



Open Standards, Open Markets

Market Research

VITA Market Developments

2021 Q3 Report
December 2021

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Embedded Market Research



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Brian Arbuckle Autobiography

Brian Arbuckle is a market analyst specializing in embedded computing. Brian has an engineering degree from the University of Warwick and an MBA. His career has spanned marketing management roles in industry for electronic and mechanical components and systems and communications networks. He has worked in analyst roles for technical market research organisations, IHS Markit and Informatech and in recent years has authored an annual market research report on the embedded computing industry.

Forward

VITA has commissioned this market research to gather information on data related to the most popular of VITA standards. We are planning quarterly updates on trends, contracts, and products. A comprehensive research report of the market for VITA standard products is in final preparation. The report, largely based on a VITA member survey of sales in 2019 and 2020, will shortly be available to order directly from VITA.

This paper reviews highlights and developments during the third trading quarter of 2021 and the trends that are driving technology development for VITA technology boards and systems.

All dollar amounts are in USD.

Introduction

The military and critical embedded computing market remains healthy, judging by encouraging growth reported by the leading VITA board and system suppliers in their SEC returns and the number of new VITA Standards-based products announced in Q3.

Financial Results

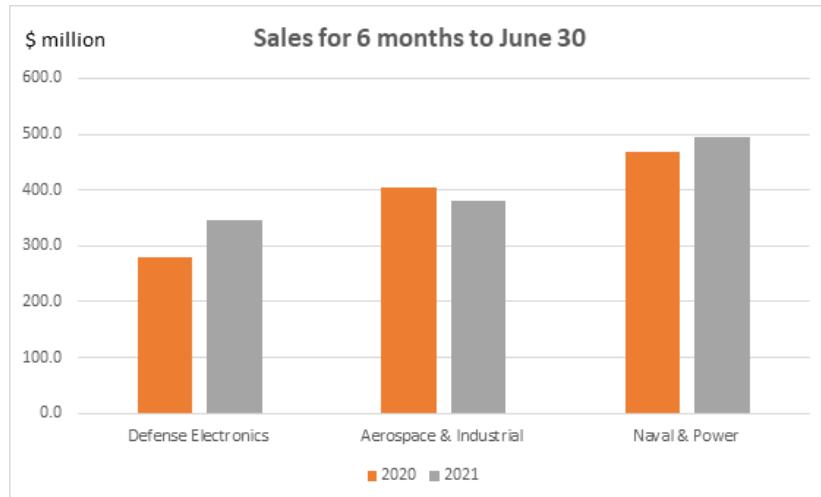
Results published by Curtiss-Wright Defense Systems and Mercury Systems in the last quarter provide an insight into the general health of the VITA market.

Curtiss Wright Corporation published its second quarterly SEC return on August 4th 2021.

Total sales during the six months ended June 30, 2021 increased \$67 million, or 6%, to \$1,219 million, compared with the prior year period. On a segment basis, sales from the Defense Electronics and Naval & Power segments increased \$64 million and \$27 million respectively.

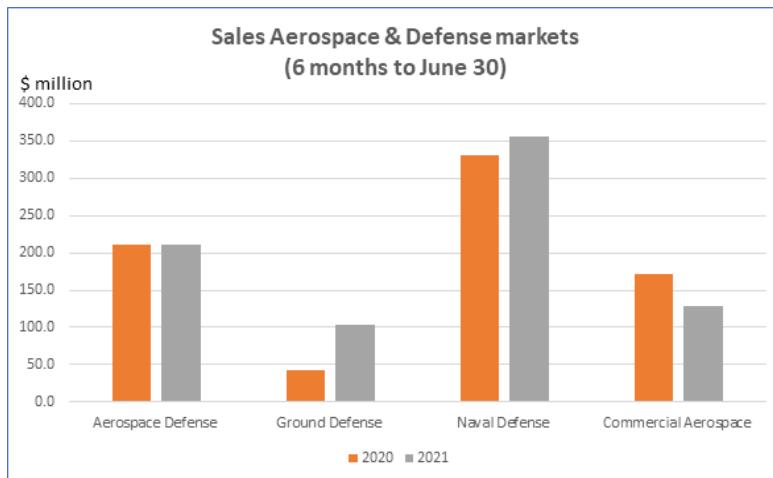
Sales in the Defense Electronics segment are primarily to the defense markets and, to a lesser extent, the commercial aerospace market. (The Defense Aerospace segment (15% of total revenue) comprises embedded computing and sensors and will contain the most VITA-standard systems sales).

Sales during the six months ended June 30, 2021 in the Defense Electronics segment increased \$64 million, or 23%, to \$345 million from the prior year period, primarily due to the incremental impact of the PacStar acquisition in the ground defense market, which contributed sales of \$64 million.



