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2020 Military & Aerospace Technology Innovators Awards announced for aerospace and defense achievement

Awards are in three tiers -- ranging from platinum, the highest, to the gold awards, and finally to the silver awards.



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NASHUA, N.H. – Military & Aerospace Electronics and Intelligent Aerospace have announced their 2020 [Technology Innovators Awards](#) to recognize companies offering substantial military, aerospace, and avionics design solutions.

Awards are in three tiers -- ranging from platinum, the highest, to the gold awards, and finally to the silver awards -- and are based on the recommendations of an independent panel of industry judges.

Platinum awards

The TITAN On Board Vehicle Power (OBVP) system for medium tactical vehicles and heavy trucks from a partnership of Leonardo DRS and Allison Transmission uses a transmission integral generator is able to produce as much power as 125 kilowatts. The retrofit kit encompasses the same volume as the standard transmission, and converts mechanical energy into electrical energy directly from the vehicle's engine. The system is maintenance-free, extends battlefield mobility, and reduces logistical footprint.

The 20-nanometer radiation-tolerant XQRKU060 Kintex UltraScale field-programmable gate array (FPGA) from Xilinx Inc. enables spacecraft designers to get hundreds of gigabits per second of processing capacity in orbit to enable seamless connectivity aboard broadband satellites. The XQRKU060 FPGA enables designers of high-throughput and high-bandwidth satellites to process data on board with a 10X increase in digital signal processing capability over the prior-generations Xilinx Space FPGA to handle the task of processing raw sensor information and render usable images.

The RuggedCONNECT smart video switcher from Pleora Technologies can help increase intelligence, awareness, and safety while reducing cognitive burden for military vehicle crew members. Manufacturers can design standards-compliant vehicles that are rapidly deployable, mission configurable, and cost-effective. The scalable platform can help implement advanced and future capabilities like machine learning, artificial intelligence, and new sensors to increase mission effectiveness with minimum integration effort. The RuggedCONNECT smart video switcher acquires and processes data from several cameras and sensors into a standardized feed that transmits over a low-latency, multicast Gigabit Ethernet network to processors and displays for vehicle-based local situational awareness and driver vision enhancer applications.

The SIU36 configurable 3U OpenVPX COTS system from North Atlantic Industries (NAI) is a sensor interface unit that focuses on the OpenVPX and COSA architectures to make the most of I/O density. The configurable rugged COTS system is for military, industrial, and commercial applications with the option to use as many as six NAI 3U OpenVPX boards and align with MOSA, OSA, SOSA, and the FACE technical standards. The system makes six card slots available, and offers the option to configure as many as 18 I/O and communication function modules.

The Safety Critical Advanced Compute Solution from CoreAVI and Wind River Systems combines CoreAVI's VkCore SC Vulkan driver, ComputeCore GPGPU compute library, and Wind River's VxWorks 7 real-time operating system. It offers object tracking capabilities through compute; safety critical capabilities; graphics and compute capabilities on one GPU; a real-time operating system for deterministic applications; connectivity and communications; multi-core and multiprocessing support; and a low-risk business model.

The Connected Vest from Wearin' SA is a centralized integrated connectivity system for the infantry warfighter with an integrated distributed data and power bus that can eliminate the need for several batteries, external wires, and break-out cables that can weigh soldiers down and limit their movements. The vest offers optimized power management through the single central power source; enhanced usability through optimized cable management; and convenience from the integrated data and power bus for easy cleaning and replacement, as well as for technological upgrades when more advanced components become available.



The QGen model-based development tool suite from AdaCore includes a qualifiable code generator for the MathWorks Simulink/Stateflow modeling language, which generates C or Ada source code from the model, without human intervention. Developed by AdaCore, the QGen code generator is being qualified by AdaCore and their partner Verocel at tool qualification level one (TQL-1), which is the highest level of qualification recognized by the U.S. Federal Aviation Administration (FAA). The fundamental goal of a qualified code generator is to ensure that the software that is auto-generated has identical semantics to the original model, ensuring that any

activities performed at the model level through simulation will produce identical behavior on the final target.

