



Market Research

VITA Market Developments

2Q 2022

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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 Informatel 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. This report reviews highlights and developments during the second trading quarter of 2022 and the trends that are driving technology development for VITA technology boards and systems.

Delayed defense budget depresses second quarter revenues

The U.S. Congress passed the FY '22 Defense Appropriations bill in March, following a prolonged continuing resolution that delayed funding on critical new start programs. The bill includes a strong 5.5% increase over the FY '21 enacted budget, which the critical and defense embedded computing industry is well positioned to benefit from.

In addition, the Biden administration released the initial FY '23 budget on March 28, requesting \$773 billion for the Defense Department or 4% growth over FY '22 enacted. This proposed budget includes increases across all services with naval shipbuilding receiving the highest increase over 2022 aligned with the administration's focus on the Indo-Pacific region.

The recently released 30-year shipbuilding plan provides further confidence in the Defense Department's commitment to build out the naval fleet and align U.S. forces to be prepared to face the biggest global threat. In the ground defense market, the budget targeted the continued funding for the Army's top modernization priorities, while in the aerospace defense, there was support for various helicopter and unmanned platforms.

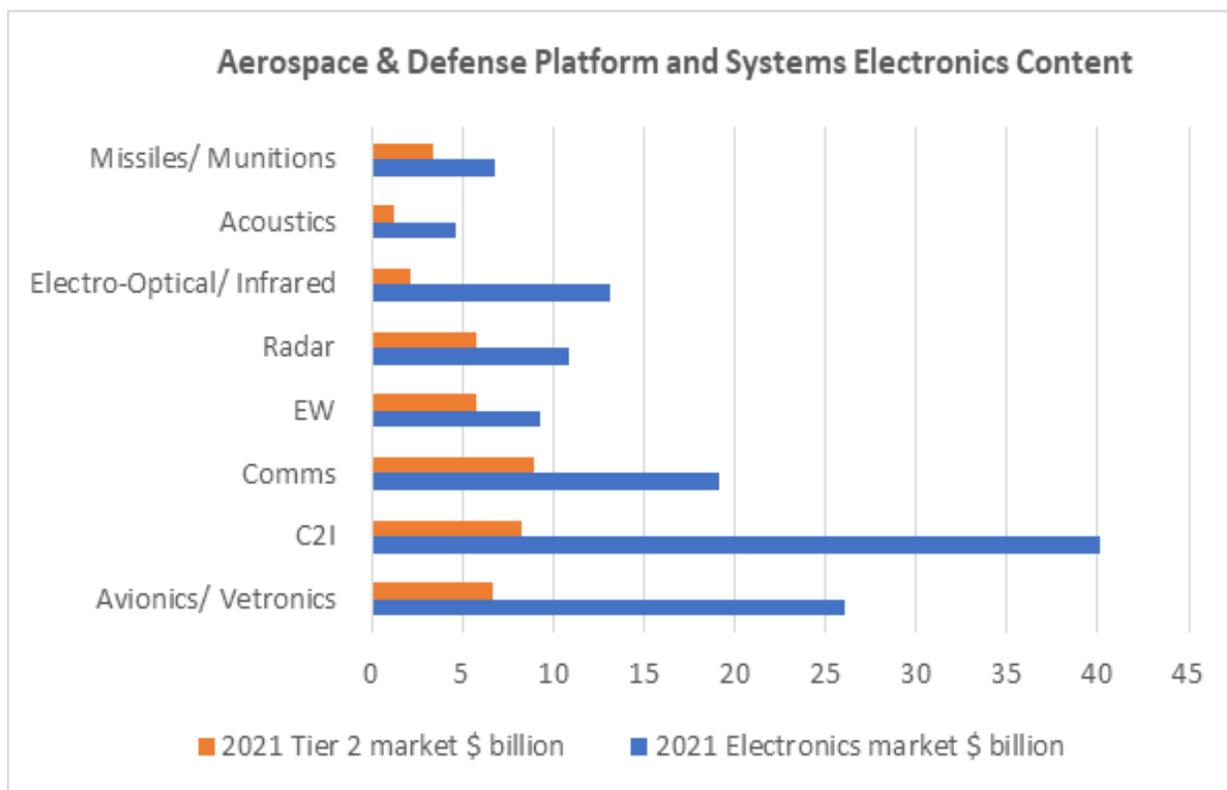
Worldwide defense spending trending upwards

Defense spending reviews around the world are in sharp focus as the war in Ukraine continues. It has become clear since the conflict began that it has solidified political commitment to defense investment and we have witnessed many NATO countries proposing or increasing defense spending to 2% or greater of GDP. NATO expansion with the likely admission of Sweden and Finland may also require additional expenditure towards modernization and standardization of these countries' forces. An overall increase in global defense spending provides support for the long-term growth outlook across defense end-markets. Additionally, defense electronics are comprising a larger share of military platform cost on both new and legacy platforms. Significant system upgrades are underway to maintain and extend competitive advantage: Sensor & C4I as well as weapon systems modernization and readiness.