Total Sales (for 6 months to June 30, \$M USD)	2020	2021	Change
Defense Electronics	280.2	345.8	23.4%
Aerospace & Industrial	404.6	381.4	-5.7%
Naval & Power	468.0	495.1	5.8%

Net sales disaggregated by customer type (from the Quarter 2 SEC return) are as follows:



Aerospace & Defense Sales (for 6 months to June 30, \$M USD)	2020	2021	Change
Defense Electronics	280.2	345.8	23.4%
Aerospace Defense	211.1	211.0	-0.1%
Ground Defense	42.7	104.0	143.6%
Naval Defense	330.6	355.6	7.6%
Commercial Aerospace	171.8	128.8	-25.0%
Total	756.2	799.7	5.7%

Aerospace and Defense sales during the six months ended June 30, 2021 increased \$43 million, or 6%, to \$799 million, primarily due to higher sales in the ground defense and naval defense markets. The ground defense market benefited from the impact of the PacStar acquisition, which contributed incremental sales of \$64 million. In the naval defense market, sales benefited from increased production on the CVN-81 aircraft carrier program as well as higher service center and foreign military sales. These increases were partially offset by lower sales in the commercial aerospace market during the first quarter of 2021 due to a pandemic-driven decline in demand for sensors products and surface treatment services.

While no new acquisitions were made during Quarter 2, the significance of recent acquisitions is emphasized by the relatively weak organic growth. Mergers and acquisitions in the embedded computing sector have been identified by Curtiss-Wright as a priority towards strategic acceleration

Mercury Systems published full year fiscal 2021 results with their fiscal year ending June 30. Mark Aslett, Mercury's President and Chief Executive Officer commented "As expected, the quarter and fiscal year were more challenging as a result of program delays which are likely to also impact fiscal 2022."

Full year fiscal 2021 revenues were \$924.0 million, compared to \$796.6 million for full year fiscal 2020. The full year fiscal 2021 results include organic revenue of \$835.6 million, an increase of 5% from fiscal 2020. (Organic revenue represents total company revenue excluding net revenue from acquisitions for the first four full quarters since the entity's acquisition date).

These increases were driven by higher demand for integrated subsystems and modules and sub-assemblies which increased \$153.1 million or 35.0% and \$25.4 million or 19.3%, respectively, partially offset by a decrease to components of \$51.1 million or 22.5% during fiscal 2021.

The increase in total revenue was primarily from C4I and radar end applications which increased \$101.0 million and \$55.2 million, respectively, and were partially offset by decreases of \$17.5 million and \$7.1 million from EW and other sensor and effector end applications. The increase spanned land, naval and airborne platforms which increased \$79.6 million, \$20.3 million and \$19.3 million, respectively. The largest program increases were related to a classified radar program, LTAMDS, Abrams, CPS and E2D Hawkeye.

In addition, Mercury completed the acquisition of Pentek, to increase penetration into core radar, electronic warfare and signals intelligence markets.

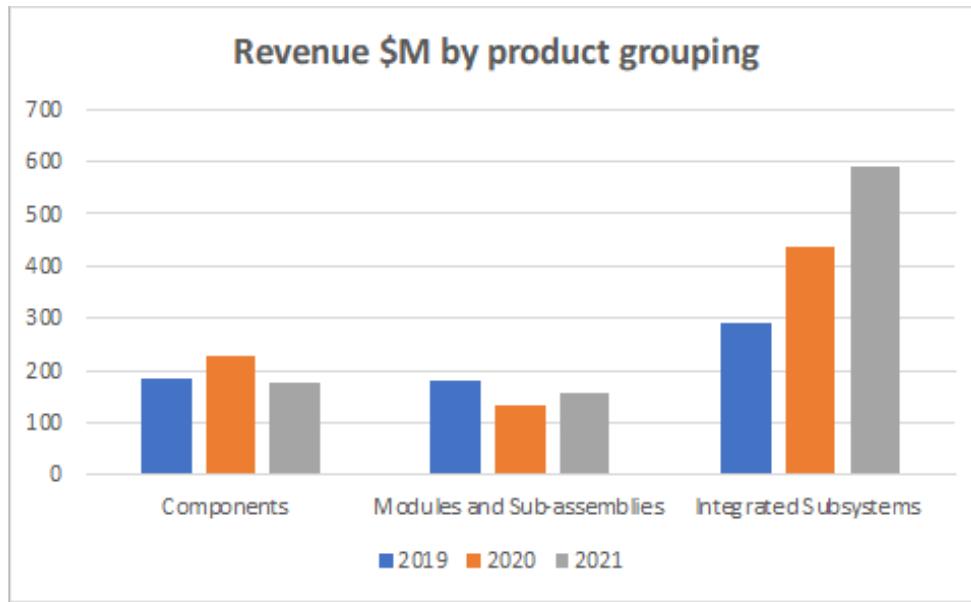
Total Mercury fourth quarter fiscal 2021 revenues were \$250.8 million, compared to \$217.4 million in the fourth quarter of fiscal 2020. The fourth quarter fiscal 2021 results included an aggregate of approximately \$40.8 million of revenue attributable to the Physical Optics Corporation and Pentek acquired businesses.