The TranzPak 2 Tracker (TP2 Tracker) from ZMicro Inc. is a removable data storage solution for military applications that enables users to enforce data security policies automatically. The TP2 Tracker is a lightweight rugged removable solid-state device (SSD) that can generate a label dynamically that is written to its built-in e-paper display. The label automatically updates to ensure that it accurately describes user data, security data, and administrative data. This information is stored as metadata in non-volatile memory on the device and enables automatic enforcement of data encryption and access policies.

The CIOE-1390 from Mercury Systems is a COM Express-based processor module that capitalized the collaboration between Intel and Mercury's design and flight safety certification experts to deliver flight safety-certifiable multicore processing resources. Safety certification is a critically important requirement for commercial aircraft avionics. Complying with the associated standards is time-consuming and expensive, but they must be applied rigorously to ensure the safety of incredibly complex systems. To address the demand for onboard avionics processing, the device has the Intel Atom multicore processors and embedded BuiltSAFE technology capable of flight safety certification. The CIOE-1390 are rugged, small form factor COM Express Type 10 Mini processor modules that are powered with either a dual- or quad-core E3900 Atom Apollo Lake processor, and are available with DO-254 DAL-C flight safety certification evidence for the circuit card assembly and DO-178C DAL-C evidence for custom BIOS and bootloader software.

The Secure Wireless Command Post (SWCP) from PacStar is a small, modular communications package that enables warfighters to transmit classified and unclassified information securely in tactical settings while using their Wi-Fi and LTE-enabled commercial smartphones and tablet computers. PacStar SWCP has proven transformation for military requirements because it marries a modular communications package of hardware and software that reduces the management burden for tactical high-security communications. At the same time, PacStar shrunk the software/hardware package down to where it could be deployed practically in tactical environments. Prior to PacStar SWCP, it simply was not possible for DoD organizations to deploy CSfC in tactical settings.

The MTS-3060A SmartCan Universal O-Level Armament Test Set from Marvin Test Solutions Inc. addresses the challenges of performing flightline test activities with an existing generation of armament test sets

that limit the ability to verify armament system functionality, failures, and readiness. The system can perform flightline test and measurement of all fighter aircraft armament and gun systems. The SmartCan weighs 4.2 pounds, and incorporates more than 30 measurement channels, electronic loads, communications interfaces, a switch matrix, and video/audio signal generators, and cable ID. It is lightweight, cyber secure, battery powered and rugged, and eliminates the need for multiple test sets and cables. Broad measurement capability with more than 30 analog and digital measurement channels enables maintenance testing on armed legacy or 5th generation aircraft. The test set employs smart weapon emulation - enables active versus conventional passive testing.

The VPX3U-XAVIER single-board computer from Wolf Advanced Technology is designed to use an NVIDIA Jetson AGX Xavier in a rugged 3U VPX military and aerospace environments, at the edge, while also adding SDI and CVBS signal conversion capabilities in air- and conduction-cooled versions. Other innovations include the addition of solid-state drive options as large as 1 terabyte. The WOLF VPX3U-XAVIER-SBC is the only product, thus far, that enables the NVIDIA Jetson AGX Xavier to be used at the level of ruggedness required by military and aerospace applications at the edge. The VPX3U-XAVIER-SBC is a single board computer and thus does not require a host to operate, yet it can also work with a PCIe switch with non-transparent-bridge capability. Multiple WOLF VPX3U-XAVIER-SBC's can be configured to work together in a chassis.