According to a scenario forecast prepared by RSA Advisers for Mercury Systems, if all European NATO nations increased defense spending to at least meet the 2% target (of total GDP), this would likely add an additional \$80-100 billion of annual defense expenditure to the current combined European total of \$300 billion by the end of the decade.¹

The current value of electronics in a modern fighter aircraft represents approximately 45% of the total platform value, a tank 45% and a destroyer 40%. RSA estimate the Aerospace & Defense electronics systems market at ~\$130 billion annually of which the total addressable tier 2 market (including embedded computing and subsystems with RF content) is now ~\$42 billion. The following chart illustrates the available and addressable market by system type as estimated by RSA.

¹ <https://ir.mrcy.com/static-files/da32da08-f844-49bb-8dc0-39deef4d2ebb>



Semiconductor supply chain challenges – Intel Taking Steps

Intel CEO Pat Gelsinger expects the semiconductor industry to suffer supply shortages until 2024. David Zinsner, executive vice president and CFO for semiconductor chip manufacturer Intel, gave some insights speaking on a panel hosted by the Wall Street Journal in June.²

Ensuring access to a diverse list of potential suppliers is essential, Zinsner said, noting companies within the chip industry are also taking steps to grow their inventory to combat growing shortages of key materials.

“I think the industry in general is absolutely carrying larger buffer inventory to manage supply chain shocks and there’s multiple things that have occurred,” he said. “It’s not just one geopolitical pandemic, obviously, there are climate-related challenges that have occurred now more recently that certainly impacted supply chains so for sure, there needs to be an adjustment in the supply chain.”

Lockdowns, climate change, the Russian-Ukrainian conflict and other global factors have made collecting the raw materials necessary for semiconductor chip creation, such as neon and palladium, increasingly difficult. Many of the raw materials needed to craft these chips are in “fairly concentrated regions,” Zinsner stated, noting Intel is speaking with both U.S. and European entities regarding the importance of global diversification to help to combat these and related difficulties.

“This really is a perfect example of why that’s necessary, because once there’s a shortage in one region of the world, it creates significant issues across the globe,” he said. “So we’re making a lot of investment in the U.S., [making] significant investment in Europe to build out a more global diversified supply chain to help accommodate the challenges in the future.”

² <https://www.wsj.com/video/intel-taking-steps-to-address-supply-chain-challenges-cfo-says/A37BEB94-A056-43C8-920C-D000806C82B6.html>

Shortages contributed to a surge in demand for chips in 2021, a boon for chip makers such as Intel, which reported a record high in annual revenue of \$79 billion for 2021 — making it the world’s largest semiconductor chip manufacturer in terms of revenue. The company announced a \$20 billion investment in January to build out two new manufacturing plants near Columbus, Ohio, to meet surging semiconductor demand. It announced similar investments in Europe in March, earmarking approximately \$17 billion USD (€17 billion) to build out a semiconductor site in Germany, an R&D and design center in France, and various manufacturing and foundry services in Ireland, Italy, Poland and Spain.

Shortages of raw materials and the subsequent chip crunch have also exacerbated the economic tug-of-war between the U.S. and China regarding the future of chip manufacturing. China has splurged on orders for chip making equipment, with orders rising 58% last year — making it the industry’s biggest market for a second consecutive year, according to a Bloomberg report. Taiwan also remains a key source of imports for U.S. technology companies, responsible for nearly 90% of chip production for large-scale U.S. companies.³

U.S. regulation surrounding the semiconductor chip industry, meanwhile, is inching its way through Congress, with the House and Senate having both passed different versions of the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Bill for America Act, a bill meant to bolster U.S. competitiveness in the sector. CEOs from 100 companies including Alphabet Inc, Amazon and Microsoft have added their signatures to a letter sent to Congress, urging the Senate and House to reach an agreement and to pass a completed bill on to President Joseph Biden for signing, according to a Reuters report. Passing the CHIPS bill is key for making the appropriate investments within the U.S. needed in order to meet demand, Zinsner said of the legislation.⁴

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

Curtiss-Wright Corporation published its first quarterly report for fiscal 2022 on May 5, 2022.⁵