Mercury's acquisitions have changed its technological capabilities, applications and end markets. As these acquisitions and changes occurred, Mercury's proportion of revenue derived from the sale of components in different technological areas, and modules, sub-assemblies and integrated subsystems which combine technologies into more complex diverse products has shifted.

The key customer base for Mercury Systems was the U.S. Navy become over 10% of revenue moving into third place in key customers.

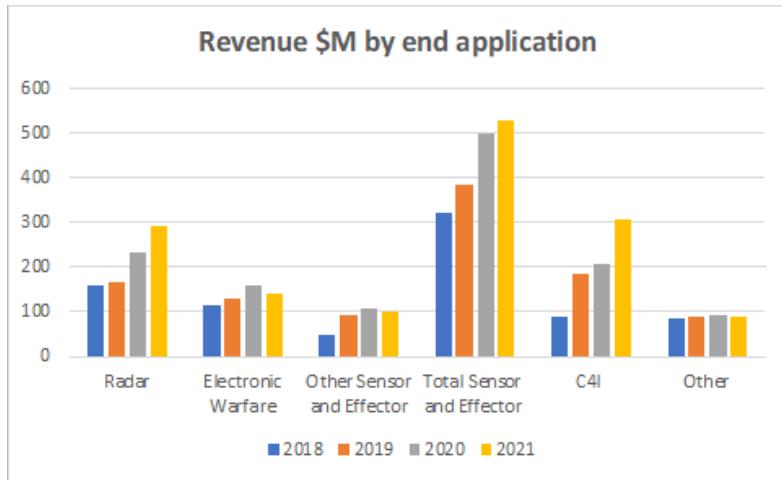
Key Customers, (> 10% of revenues)	2018	2019	2020	2021
Raytheon Technologies	19%	20%	16%	19%
Lockheed Martin Corporation	19%	17%	16%	15%
U.S. Navy	0%	0%	0%	12%
Total	38%	37%	32%	46%

Mercury Systems breaks revenue into three product categories: Components, Modules and sub-assemblies, and Integrated subsystems. The Mercury Systems focus on integrated subsystems is reflected in the greater than 25% growth in that product category in 2021.



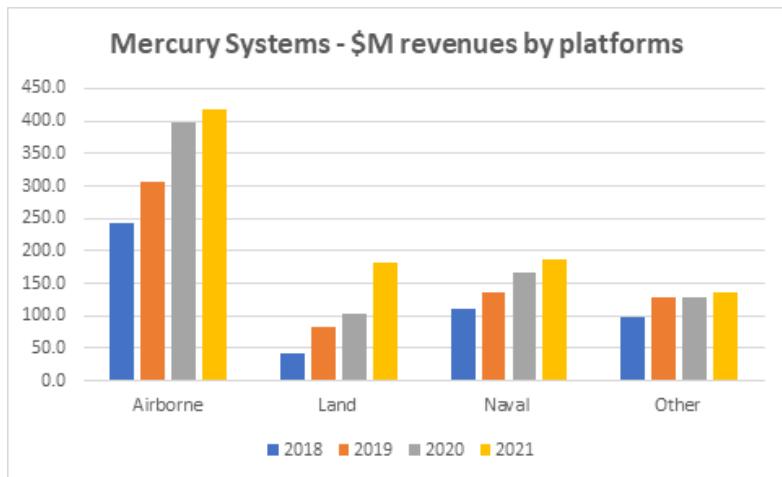
Notes:

1. Components include technology elements typically performing a single, discrete technological function, which when physically combined with other components may be used to create a module or sub-assembly. Examples include but are not limited to power amplifiers and limiters, switches, oscillators, filters, equalizers, digital and analog converters, chips, MMICs (monolithic microwave integrated circuits), and memory and storage devices.
2. Modules and Sub-assemblies include combinations of multiple functional technology elements and/or components that work together to perform multiple functions but are typically resident on or within a single board or housing. Modules and sub-assemblies may in turn be combined to form an integrated subsystem. Examples of modules and sub-assemblies include but are not limited to embedded processing modules, embedded processing boards, switch fabric boards, high speed input/output boards, digital receiver boards, graphics and video processing and Ethernet and IO (input- output) boards, multi-chip modules, integrated radio frequency and microwave multi-function assemblies, tuners and transceivers.
3. Integrated Subsystems include multiple modules and/or sub-assemblies combined with a backplane or similar functional element and software to enable a solution. These are typically but not always integrated within a chassis and with cooling, power and other elements to address various requirements and are also often combined with additional technologies for interaction with other parts of a complete system or platform. Integrated subsystems also include spare and replacement modules and sub-assemblies sold as part of the same program for use in or with integrated subsystems sold by the Company.