The Data Distribution Unit-Expandable (DDUx) from Leonardo DRS is designed to eliminate the need for several line-replaceable units on a vehicle or weapon system. The multi-purpose design creates the ability to reduce size, weight, power consumption, and cost, and facilitates the integration and convergence of C5ISR, EW, SIGINT and cyber on vehicles and dismounted access to those systems. The DDUx provides an assured edge processing and storage system for platform Cyber including but not limited to protect, defend, identify, isolate/mitigate, restore and report Cyber threats while maintaining the integrity of platform microsystems, subsystems for today and for the next generation of tactical computers. It enables the integration and use of Artificial Intelligence (AI) on data collected and stored at the edge and is stackable to support multi-domain operations. The DDUx also facilitates multipurpose utilization for multiple ground and air platforms.

The Techaya MILTECH404 from MilSource is an integrated soldier power and data management system (ISPDS) that combines USB, serial, and SMBUS communication along with full smart power management for infantry soldiers. The MILTECH 404 helps create an open architecture and

open communication system for field deployable applications. It supplies one port of Fast Ethernet, three USB 2.0 ports, one serial port and one external power source. MIL-STD 810F and IP 68 rated, the MILTECH 404 weighs 300 grams. As the number of soldier-carry technologies continues to expand, each of these technologies requires power. Without the necessary power, the wearable technologies become additional burdens on the battlefield: these technological breakthroughs meant to help soldiers effectively execute a mission can instead put them in harm's way.

The RFM3103s from Mercury Systems is an ultra-wideband dual upconverter, designed to align with the emerging sensor open systems architecture (SOSA) technical standards for demanding electronic warfare (EW) environments. The rugged, compact dual upconverter pioneers system interoperability and upgradeability, supporting an increased and more diverse range of unmanned systems on various platforms including ground, airborne, and subsurface. This SOSA-alignment product contributes to how profoundly more accessible this technology is to aerospace and defense industries. Packages in a low-SWaP 3U module, the RFM3103s is optimized for future upgradeability, and is for electronic attack, ELINT, and beamforming systems.

The IC-ARM-VPX3a from Interface Concept is a 3U VPX single-board computer that supports 100-Gigabit Ethernet on the backplane. It has the NXP Arm Cortex-A72 based LX2160A multicore communications processor, and meets the 25 gigabit-per-second Ethernet interfaces on a 3U VPX system backplane specified by the Sensor Open Systems Architecture (SOSA) working group. The NXP Layerscape LX2160A processor combines the low power of FinFET (Fin Field Effect Transistor) process technology, sixteen Arm Cortex-A72 cores up to 2.2 GHz with data path acceleration for L2/3 packet processing, security offload, and traffic management. This board complies with VITA 65.0 standard. It comes with a boot loader and with a Linux or VxWorks BSP. It is available in air-cooled and conduction-cooled versions.

The WILDSTAR 100 Gigabit Ethernet OpenVPX switch from Annapolis Micro Systems Inc. delivers as much as 6.4 terabits per second of switching between backplane slots of multiple channels of 100 Gigabit Ethernet; as many as 26 40 and 100 Gigabit Ethernet ports; seven optional 40 and 100 Gigabit Ethernet optical interfaces to VITA 66; four optional 40 and 100 Gigabit Ethernet optical interfaces to the front panel; air, conduction, or liquid cooling; alignment with the SOSA technical standard; and compliance with VITA 65. These high-performance products are designed for advanced HPC, ISR, and multi-function EW applications, including phased array radar, cyber security network processing, DRFM,

beamforming, sensor processing, wireless communication, and radar signal processing.

The PNA/PNA-X network analyzers from Keysight Technologies Inc. provide low phase noise on a network analyzer, enabling users to save time by measuring with a wide IF bandwidth without using averaging. The low phase noise enhances the performance of the wide range of PNA software applications. With a new direct digital synthesis (DDS) source, the PNA and PNA-X provide extremely low phase noise, enhancing applications such as modulation distortion, nonlinear vector network analysis (NVNA), SMC with phase, differential mixer measurements, and I/Q converter measurements. Users can eliminate a signal generator from the mixer test setup. They also can perform gain compression measurements without the need to average multiple sweeps.

