NEWS RELEASE

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Curtiss-Wright, Green Hills, and Harris are First to Demo FACE™-Conformant Software Running Simultaneously on x86 and Power Architecture Platforms

Demo features Harris's FACE-conformant FliteScene® Digital Moving Map Software and Curtiss-Wright 3U OpenVPX Single Board Computers and Graphics Modules

U.S. Army FACE™ Technical Interchange Meeting (TIM), HUNTSVILLE, Alabama (Booth #22) – Sept 18, 2018 – Curtiss-Wright's Defense Solutions division, in collaboration with Harris Corporation and Green Hills Software® (GHS), has publicly demonstrated the first working example of a FACE-conformant operating system (OS) and FACE-conformant software application running simultaneously on two completely different processor infrastructures (Intel® and NXP® Power Architecture®). The demo featured Harris's popular FACE-conformant FliteScene Digital Moving Map software running on top of GHS's industry-leading and FACE-conformant INTEGRITY-178 tuMP™ real-time multicore OS.

The commercial off-the-shelf (COTS) module hardware solutions showcased in the demonstration included Curtiss-Wright's NXP Power Architecture QorIQ™ Quad-core AltiVec™-enabled T2080 processor-based **VPX3-152, a DO-254 safety-certifiable 3U OpenVPX single board computer (SBC)**, and the **VPX3-1258, a 4th Gen Intel® Core™ i7 (Haswell) processor-based 3U OpenVPX SBC**. The demonstration of two completely different hardware instantiations running the exact same OS and application software highlighted how the use of a FACE-conformant software infrastructure enables operators of different aircraft types to run common capabilities on hardware solutions that have been size, weight, power and cost (SWaP-C)-optimized for each individual platform.

"We are very proud, in collaboration with Green Hills and Harris, to have shown the first public demonstration of FACE-conformant software running simultaneously on heterogeneous processor

architectures," said Lynn Bamford, Senior Vice President and General Manager, Curtiss-Wright Defense Solutions division. "The promise of FACE is to deliver greater flexibility to military system designers while simplifying their logistics, boosting interoperability, and eliminating costly proprietary solutions. This successful demonstration helps advance that promise from theory to practical reality."

Today, as 3U VPX becomes the industry standard (replacing the ubiquitous 6U VME form factor), leading COTS vendors offer a wide range of 3U OpenVPX processors that are based on Intel x86, Power Architecture, and Arm architectures (including DO-254 safety-certifiable solutions) that can be rapidly deployed in a rugged chassis for applications onboard fighter jets, cargo aircraft, and helicopters. The availability of GHS's FACE-conformant INTEGRITY-178 tuMP OS to support all of these processor types provides system designers with the ability to select the optimal mix of processors and OS when integrating a FACE-aligned, SWaP-C-optimized system.

About FACE

FACE is a government-industry software standard and business strategy for acquisition of affordable software systems that promotes innovation and rapid integration of portable capabilities across global defense programs. Certon, an affirmed FACE Verification Authority, completed all verification activities on the FliteScene software in accordance with the FACE Technical Standard and FACE Conformance Policy, resulting in Harris receiving FACE Conformant Certificate #2. Certon was also the FACE verification authority for Green Hills' RTOS.

About Green Hills Software INTEGRITY-178 tuMP RTOS

The INTEGRITY-178 tuMP, the first true multicore operating system to conform to the FACE Technical Standard, is conformant to the FACE 2.1.1 Technical Standard. It conforms to both the FACE Safety Base and Security Profiles for the C, C++ and Ada programming languages. The RTOS has successfully met the DO-178 DAL A certification objectives multiple times across several different multicore SOC architectures, each of which featured a different core design. It is available for all of Curtiss-Wright's DO-254 safety-certifiable products including its Power Architecture, Intel, and Arm-based SBCs. (www.ghs.com)

GHS FACE Conformance Certificate numbers:

- INTEGRITY-178 tuMP for Intel – Certificate number 152443467 issued Apr 22, 2018
- INTEGRITY-178 tuMP for PowerPC – Certificate number 25338888 issued March 5 2018