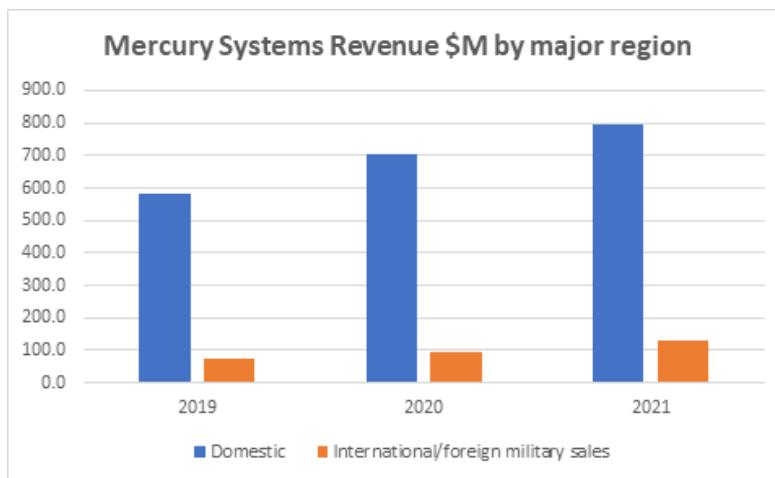
Notes:

1. Radar includes end-use applications where radio frequency signals are utilized to detect, track, and identify objects.
2. Electronic Warfare includes end-use applications comprising the offensive and defensive use of the electromagnetic spectrum.
3. Other Sensor and Effector products include all Sensor and Effector end markets other than Radar and Electronic Warfare.
4. C4I includes rugged secure rackmount servers that are designed to drive the most powerful military processing applications.
5. Other products include all component and other sales where the end use is not specified.



Notes:

1. Airborne platform includes products that relate to personnel, equipment, or pieces of equipment designed for airborne applications.
2. Land platform includes products that relate to fixed or mobile equipment, or pieces of equipment for personnel, weapon systems, vehicles and support elements operating on land.
3. Naval platform includes products that relate to personnel, equipment, or pieces of equipment designed for naval operations.
4. Other represents all platforms other than Airborne, Land or Naval.



Notes:

1. Domestic revenues consist of sales where the end user is within the U.S., as well as sales to prime defense contractor customers where the ultimate end user location is not defined.
2. International/Foreign Military Sales consist of sales to U.S. prime defense contractor customers where the end user is outside the U.S., foreign military sales through the U.S. government, and direct sales to non-U.S. based customers intended for end use outside of the U.S.

Contract and Design Win Announcements

Not all defense contracts are announced publicly and for those that are, not all identify details of embedded computing technology on board. Only contract wins that specifically mention VITA standards are reported.

- ❑ Curtiss-Wright's Defense Solutions division, announced its participation on the Raytheon Technologies team to support the development of the U.S. Army's Tactical Intelligence Targeting Access Node, or TITAN, program. TITAN is a tactical ground station that finds and tracks threats to support long-range precision targeting. Curtiss-Wright's Defense Solution division will provide modular open system approach (MOSA) compliance and network infrastructure management solutions that deliver an accelerated path to TITAN's ground station modernization schedule for brigade and above.¹
- ❑ Curtiss-Wright's Defense Solutions division also announced it was awarded a contract by Raytheon Technologies to provide its rugged MOSA-based processor and networking modules for use in the NextGen SMP (Next Generation Special Mission Processor). The NextGen SMP serves as the central processing component of the AC/MC-130J aircraft (also known as the Ghostrider and Commando II). Under the contract, Curtiss-Wright is supplying Raytheon Intelligence & Space with its rugged OpenVPX single board computers (VPX3-1260 and VPX3-152), Ethernet switch (VPX3-687), and Ethernet router (VPX3-685) modules. Shipments, which began in 2021, are scheduled to run through 2032.²

1 <https://www.curtaiswrightds.com/news/press-release/curtiss-wright-supports-raytheon-technologies-army-titan-team-modular-open-systems-approach-solutions.html>

2 <https://www.curtaiswrightds.com/news/press-release/cw-selected-by-raytheon-to-provide-mosa-based-processing-networking-modules.html>

