34 GBps over 2 ECC channels).

NVIDIA Quadro Pascal OpenVPX Modules

- **VPX3-4923**: 3U OpenVPX GPGPU Processor Card with NVIDIA Quadro Pascal P5000, 6.2 TFLOP. The VPX3-4923 provides four DisplayPort™ 1.4 outputs. Memory support includes 16 GB GDDR5 memory with NVIDIA GPUDirect™ DMA technology.

- **VPX6-4943**: 6U OpenVPX GPGPU Processor Card with Dual NVIDIA Quadro Pascal P5000, 12.4 TFLOPS. The VPX6-4943 provides 8 independent DisplayPort 1.4 video outputs. Memory support includes 32 GB GDDR5 memory with NVIDIA GPUDirect DMA technology.

NVIDIA Quadro Pascal XMC Module

- **XMC-4902**: XMC (VITA 42) module GPGPU Processor Card with NVIDIA Quadro Pascal GP107, 2.3 TFLOPS. For less demanding applications, the XMC-4902, features a lower power Quadro Pascal GP107 GPU. It provides four DisplayPort 1.4 video outputs. Memory support includes 4 GB GDDR5 memory with NVIDIA GPUDirect DMA.

Xilinx UltraScale+ FPGA OpenVPX Module

- **VPX3-535**: VITA 48.8 AFT-cooled 3U OpenVPX FPGA-based transceiver card. Xilinx Virtex™ VU9 UltraScale+ FPGA to process dual 6Gsps 12b ADC/DAC channels on a single slot module solution with 6GHz bandwidth. Onboard Zynq® UltraScale+ MPSoC FPGA with embedded Quad-core ARM A53 processors.

Xilinx Kintex KU115 UltraScale FPGA OpenVPX Module

- **VPX3-534**: Conduction cooled 3U OpenVPX FPGA-based transceiver card. Xilinx Kintex KU115 UltraScale FPGA. This module supports the same dual 6 GSPS 12b ADC/DAC channels as the VPX3-535, and also supports an option for quad 3 GSPS ADC channels. Onboard Zynq® UltraScale+ MPSoC FPGA with embedded Quad-core ARM A53 processors.

About OpenHPEC Accelerator Suite:

Curtiss-Wright HPEC modules and systems are supported by the award-winning OpenHPEC™ Accelerator Suite of best-in-class software development tools. OpenHPEC Accelerator Suite eases, speeds and lowers the cost of ISR application development. Using non-proprietary open standard based software, these tools bring the benefits of open standard HPC software to the COTS market to effectively remove the risk from developing large scale embedded computer clusters. The tools include a broad and comprehensive array of open standard drivers, middleware and libraries. OpenHPEC Accelerator Suite also includes proven solutions for cluster-wide debugging tools, performance profiling, performance reports, data flow performance analysis, and built-in-test tools, all of which have already been developed and qualified for commercial HPC use.

System Level AFT Solutions

Curtiss-Wright's OpenVPX HPEC modules are designed to support VITA 48.8 AFT cooling. For today's COTS 3U and 6U VPX modules that dissipate ~150W+, VITA 48.8 provides a low-cost, effective means to cool the latest generation of high power components. Curtiss-Wright's groundbreaking AFT cooled system-level solutions for compute intensive C4ISR/EW applications deliver optimal performance for today's leading-edge semiconductor devices deployed in SWaP-optimized rugged chassis, and includes SBCs, FPGA modules, GPGPUs, and Ethernet switches.

The VITA 48.8 standard (ANSI ratified Standard ANSI/VITA 48.8-2017, "Mechanical Standard for Electronic VPX Plug-in Modules Using Air Flow Through Cooling") significantly reduces system size, weight, power and cost while increasing the reliability of avionics systems. It provides OEM suppliers with a license-free industry standard for cooling the latest high performance electronics used in demanding aerospace and defense applications. The VITA 48.8 Working Group was chaired by Curtiss-Wright. ANSI/VITA 48.8 compliant plug-in modules will provide government and industry customers. For more information about VITA 48.8 compliant modules, please contact the factory.

Fully Integrated HPEC Solutions

To reduce program risk, improve affordability, and speed time to deployment, Curtiss-Wright offers system integrators a range of development to deployment system options. This approach enables the system integrator to match the equivalent development system they need to the

appropriate stage of their program, while enabling application transfer between the stages with minimal effort.

For more information about Curtiss-Wright's Defense Solutions division, please visit www.curtisswrightds.com.

About Curtiss-Wright Corporation

Curtiss-Wright Corporation is a global innovative company that delivers highly engineered, critical function products and services to the commercial, industrial, defense and energy markets. Building on the heritage of Glenn Curtiss and the Wright brothers, Curtiss-Wright has a long tradition of providing reliable solutions through trusted customer relationships. The company employs approximately 8,600 people worldwide. For more information, visit www.curtisswright.com.

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