- INTEGRITY-178 tuMP for Arm – Certificate number 25338915 issued March 5 2018

About the VPX3-152 Single Board Computer

Curtiss-Wright's VPX3-152 is a DO-254 DAL A safety-certifiable COTS SBC. The rugged 3U OpenVPX module features NXP's QorIQ® T2080 multicore SOC. For safety-certifiable SBC designs, the QorIQ T2080, a quad-core AltiVec™-equipped 64-bit Power Architecture SOC processor, has emerged as a de facto standard thanks to its support from a wide range of proven and trusted OS vendors, including Green Hills Software, Lynx Software Technologies®, SYSGO®, and Wind River®. Curtiss-Wright designed the 3U VPX VPX3-152 from the ground up to be cost-effective and to support DO-254 DAL A safety certifiability for critical defense and aerospace avionics applications. Designed around the NXP T2080 SOC, the VPX3-152 takes full advantage of the T2080's features to reduce the chip count and complexity, which lowers the cost and the risk associated with the safety certification effort. Designed for use in size, weight, and power (SWaP)-constrained applications, the VPX3-152's compact 3U design is ideal for use in a wide range of C4ISR applications deployed in harsh environments, especially those that require safety-certifiable DO-254 hardware and DO-178C software.

About the VPX3-1258 Single Board Computer

Curtiss-Wright Defense Solutions' VPX3-1258 is a high performance 3U OpenVPX SBC featuring the latest 4th Gen Intel Core i7 (Haswell) processor. Pin-compatible with Curtiss-Wright's previous generations of Intel SBCs, the VPX3-1258 offers the highest performance Intel processing in the smallest 3U form factor. The Intel Core i7 processor offers Quad-Core (8-thread) performance at 2.4 GHz. With up to 16 GB of dual-channel high speed ECC protected DDR3 memory, the VPX3-1258 provides up to 25.6 GB/s memory throughput, maximizing the capabilities of the processor. The processor also features AVX and AVX2 SIMD extensions, accelerating math-intensive algorithms. The Intel Core i7 processor includes an enhanced Intel HD Graphics 4600 GPU, offering discrete GPU performance with OpenGL® for graphics-intensive applications, and also serving as a 20-core GPGPU with performance up to 320 GFLOPS with OpenCL™ support for data processing-intensive applications.

About the VPX3-716 Graphics Module

Both the VPX3-152 and the VPX3-1258 were combined with Curtiss-Wright's VPX3-716 3U OpenVPX high performance graphics processor based on the AMD Radeon E8860 Graphics Processing Unit (GPU). The E8860 meets the long lifecycle availability required for military

programs through the use of a suite of CoreAVI software drivers and 20-year component supply program. Designed for high reliability, the VPX3-716 is especially well-suited to support embedded training, moving maps, Geographic Information Systems (GIS), 360 degree situational awareness, Degraded Visual Environment (DVE) and other graphics, video and compute-intensive applications.

About Harris FliteScene Digital Map

The Harris FliteScene Digital Map open-architecture system provides situational awareness for both civilian and military operations. It supports advanced terrain awareness and obstacle avoidance features and offers three-dimensional synthetic vision modes. It has been integrated with modern tactical networks such as Link 16 and ANW2 providing a full real-time common operating picture. FliteScene supports a standard OpenGL interface that can be integrated with COTS processors and graphic accelerators. This combat-proven, feature-rich digital mapping software solution enables system integrators to seamlessly integrate critical situational awareness capabilities into demanding commercial and military airborne platforms. It provides scalable and configurable 2D and 3D terrain images, street maps, map overlays, and mission planning capabilities required for demanding aerospace, defense, law enforcement, fire, and search and rescue applications. For more information about FliteScene, please visit www.harris.com/solution/flitescene-digital-map.

FliteScene Performance Features:

- Capable of displaying raster maps in all relevant formats and scales
- 2D and 3D views for both cockpit and wingman, with extended scene and enhanced performance
- Map overlays for elevation, depth, vectors, targets, and other line-of-sight objects
- Multiple map underlay layers including terrain and bathymetry
- Multi-vehicle tracking and sensor footprint display
- Configuration via XML configuration files
- Multi-channel output with pan/zoom, and orientation capabilities

Sales inquiries: Please forward all Sales and reader service inquiries to ds@curtisswright.com.

For more information about the Curtiss-Wrights 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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