- ❑ Abaco Systems announced a design win which supports a customer with upgrades to a mine hunting system, which is a towed sonar array that uses multiple sensors to identify and detect mine-like objects. These upgrades will provide faster processing and the latest technology which will increase safety for warfighters. This win contains Abaco's VP780 FPGA card, as well as the SBC329 3U OpenVPX single board computer.³
- ❑ Abaco Systems announced an award of \$1.5m, supporting a major Turkish defense contractor with their naval combat management system (CMS). This system is targeted into multiple ally naval ship programs and brings CMS capabilities including the control of sensors and weapons, Tactical Status Display, Navigation, Training and simulation functions. The design win contains three of Abaco's products: the PEX442, the SBC627, and the P-SER. The PEX442 is a XMC carrier providing tech insertion for XMC boards that had been used in the previous VME based system. The SBC627 is Abaco's 6U OpenVPX rugged single board computer featuring a 5th generation Intel® Core™ i7 processor. The P-SER is a native PMC form factor interface providing real-time serial input and output with high time-precision reception/input time-stamping, scheduled transmission/output, event triggering and interrupt support. The naval ship's various sensors will send information to the SBC627, while the P-SER will send communications to other PCs within the system. Each of these products will be utilized as an upgrade from a VME form factor to a VPX form factor. The customer will be purchasing 25 units a year over the next four years.⁴

Product Announcements

VPX Technology

The sensor community served by the SOSA™ Technical Standard relies heavily on VPX modules, so defining a minimum set of 3U and 6U VPX slot and module profiles for the standard was a natural starting point. By defining these profiles, along with implementation rules for common utility functions such as power, control signals, and maintenance ports, the SOSA™ Consortium established the elements that define the basic building blocks of SOSA systems, namely plug-in cards (PICs) and backplanes.

In September, Military & Aerospace Electronics published a review of progress as part of its “trusted computing” feature. Titled “[SOSA standard taking hold in military embedded computing](#)”, the article focused on how SOSA is heavily influencing the backplane and chassis development in military embedded computing applications, and is driving development of backplanes, chassis, connectors, high-speed switch fabrics, VME, VPX, CompactPCI, PCI Express, and embedded computing computer boards.

As the initiative continues to move forward, a number of new products have been launched by the VITA community, largely featuring VPX:

- ❑ Abaco Systems announced the GRA115V, a rugged 3U VPX video capture, processing and output board featuring the latest NVIDIA® Turing™ based Quadro RTX™ 3000 GPU. This board delivers high performance in a low SWaP 3U VPX form factor offered in air-cooled and conduction cooled formats.⁵

3 <https://www.abaco.com/news/abaco-systems-announces-design-win-minehunting-system>

4 <https://www.abaco.com/news/abaco-systems-selected-support-upgrades-turkish-naval-combat-management-system>

5 <https://www.abaco.com/news/abaco-systems-announces-newest-video-capture-and-graphics-output-board>

- ❑ Abaco Systems announced the VSR347D, a fully rugged 3U VPX secure router featuring Juniper Network's® Junos® vSRX virtual firewall. Capitalizing on single board computer and networking expertise, this router expands Abaco's portfolio from switching and network interfaces, to include secure routing. The VSR347D provides a highly optimized, interoperable solution to meet customer demands and is the first-to-market fully rugged 3U VPX networking solution to offer Juniper Networks' vSRX secure firewall.⁶
- ❑ Aitech Systems, announced the immediate availability of its U-C8770 3U VPX single board computer, aligned with the SOSA Technical Standard and offering advanced data breach and threat protection through Aitech's proprietary AiSecure cybersecurity infrastructure. It is the first single board computer in its class to offer extremely large RAM and storage capacities combined with a large onboard FPGA, which helps further optimize SWaP-C and design efficiency.⁷
- ❑ Concurrent Technologies launched a new 3U VPX Plug in Card (PIC) designed in alignment with the SOSA Technical Standard. This new I/O intensive processor is targeted for use in a variety of Situational Awareness and Intelligence, Surveillance and Reconnaissance (ISR) applications that need a combination of general-purpose processing augmented with image processing and Artificial Intelligence (AI) acceleration.⁸
- ❑ Concurrent Technologies also announced a new 3U VPX conduction-cooled plug in card based on the Intel Xeon® W-11000E Series processor for use as the system controller in high performance sensor based solutions in the defense space that are used in Situational Awareness, Software Defined Radio and RADAR processing applications.⁹
- ❑ Curtiss-Wright Introduced a 6U OpenVPX™ Storage Blade with 32/64 TB of 6.25 GBps NVMe Memory.¹⁰
- ❑ Curtiss-Wright's Defense Solutions division, announced the newest addition to its family of MOSA-based network switches with the introduction of the VPX3-655, a 3U OpenVPX Ethernet switch module providing up to 20 high-speed Ethernet ports.¹¹
- ❑ Curtiss-Wright's announced the VPX6-1961 single board computer featuring the Intel Xeon W-11000E Series processor. The VPX6-1961 harnesses the extended operating performance of the Intel Xeon W-11000E to deliver an single board computer capable of delivering the highest performance over extreme temperature, shock, and vibration conditions. With its eight cores, doubling the count of previous generation quad-core processors, this 6U OpenVPX module leverages the latest Intel Core architectures. The module's additional processor cores enable system designers to significantly reduce their platform's size, weight, power, and cost (SWaP-C). Processing tasks that would formerly require multiple single board computers can now be consolidated into a single slot.¹²