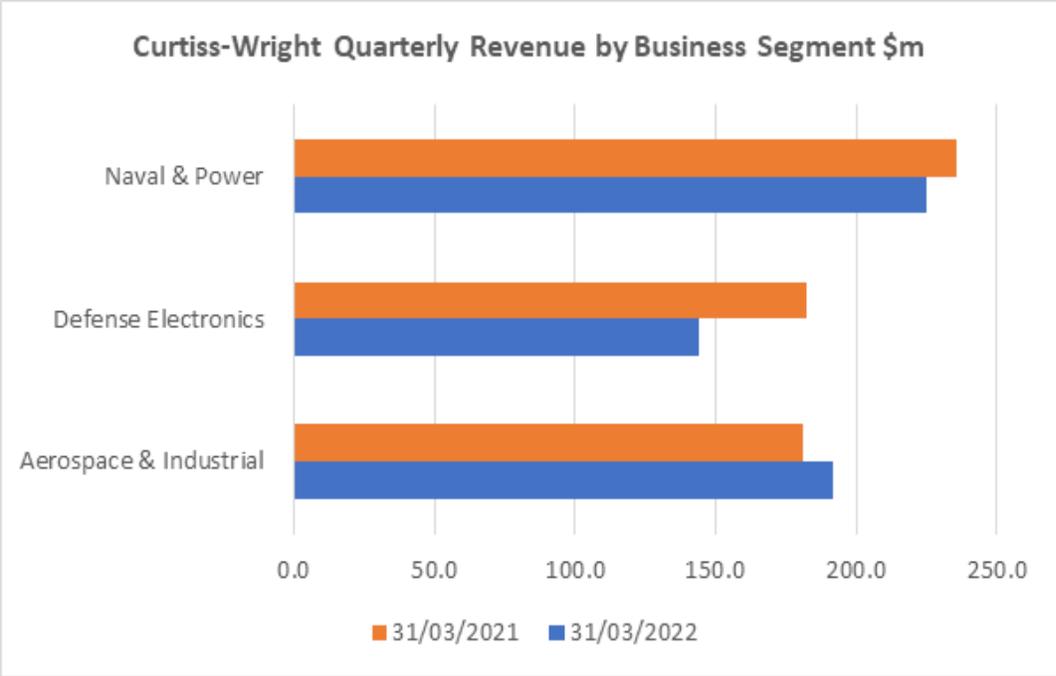
Results by business segment

Sales during the three months ended March 31, 2022 decreased \$38 million, or 6%, to \$559 million, compared with the prior year period. On a segment basis, sales from the Defense Electronics and Naval & Power segments decreased \$38 million and \$11 million, respectively, with sales from the Aerospace & Industrial segment increasing \$11 million.

3 <https://www.bloomberg.com/news/articles/2022-06-13/china-s-growing-clout-in-global-chip-market-rings-alarm-bells-in-washington>

4 <https://www.reuters.com/technology/more-than-100-ceos-urge-us-congress-pass-china-competition-bill-2022-06-15/>

5 <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000026324/819eeade-7962-40df-a88f-6082b6c90bdc.pdf>



Defense Electronics segment

Sales in the Defense Electronics segment are primarily to the defense markets and, to a lesser extent, the commercial aerospace market. Sales during the three months ended March 31, 2022 decreased \$38 million, or 21%, to \$143 million from the prior year period, primarily due to timing across all defense markets. In the ground defense market, sales decreased \$17 million primarily due to ongoing supply chain headwinds, which contributed to lower sales of embedded computing and tactical communications equipment on various programs. Sales in the aerospace defense market decreased \$14 million primarily due to the delayed signing of the FY22 defense budget, which resulted in lower sales of embedded computing equipment on various programs. Sales in the naval defense market were negatively impacted by the timing of orders on various submarine and surface combat ship programs.

Aerospace & Industrial segment

Sales in the Aerospace & Industrial segment are primarily generated from the commercial aerospace and general industrial markets, and to a lesser extent the defense and power & process markets.

Sales during the three months ended March 31, 2022 increased \$11 million, or 6%, to \$191 million from the prior year period, primarily due to higher demand for actuation and sensors products as well as surface treatment services on narrow-body platforms in the commercial aerospace market. Sales also benefited from higher demand for industrial vehicle products in the general industrial market.