Gold awards

The SCM6010 OpenVPX data storage modules from Mercury Systems feature non-volatile NVMe M.2 memory for high-speed, low-latency performance. Their removable storage canisters are for rapid mission updates, removal of sensitive material and technological refreshes.

The GORE PHASEFLEX RF and microwave test assemblies from W. L. Gore & Associates Inc. have durable construction with inner layers that provide electrical performance and outer-layer protection enable these test assemblies to perform throughout the life of a system.

The ISL70005SEH from Renesas Electronics Corp. is a radiation-hardened dual output point-of-load regulator that combines the high efficiency of a synchronous buck regulator with the low noise of an LDO regulator for systems with 3.3- or 5-volt power buses.

The Field Master Pro MS2090A from Anritsu Co. can measure the amplitude of one spectrum event as short as 2 microseconds and detect an event as short as 5 nanoseconds in a ruggedized, size, weight, and power (SWaP) optimized, field-deployable handheld spectrum analyzer.

The JetSys 5320 Rugged SFF Platform for AI from Elma Electronic is a small, high-performance edge computing platform based on the NVIDIA Jetson module for artificial intelligence (AI) and other image-processing applications.

The Pumped Two-Phase (P2P) Cooling system from Advanced Cooling Technologies Inc. uses vaporization instead of liquid cooling to offer high heat flux capabilities; uniform temperature distribution over large surfaces; and small flexible packaging; and high reliability.

The DuraMAR 6300 rugged Cisco-based Gigabit Ethernet router from Curtiss-Wright Defense Solutions integrates a Cisco ESR-6300 embedded services router card running Cisco IOS-XE software. It is built on trusted Cisco Systems IOS-XE technology for cyber security in a miniature IP67-rated fanless chassis.

The VP430 RFSoc board from Abaco Systems has the 8x8 Xilinx Radio Frequency System On Chip, RFSOC Technology, which combines FPGA processing, multi-processor embedded ARM Cortex-A53, ARM real time processing unit (RPU) and eight A/D and D/A input channels on the 3U VPX standard form factor.

The LAD2150 rugged large-area display from Mercury Systems is a dual-redundant AMLCD display with 1.3 billion colors and 1024 gray shades to enable the viewer to identify objects at extended distances with day and night backlight approaches.

The PIP40 family of rugged embedded computers from MPL AG is based on the Intel 9th Generation CPU. The fanless embedded computer is ruggedized against the effects of shock, vibration, and extended temperatures, and are designed for long-term availability.

The Keysight Z2098B Threat Simulation System from Keysight Technologies Inc. Keysight Technologies Inc. enables users to develop and test sophisticated electronic warfare (EW) systems incrementally based on their needs and budget by combining hardware, software, and services.

The RP24 1,000-Watt power system from Elma Electronic offers protection from electro-magnetic pulse (EMP), overvoltage, shock, and vibration, and is qualified for operation in field deployment, ground vehicles, helicopters and other aircraft.

The VPX3-673 Assured Position, Navigation and Timing (A-PNT) Card from Curtiss-Wright Defense Solutions is a specialized single-board computer and timing card to eliminate the need for multiple in-platform boxes to field new navigational capabilities on ground vehicles.

The DCM5614 isolated regulated 270V-28V DC-DC converter from Vicor Corp. offers a power density of 451 Watts per cubic inch at 178 grams for manned aircraft, ships and submarines, and unmanned aerial vehicles where power density, weight and efficiency are critical.

The VME-1910 single board computer from Curtiss-Wright Defense Solutions brings the latest rugged, high-performance Intel processing technology and enhanced trusted computing to replacing legacy computer boards in existing VME systems.

The model 6001 8-Channel A/D & D/A Zynq UltraScale+ RFSoc Processor from Pentek Inc is a high-performance system-on-module (SoM) based on the Xilinx Zynq UltraScale+ RFSoc FPGA with eight integrated RF-class A/D and D/A converters.