6 <https://www.abaco.com/news/abaco-systems-announces-first-virtual-secure-router>

7 <https://aitechsystems.com/sosa-aligned-u-c8770-sbc-cybersecurity/>

8 <https://www.gocct.com/2021/07/28/concurrent-technologies-launches-a-new-3u-vpx-i-o-intensive-plug-in-card/>

9 <https://www.gocct.com/2021/08/04/concurrent-technologies-announces-a-3u-vpx-card-with-100g-ethernet/>

10 <https://www.curtisswrightds.com/news/press-release/curtiss-wright-introduces-fastest-highest-capacity-6u-openvpx-storage-blade.html>

11 <https://www.curtisswrightds.com/news/press-release/curtiss-wright-introduces-versatile-multi-standard-20-port-1-10-40-gigabit-ethernet-switch-module.html>

12 <https://www.curtisswrightds.com/news/press-release/curtiss-wright-boasts-ruggedization-6u-openvpx-module-new-eight-core-intel-xeon-w-11000e-series-processor.html>

- ❑ EIZO Rugged Solutions Inc. has released the Condor GR4-RTX3000, a 3U VPX video capture and GPGPU processing card using MXM technology based on the NVIDIA Turing architecture and the NVIDIA RTX™ platform.¹³ The Condor GR4-RTX3000 supports four 3G-SDI inputs, four 3G-SDI outputs, and one DisplayPort (4K UHD) output. This card is designed with the NVIDIA RTX 3000 (TU106) with 1920 CUDA® parallel processing cores, 240 Tensor cores, and 30 RT cores. This single card offers video capture and display, GPGPU computing, Artificial Intelligence (AI), deep learning capabilities
- ❑ EIZO Rugged Solutions Inc. introduced the Condor XR1 6U VPX Series – an OpenVPX 6U form factor high-performance computer (HPC) and GPGPU processing card based on the NVIDIA Turing architecture using either the NVIDIA RTX5000™ or NVIDIA RTX3000™ platforms.¹⁴
- ❑ Kontron has upgraded the VX305C-40G 3U OpenVPX single board computer to align with SOSA Technical Standard. This important update replaces the mini-SATA Solid State Drive with a faster and larger capacity NVMe SSD. In addition, a new non-SOSA variant of the VX305H-40G is now available that offers additional industry-standard I/Os such as USB, SATA, general-purpose I/O, and XMC mapped pins.¹⁵
- ❑ Kontron commenced first deliveries of its high performance VX3060-S2 Blade PC, 3U VPX single board PC.¹⁶
- ❑ Mercury Systems Inc. announced a new line of safety-certifiable 3U OpenVPX SOSA-aligned avionics modules designed to accelerate critical avionics applications and streamline subsystem development and platform safety certification. The SBC3515-S module delivers up to 40x better performance than traditional safety-certifiable processing boards.¹⁷
- ❑ Mercury Systems Inc. announced the SCFE6931 processing module, the first in the industry to incorporate integrated artificial intelligence (AI) processing functionality. Featuring dual Xilinx® Versal™ AI Core adaptive compute acceleration platform (ACAP) processors, the 6U OpenVPX heterogeneous processing module delivers performance improvements up to 20x more than today's fastest FPGA implementations and 100x more than today's fastest CPU implementations. The result is significantly more processing power for a wide variety of digital signal processing-intensive (DSP) applications such as radar, 5G wireless, electronic warfare (EW) and signals intelligence (SIGINT).¹⁸
- ❑ North Atlantic Industries (NAI), Inc. introduced the 68ARM2, a rugged 3U OpenVPX single board, cybersecure and anti-tamper single board computer. The 68ARM2 is a 3U OpenVPX Zynq® UltraScale+™ Quad-core ARM® Cortex™-A53 MPCore™ based single board computer that can be configured with up to three NAI Smart I/O and communications function modules.¹⁹

13 <https://www.eizorugged.com/press-releases/eizo-releases-3u-vpx-video-capture-gpgpu-card-with-four-3g-sdi-inputs-and-outputs-designed-for-hpec-systems-in-isr-markets/>

14 <https://www.eizorugged.com/press-releases/eizo-releases-6u-openvpx-sosa-aligned-gpgpu-processing-card-with-dual-nvidia-turing-rtx-gpus-for-sensor-and-data-driven-missions/>

15 <https://www.kontron.com/en/news/kontron-updates-its-vx305c-40g-and-vx305h-40g-single-board-computers/n169413>