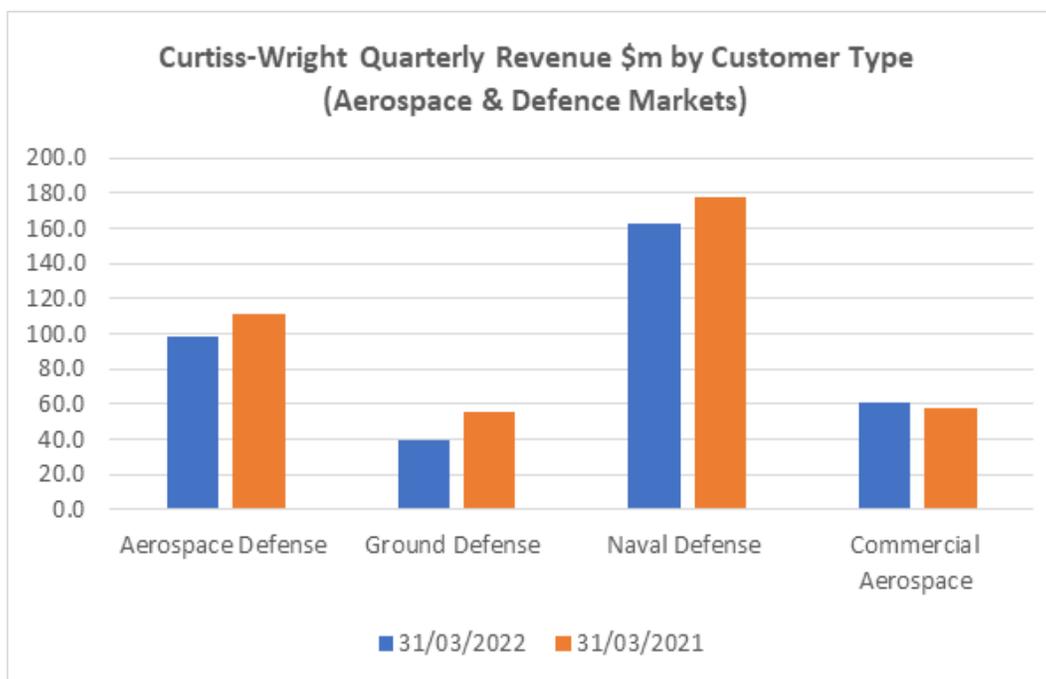
Naval & Power

Sales in the Naval & Power segment are primarily to the naval defense and power & process markets. Sales during the three months ended March 31, 2022 decreased \$11 million, or 4%, to \$225 million from the prior year period. In the naval defense market, sales decreased \$6 million primarily due to lower sales on the CVN-80 aircraft carrier and Virginia-class submarine programs, partially offset by higher demand on the Columbia-class submarine program. In the

power & process market, higher nuclear aftermarket sales were more than offset by the wind down on the China Direct AP1000 atomic energy program.

Sales disaggregated by end-user markets (Aerospace & Defense)

The following chart depicts Curtiss-Wright Corporation Aerospace and Defense sector sales disaggregated by end market.



Sales during the three months ended March 31, 2022 decreased \$41 million, or 10%, to \$361 million, primarily due to lower sales in the aerospace defense, ground defense and naval defense markets. Sales in the aerospace defense and ground defense markets decreased primarily due to timing of sales of embedded computing and tactical communications equipment on various programs (certain revenues shifted out of Q1'22 due to supply chain headwinds). Sales decreases in the naval defense market were primarily due to lower sales on the CVN-80 aircraft carrier and Virginia-class submarine programs, partially offset by higher demand on the Columbia-class submarine program.

Commenting on these issues affecting defense sales, Lynn M Bamford (CEO) said “This timing was influenced by the continued global supply chain disruption due to the extended lead time and delays in the receipt of electronic components. Our first quarter defense sales also reflected the impact of the continuing resolution and the delayed signing of the DoD budget.”

Secular trends influencing growth in aerospace and defense markets

In a June 7th presentation to investors, the Curtiss-Wright board pointed to trends that play to the corporation’s strengths, namely the elevated threat environment from U.S. adversaries driving urgency for global defense spending and strong global shipbuilding base; “Return to Major Power Competition”. Additionally, advancement of the high-tech battlefield is driving increased demand for more sophisticated technologies.

Forecast Aerospace & Defense sales growth is weighted to the second half of 2022 with a caution remaining on supply chain issues. Bamford commented “Due to the ongoing supply chain challenges and delayed signing of the DoD budget, we continue to expect a greater than

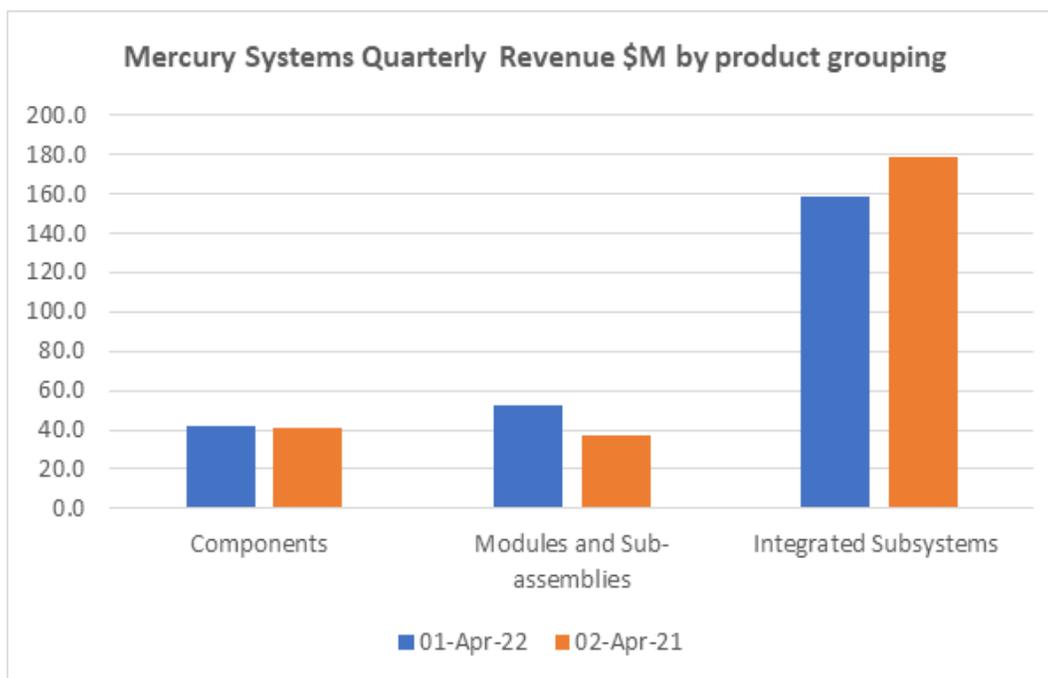
normal percentage of our total sales will be weighted to the back half of the year. While we are approaching the situation with tempered optimism, our ongoing discussions with critical suppliers indicate that delays in acquiring electronic components will begin easing in the third quarter, particularly as it relates to semiconductors. While this is encouraging, we are currently anticipating this disruption will continue throughout the remainder of '22 and likely into 2023.”⁶