Silver awards

The SupIR-SMD Rad Hard MOSFET package technology from International Rectifier HiRel Products Inc. offers a patented multi-layer base design, enabling a gradual CTE change from ceramic to PCB and reducing stress of a large CTE mismatch; and curved wide flat leads, formed to surface mount configuration to give additional stress relief.

The SBC3511 3U VPX single-board computer from Abaco Systems is a SOSA-aligned 3U system that offers high performance, advanced security and leading-edge thermal management, thanks to the long-lived Xeon E3 processor with integrated GPU.

The Space Qualified InGaAs Quad PD + TIA Photoreceivers from Discovery Semiconductors Inc. offers a large active area diameter; small photodiode capacitance; small crosstalk between adjacent quadrants; resilient to radiation for space qualification; and comprehensively tested for radiation background for the space environment.

The M4054 SOSA Aligned 3U VPX from Milpower Source is a VITA 62-compliant 3U DC-DC power supply that is SOSA aligned for 12-volt DC heavy payload applications. It can be configured to support airborne applications per MIL-STD-704 and ground applications per MIL-STD-1275 & Def Stan 61-5.

The EnsembleSeries DCM3220 3U low latency digital transceiver from Mercury Systems has high spectral processing density, and integrated

FPGA processing for system security engineering, and is coherent and spectrally pure for electronic warfare (EW) applications.

The TRM Custom 10-Way Power Divider from TRM Microwave is a high-power device, 140 Watts CW at UHF frequencies with tight amplitude and phase tracking requirements.

The Eurofighter Defensive Aids Sub-System (DASS) End-to-End Test (EETE) Suite (AGERD B1162) from Leonardo DRS is an integrated electronic warfare system (EW), with a significant array of antennae for both ESM and ECM functions, with an active missile warning system and RF towed decoys.

The NETernity GBX25 communications switch from Abaco Systems enables users to free-up slot space, power, and cooling resources in existing chassis by using one switch to replace several switch cards while maintaining a range of communication protocols.

The ADSR-4003 advanced data server and recorder from Curtiss-Wright Defense Solutions can host as many as four host cards for custom data acquisition by integrating three independent solid-state recorders with capacity to 256 gigabytes each into a single unit.

The VITA 48.4 liquid flow-through (LFT) rugged ATR platform from Elma Electronic is designed for data rates as fast as 10 gigabits per second, with eight 6U slots on a 1.2-inch pitch. It is designed to accommodate boards requiring VITA 48.4 LFT liquid flow-through cooling.

The 25G SI Probe Card for OpenVPX Backplane Testing from Elma Electronic exhibits a low-loss launch design using a very low loss dielectric material. A successful low loss launch is very good return loss, meaning the design launches with minimal reflections.

The ComSys 5371 rugged Type 7 COM Express CPU from Elma Electronic features an Intel Xeon server-grade processor with high bandwidth network connectivity via 10 Gigabit Ethernet fiber ports along with increased number of PCI Express ports for added I/O expansion potential.

The M3GB 120-volt input rad hard hybrid DC-DC converter from International Rectifier is a radiation-hardened power supply that uses hybrid technology. It is qualified to MIL-PRF-38534 Class K with DLA

Standard Microelectronics Drawing (SMD) for use aboard orbiting spacecraft.

The SFM6126 OpenVPX wideband PCI Express switch from Mercury Systems switches the control and expansion planes with a PCI Express architecture that delivers a performance boost to OpenVPX subsystems for contemporary AI and other big-processing algorithms.

The GVDU ground vehicle display unit from Curtiss-Wright Defense Solutions combines military rugged design in a size-, weight-, and power-optimized display with high performance and GVA programmable bezel buttons and video over Ethernet capability based on the MODUK DEF-STAN 00-82.

<https://www.militaryaerospace.com/defense-executive/article/14182910/2020-military-aerospace-technology-innovators-awards>