16 <https://www.kontron.com/en/news/kontron-s-vx3060-s2-takes-3u-openvpx-tm-to-next-level/n170719>

17 <https://ir.mrcy.com/news-releases/news-release-details/mercury-launches-aircraft-ready-openvpx-modules>

18 <https://ir.mrcy.com/news-releases/news-release-details/mercury-introduces-industry-first-heterogeneous-processing>

19 <https://www.naii.com/pressrelease/115>

- ❑ VadaTech announced the VPX760, a VPX processor module for general purpose processing in demanding applications. Based on the Intel Xeon Processor E-2176M with CM246 PCH, the processor base frequency is 2.7 GHz with maximum turbo frequency of 4.4 GHz.²⁰

Backplane and Chassis Technology

- ❑ Atrenne Computing Solutions announced a new series of OpenVPX backplanes. This series is part of Atrenne's product family that enables end-to-end solutions for 64/100 Gigabit systems.²¹
- ❑ Elma Electronic Inc. announced the 3U VPX slimline CompacFrame, the first in a series of new development platforms designed to accelerate the design and testing of open architecture-based embedded systems. Elma's all-new slimline CompacFrame is the next-generation platform designed to accelerate development and testing of Plug-In Cards (PICs) aligned to the SOSA Technical Standard. The platform features a card cage that is tilted upwards by 5° for easier access and accommodates up to four, 1-slot power and ground only VPX backplanes or up to 4 slots OpenVPX. It also enables testing of plug-in cards that are aligned to The Open Group Sensor Open Systems Architecture™ (SOSA) initiative.²²
- ❑ LCR Embedded Systems released two conduction cooled chassis for high speed VPX systems. The AoC3U-400 Series of chassis use leading edge technology to manage high heat dissipating board payloads. This emerging family of ATR chassis is designed to maintain safe operating temperatures for high power 3U VPX and SOSA aligned module-based systems. Each chassis combines forced air with conduction cooling to dramatically increase aggregate heat dissipation capacity by up to 100% versus straight passive conduction solutions while leveraging readily available VITA 48.2 plug in modules.²³
- ❑ A new extension to nVent SCHROFF Titan Commercial-Off-The-Shelf (COTS) Rugged VPX Systems is available now. Designed for rugged applications within the aerospace and defense industry, the nVent SCHROFF Titan COTS Rugged VPX System includes enhanced shock and vibration resistance. This 19" VPX system is mechanically based on the nVent SCHROFF EuropacPRO type rugged subrack and can withstand shock loads up to 25g and vibrations up to 3g. nVent SCHROFF VPX backplanes support the latest VPX standard with link speeds up to 10.3125 Gbaud data rate. Also included are front-to-back forced air cooling with temperature-controlled fans, front pluggable fan tray for easy accessibility and maintenance, and simple and quick adaptations with modular construction.²⁴
- ❑ Pixus Technologies announced a new 3-slot 3U OpenVPX backplane with an additional VITA 62 power supply unit slot.²⁵

20 https://www.vadatech.com/media/pdf_PR_-_VadaTech_Announces_a_3U_VPX_Intel_E-2176M_Xeon_Processor.pdf

21 <https://www.atrenne.com/press-room/news/atrenne-computing-solutions-introduces-industry--first-gen-45-openvpx-backplanes>

22 <https://www.elma.com/en-gb/news-and-events/news-releases/2021/07/compacframe-development-platform-sosa>

23 <https://www.lcrembeddedsystems.com/aoc3u-400-news-release/>

24 <https://schroff.nvent.com/resources/news/nvent-expands-nvent-schroff-titan-commercial-shelf-rugged-vpx-systems-enhanced-shock>

25 <https://pixustechnologies.com/assets/Press-Releases/Pixus-PR-3-slot-15.2.9-1-V62-PIB.pdf>

- ❑ Pixus launched a new chassis for extra deep OpenVPX 6U boards. The RiCool chassis platform allows up to 16 slots of 220mm boards at a 1.0" pitch or 14 slots at a 1.2" pitch. The enclosure also facilitates an optional mix of various slot pitches as well as card guides for either air or conduction-cooled boards.²⁶
- ❑ Pixus Technologies announced the launch of Pixus Technologies USA Corporation with an office opening near Buffalo, New York. Canadian-based Pixus Technologies Inc, has been providing ruggedized and commercial OpenVPX and other COTS backplane/enclosure solutions for over ten years. The US company has joined the Sensor Open Standard Architecture (SOSA) Consortium.