Mercury Systems

Mercury Systems published its Q3 report on May 10, 2022 for the period ending April 2, 2022.⁷

Total revenues decreased \$3.8 million, or (1.5)%, to \$253.1 million during the third quarter ended April 1, 2022, as compared to \$256.9 million during the third quarter ended April 2, 2021, including “acquired revenue” which represents net revenue from acquired businesses that have been part of Mercury Systems for completion of four full quarters or less. The decrease in total revenue was primarily due to \$23.1 million less organic revenues, partially offset by \$19.3 million of acquired revenues from the Pentek, Avalex and Atlanta Micro businesses.

Revenue decreases were driven by integrated subsystems, which decreased \$20.6 million and was partially offset by increases in modules and sub-assemblies, which increased \$15.2 million and components which increased by \$1.6 million.



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,

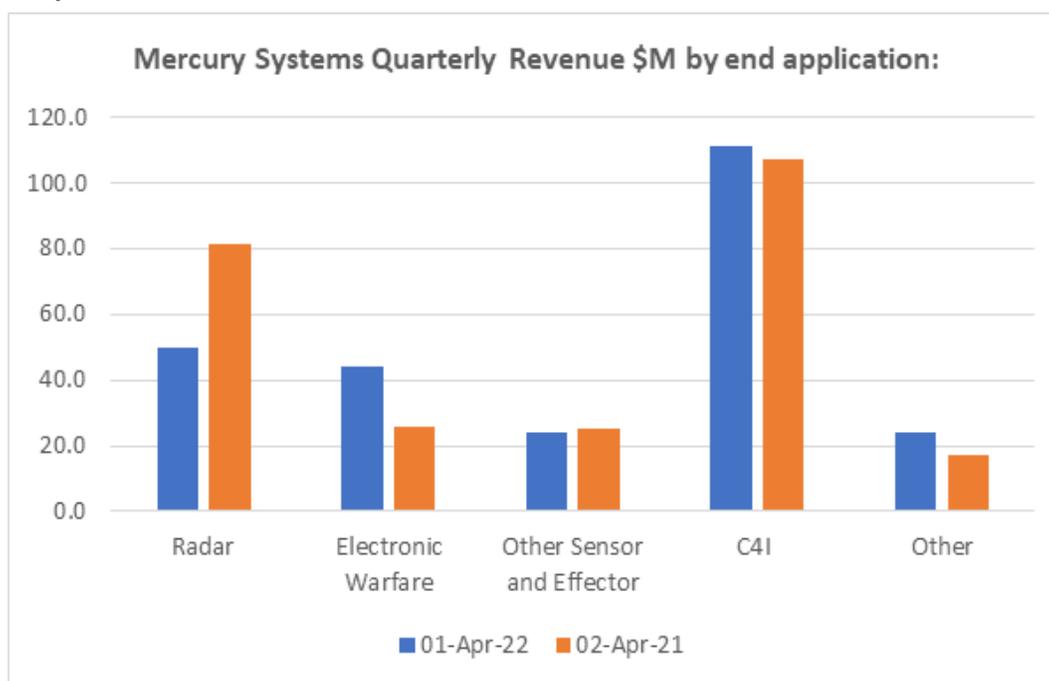
⁶ <https://curtisswright.com/investor-relations/events-and-presentations/default.aspx>