Mergers, Acquisitions, and Partnerships

- ❑ September 20, 2021 – Curtiss-Wright's Defense Solutions division and FPGA board and systems supplier, Annapolis Micro Systems, announced they will collaborate to bring best-in-class SOSA-aligned solutions to the embedded market. Under the agreement, both companies will qualify for interoperability, a range of their products based on the SOSA Technical Standard. The agreement will simplify and speed the ability of customers to access and integrate products from the two companies, greatly expanding the range of SOSA-aligned products the companies can deliver to system designers. Under the agreement, both companies will be able to reference sell their SOSA-aligned 3U and 6U OpenVPX modules and chassis to support designers of demanding compute-intensive applications such as EW, radar, and signals intelligence.²⁷
- ❑ September 27, 2021 -- Mercury Systems, announced that it has signed a definitive agreement to acquire Avalex Technologies Corporation ("Avalex"). Based in Gulf Breeze, FL, Avalex is a provider of mission-critical avionics, including rugged displays, integrated communications management systems, digital video recorders, and warning systems. "Avalex's product and technology portfolio is highly complementary to Mercury's existing offering," said Mark Aslett, Mercury's president and chief executive officer. "With deep expertise in integrated displays, digital video recorders, and communications management, their suite of innovative avionics solutions uniquely position Mercury Systems to address and enable the growing demand for digitally converged solutions in the C4I and platform/mission management markets. Like our previous acquisition of Physical Optics Corporation, Avalex is also experiencing accelerated growth due to their strong product offerings and supply chain delayering by the Government." Avalex is currently expected to generate approximately \$40 million in revenue for the twelve months ending December 31, 2022.²⁸

Summary

A significant number of new OpenVPX products were launched in Q3, generally SOSA-aligned boards and systems. Modular open systems architecture is rapidly becoming the new normal and not surprisingly is the focus of the recently announced [Embedded Tech Trends](#) conference taking place on January 24-25th in 2022.

26 <https://pixustech.com/assets/Press-Releases/Pixus-PR-New-220mm-deep-RiCool-for-OpenVPX.pdf>

27 <https://www.curtisswrightds.com/news/press-release/cw-and-annapolis-micro-systems-cooperate-to-bring-sosa-technical-standard-aligned-solutions-to-embedded-market.html>

28 <https://ir.mrcy.com/news-releases/news-release-details/mercury-systems-acquire-avalex-technologies-corporation>

While defense budgets worldwide continue to rise, the growth in embedded computing drives revenues for VITA suppliers. While this growth is welcome and steady, shareholders of public-listed companies continue to demand greater returns. Organic growth may not always provide this and so a mergers and acquisitions growth strategy is now the stated policy of the market leaders. M&A executives actively seeking opportunities and eager to better understand the dynamics of this industry sector may find some help in our recently published market report, [2021 Edition of World Market for VITA Standards-based Board and Systems Report](#).

Market Research

VITA released the 2021 Edition of World Market for VITA Standards-based Board and Systems Report. The research and analysis were conducted over the past summer through data collection and discussions with companies supplying merchant products based on key VITA standards. The report was prepared by Brian Arbuckle, Principal Market Analyst at Embedded Market Research on behalf of VITA. The full report is available for purchase from the VITA website at www.vita.com/Market_Research.

Executive Summary of Report

Annual sales of VITA-standard based products (VME, VPX and PMC/XMC) to the merchant market are estimated to have increased on average 6.3% from 2019 to 2020. Boards are the highest in revenue while systems sales are the fastest growing aspect. 6U VPX systems are the fastest growing form-factor from 2019 to 2020.

The majority of VME and VPX boards and systems are sold to defense prime contractors that in turn, sell to governments. The largest customer for defense electronics is the United States with the US Department of Defense budget having the greatest impact on market growth. US Defense spending in total remains relatively steady but the budget allocation emphasizes compute-heavy technologies and has supported the increase in demand for VME and VPX boards and systems.

Market trends reported by VITA suppliers include the Open Systems DoD mandate; sensor proliferation using artificial intelligence (AI); and an increased emphasis on security by offering trusted computing solutions. The OpenVPX standard being championed by VITA aligns well with the US Department of Defense demand for improved implementation of open standards and interoperability. VITA members are also harnessing the latest AI chip technology and developing accelerator boards for intensive data-processing applications. VITA market leading companies also offer a rigorous approach to supply chain security.

Business challenges in the reporting period include the supply chain interruption caused by COVID-19 and in particular the global semiconductor shortage. Continuing challenges include product obsolescence particularly regarding VMEbus, already in its 40th year of production. The use of COTS servers and virtualization of applications rather than using dedicated hardware is an ongoing challenge in some markets.

VITA member companies continue to grow both organically and by acquisition and there has been some M&A activity during the period which has placed a significant value on the expertise and capabilities of these VITA-standard suppliers.

The report contents are as follows:

- Executive summary
- Recent mergers and acquisitions
- Report introduction and method
- Market Analysis by VITA standard (VME, VPX, PMC/XMC)
- Trends affecting business
- Risks to business operations
- Overall Q2 summary



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