⁷ <https://ir.mrcy.com/static-files/b246301d-248c-4af3-8e56-bba10062ceef>

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.*

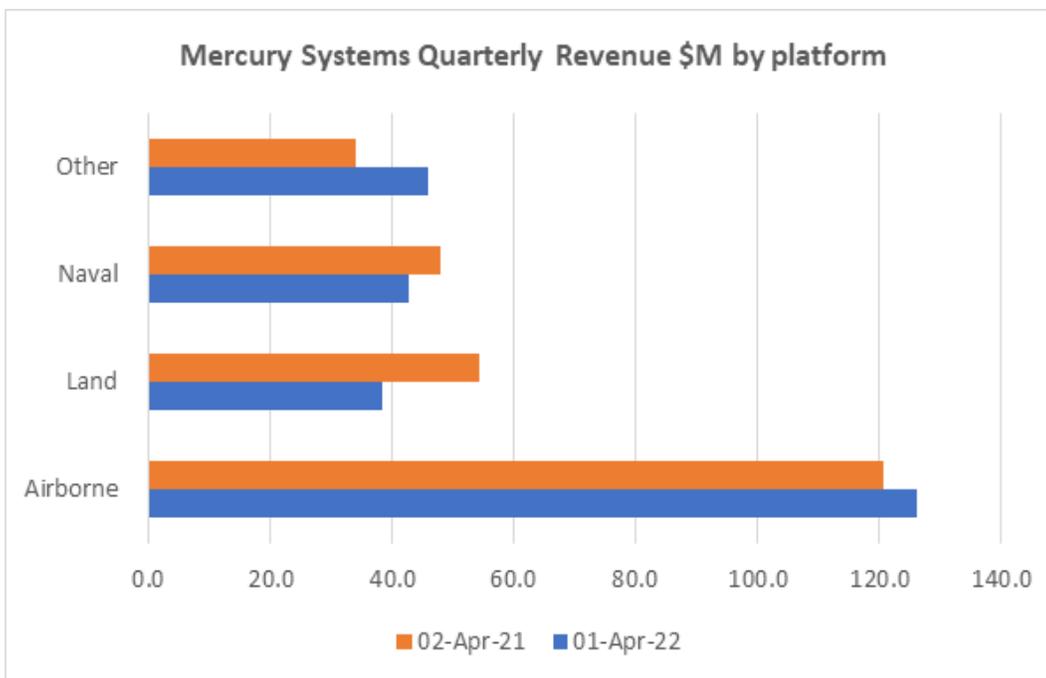
The decrease in total revenue was primarily a result of the radar application market, which decreased by \$31.4 million and was partially offset by increases in the EW, C4I, and other sensor and effector markets which increased \$18.2 million, \$6.8 million and \$4.1 million, respectively.



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.*

The decrease was primarily across the land and naval platforms which decreased \$16.1 million and \$5.1 million, respectively and were partially offset by an increase in other and airborne platforms which grew \$11.8 million and \$5.5 million, respectively, during the third quarter ended April 1, 2022. The largest program increases were related to a classified C2 program, CDS and V22.



Notes:

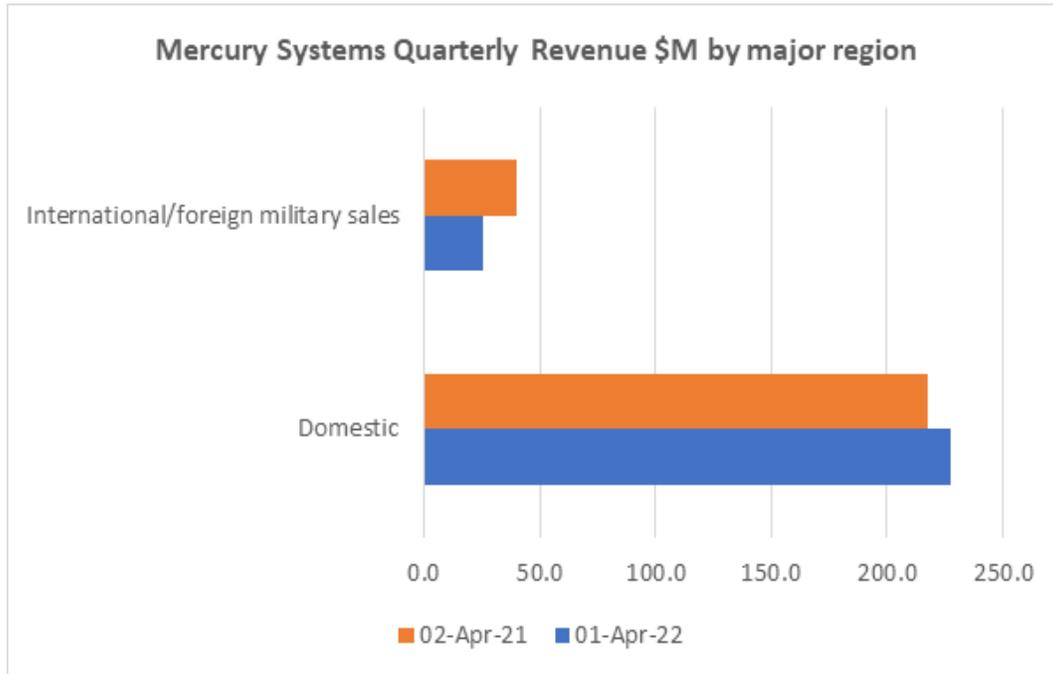
1. Airborne platform includes products that relate to personnel, equipment, or pieces of equipment designed for airborne applications
2. Land platform includes products that relate to fixed or mobile equipment, or pieces of equipment for personnel, weapon systems, vehicles and support elements operating 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.

Customers comprising 10% or more of the Mercury Systems revenue for the periods shown are as follows:

Key Customers (> 10% of revenues)	Q3 2021	Q3 2022
Raytheon Technologies	15%	18%
U.S. Navy	14%	16%
Lockheed Martin Corporation	< 10%	14%
Total	29%	48%

While Mercury Systems typically has customers from which it derives 10% or more of its revenue, the sales to each of these customers are spread across multiple programs and

platforms. There were no programs comprising 10% or more of Mercury Systems' revenues for the third quarter and nine months ended April 1, 2022 and April 2, 2021.



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.

Mercury Systems Outlook

- For the fourth quarter of fiscal 2022, revenues are forecast to be in the range of \$301.5 million to \$321.5 million.
- For the full fiscal year 2022, revenues are forecast to be in the range of \$1.00 billion to \$1.02 billion.
- Expect strong FY23 as organic growth returns.
- Foresee substantial growth in incremental defense spending in both U.S. and internationally.
- Secure processing, trusted microelectronics, and open mission systems driving growth.
- Benefiting from supply chain delayering and reshoring, increased outsourcing.

Contract and Design Win Announcements

New contracts and design wins are good indicators of future revenue and growth potential. Not all contracts are announced publicly and for those that are, not all identify details of embedded computing technology utilized in the design. Only contract wins that specifically mention VITA standards are reported in this section.

- ❑ Mercury Systems announced in April that it had received a \$6.9 million order from a leading defense prime contractor for high performance, OpenVPX™ digital signal processing systems for a manned airborne radar application. The order is expected to be shipped over the next several quarters.⁸
- ❑ In June, Mercury Systems announced it had been selected by Ball Aerospace to enhance the data recording and storage performance for MethaneSAT, the methane monitoring satellite. Mercury Systems' data storage technology delivers the high performance and sustainability required to operate successfully in space's harsh, radiation-intense environment. Ball's MethaneSAT spectrometer will incorporate Mercury's RH3440 3U VPX high-density solid-state data recorder (SSDR) to gather critical data needed to solve environmental sustainability issues. The digital recorder is optimized for size, weight and power (SWaP) and is radiation tolerant – crucial for a successful space mission.⁹
- ❑ Curtiss-Wright's Defense Solutions division, announced in June that it had been selected by a leading defense system integrator to provide its embedded Security IP module technology. Under the contract, Curtiss-Wright will supply its XMC-528 Mezzanine Card to provide a turnkey solution to add state-of-the art security protection to both legacy hardware and to new system designs. The enhanced TrustedCOTS (eTCOTS™) XMC-528 module is a security IP solution for a wide range of system architectures including ATCA, rackmount servers with PCIe slots, as well as VME and OpenVPX modules. The initial value of the award is \$2.5 million, with a lifetime value estimated between \$10-15 million.

Product Announcements

VPX Technology

VPX is a broadly defined technology utilizing the latest in a variety of switch fabric technologies in 3U and 6U format blades. OpenVPX is the architecture framework that defines system level VPX interoperability for multi-vendor, multi-module, integrated system environments. The sensor community served by the SOSA Consortium relies heavily on VPX modules. As the SOSA initiative continues to move forward, a number of new products have been launched by the VITA community, largely featuring VPX:

- ❑ In May, Mercury Systems announced the new Avionics Modular Mission Platform (AMMP), the industry's first and only SOSA aligned, DAL-certifiable, 3U OpenVPX mission computer. Featuring the latest Intel® Core™ i7 safety-certifiable processors, Mercury claims AMMP delivers up to 40x more performance than current-generation avionics computers while drawing 50% less power aimed at a wide range of platforms including rotary- and fixed-wing aircraft, ground stations and unmanned aerial vehicles.¹⁰

8 <https://ir.mrcy.com/news-releases/news-release-details/mercury-systems-receives-69m-order-high-performance-digital>

9 <https://ir.mrcy.com/news-releases/news-release-details/mercurys-data-recorder-help-monitor-global-warming>

10 <https://ir.mrcy.com/news-releases/news-release-details/mercury-launches-industry-first-safe-sosa-aligned-mission>

- ❑ In June, Curtiss-Wright's Defense Solutions division, introduced the MPMC-9337 mission computer for deployed platforms that need additional on-board processing power but must limit their size, weight and space (SWaP) burden. The MIL-grade, rugged three-slot 3U OpenVPX mission computer comes ready "out-of-the-box" to support compute intensive GPGPU driven applications, including cognitive signal and image processing. It is pre-configured with a Curtiss-Wright VPX3-1220 or VPX3-1260 single board computer (SBC) in the first slot and an NVIDIA® GPGPU based co-processor module in the second slot. The SBC hosts a Curtiss-Wright XMC-E01 fiber-optic XMC module (VITA 42) that delivers four channels of 10 Gb Ethernet.¹¹

Systems, Backplane and Chassis Technology

- ❑ In April, AMETEK Abaco Systems announced the new DEVPX3 development chassis. With eight individual slots, the DEVPX3 supports both conduction and air-cooled Abaco 3U modules aligned to OpenVPX and SOSA standards. The open frame and backplane are quickly configured with off-the-shelf cabling or rear transition modules. The chassis helps to quickly demonstrate and prove the end capability of 3U VPX solutions at a system or board level.¹²

XMC Technology

- ❑ In May, Interface Concept unveiled the IC-MPS-XMCA, a Switched Mezzanine Card (XMC) based on a Xilinx Zynq® UltraScale+ multiprocessor System on Chip (MPSoc). This new XMC product extends Interface Concept's existing FPGA board product range. This XMC board is pluggable on any carrier board and SBC equipped with an XMC slot. This mezzanine card dramatically extends the communication, networking capabilities and processing power of the system, without requiring any additional space or slot.¹³
- ❑ In June, Curtiss Wright Defense Systems introduced a new fiber-optic XMC module (VITA 42) that speeds and eases the integration of four channels of 10 Gb Ethernet (GbE) into OpenVPX and VME based embedded systems. The XMC-E01 XMC is suitable for use with both air-cooled and conduction-cooled single board computers, including the wide range of Curtiss-Wright 3U and 6U OpenVPX and 6U VME SBCs.¹⁴
- ❑ Acromag has launched new APZU series modules expanding their offering of mini PCIe-based AcroPack mezzanine modules with a programmable I/O solution featuring the Xilinx Zynq UltraScale+ multiprocessor system-on-a-chip (MPSoc). Three models are available, offering a choice of digital I/O interfaces; 28 TTL, 20 TTL and 3 RS422/485, or 14 LVDS signals. These mezzanine modules mount on a variety of AcroPack carrier cards for PCIe, VPX, and other platforms.¹⁵

Events

- ❑ In May, LCR Embedded presented a webinar "Cooling Systems: Removing Heat from Embedded Electronics Systems Webinar". Steve Gudknecht of LCR Embedded Systems discussed thermal design strategies that ensure the highest level of performance in new and evolving defense applications using advanced air and liquid cooling approaches in

11 <https://www.curtisswrightds.com/media-center/news/lightweight-mission-computer-deployed-gpgpu-based-signal-processing>

12 <https://www.abaco.com/news/new-abaco-devpx3-openvp3-development-chassis-cuts-costs-and-time-market>

13 <https://www.interfaceconcept.com/newsroom/details/New-XMC-board-based-a-Xilinx-Zynq-UltraScale-MPSoc>

14 <https://www.curtisswrightds.com/media-center/news/new-fiber-optic-xmc-card-quad-channel-10-gb-ethernet>

15 <https://www.acromag.com/blog/new-smallest-mezzanine-module-with-zynq-ultrascale-mpsoc-for-i-o-processing-and-programmable-logic/>

integrated systems and chassis. Other speakers were Gawtam Jhoty, Senior Mechanical Design Engineer, nVent/Schroff and Justin Moll, Vice President of Sales & Marketing, Pixus. The event was moderated by Dean Holman, President/Executive Director, VITA and hosted by Military Embedded Systems. A recording is available here: <https://www.lcrembeddedsystems.com/blog/>

Summary

Quarter 2 could be read as rather downbeat compared with previous quarters with fewer new product releases, fewer contract wins announced and some pretty weak revenues reported by the industry leaders. However there were a lot of new products released last quarter timing with an important SOSA meeting and the reasons for lower revenues have been explained above, largely related to U.S. defense budget delays, supply chain shortages and to some extent the overhang of Covid disruptions.

Growth is forecast to be targeted for the second half of 2022 and coupled with the general buzz around greatly increasing defense spending, particularly in Europe, the outlook remains vibrant. Intel has offered some confidence on steps taken to mitigate the semiconductor shortage and passing the CHIPS Bill will provide a lot of confidence to device consumers in all industries.

World Market for VITA Standards-based Board and Systems Report

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](#).

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 U.S. Department of Defense budget having the greatest impact on market growth. U.S. 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 U.S. 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



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