

Commercial Liaison Report – August 26th, 2024

GREG ROSSOW / DARCY SMITH
KEYSIGHT TECHNOLOGIES, INC.

Agenda

- Industry News & Updates
- Technology Trends

Industry Growth Rates

Aerospace & Defense ↔ Test & Measurement

- The global aerospace and defense market was estimated to be worth USD \$884B in 2023 and is projected to reach **\$1388B by 2030** with a compound annual growth rate (CAGR) of **6.7%**
 - A&D market growth is being fueled by increasing demand for air travel, increasing government spending on defense, technological advancements, and Space exploration



- The test and measurement equipment market was estimated to be worth USD \$34.3B in 2023 and is projected to reach **\$47.9B by 2030** with a compound annual growth rate (CAGR) of **4.8%**
 - Growth is being driven by many factors, including technological advancements in the automotive and aerospace & defense industries along with continued advancements in cellular communications and other technologies

Factors Influencing Growth

Aerospace & Defense ↔ Test & Measurement

- Various factors are influencing growth in the A&D and T&M industries, including . . .
 - 1. Supply Chain Issues**
 - Past supply chain issues have caused significant disruptions and laid bare the fragility of global supply chains
 - Pressures have fallen from earlier levels, however, and appear to be mostly in the rear-view mirror at this point
 - In response to issues seen, the US government has been taking steps to address supply chain vulnerabilities
 - 2. Workforce Shortages**
 - 29% of the A&D workforce is over 55 and retirements are expected to leave a 3.5 million worker gap by 2026
 - Jobs requiring a security clearance have increased nearly 1,000% since 2014, while the number of candidates with necessary clearances has risen by less than 10% - leaving over 70,000 roles unfilled
 - 3. Evolving Technologies**
 - Model Based System Engineering and the use of Digital Twins
 - Artificial Intelligence & Machine Learning
 - The introduction of Hybrid and Electric Aircraft

US DoD Budget Outlook



- On March 11, 2024, the Biden-Harris Administration submitted a proposed FY2025 budget request of \$849.8 billion to Congress for the Department of Defense (DoD)
 - 2% pay raise for civilian employees and 4.5% pay raise for military personnel
 - \$48.1B for shipbuilding, \$61.2B to reinforce U.S. air dominance, \$13B to bolster Army and Marine Corps combat capabilities
- The proposed FY25 budget represents a 4.1% (\$34B) increase from FY2023 level of \$816B



Accounting for inflation, however, the projected 4.1% two-year growth turns into negative growth, given that aggregate inflation over the last two years totaled about 7 percent

US DoD

Recent Contracts – Incl Sustainment



- May 2nd, 2024 - Northrop Grumman was awarded an indefinite-delivery/ indefinite-quantity contract with a \$7,000,000,000 ceiling for B-2 modernization & sustainment
 - Enhancements, sustainment, and logistics elements including sustainment engineering, support equipment, programmed depot maintenance of the fleet, and other interim contractor support
 - Work will be performed at Palmdale, CA; Whiteman Air Force Base, MO; Tinker AFB, OK; Wright Patterson AFB, OH; Edwards AFB, CA; and Hill AFB, UT, and is to be completed by May 3, 2029
- June 27th, 2024 - Lockheed Martin awarded a \$1,564,262,634 contract for logistics support of F-35 Lightning II Joint Strike Fighters for the USAF, USMC, Navy, FMS customers, and non-U.S. DoD participants
 - Ground & depot maintenance activities, automatic logistics information system operations and maintenance, reliability and maintainability, supply chain management, pilot training, maintainer training, and training system sustainment
 - Work will be performed in Fort Worth, TX (57%); Orlando, FL (26%); Greenville, SC, (11%); Marietta, GA, (4%); and Palmdale, CA (2%), and is to be completed in December 2024

Industry News

Test Solutions - Electrification

September 11th, 2023 – NI Announces its Most Compact and High-Density Battery Cycler & Emulator

- NI's NHR4800 enables high-power testing in a very small form-factor
 - High-density 80 VDC and 400 A, up to 16.5 kW in 4U chassis
 - Modular and scalable, parallel operation of up to 10 systems to go from 16.5 kW to 165 kW
 - Regenerative capability with >90% power recovery for significant cost savings
- Addresses battery testing needs across automotive, aerospace, and energy industries



Source: [NI](#)

January 2nd, 2024 – Keysight Showcasing Electric Vehicle Innovations at CES 2024

- At CES 2024 Keysight displayed solutions designed to accelerate innovation in electric vehicle (EV) development
 - Battery Cell Test Systems to enable development of higher energy-density batteries
 - Battery Pack Test Systems to accelerate development & validation of battery packs
 - Keysight's Charging Discovery System, a complete solution for all EV & EVSE charging equipment



Source: [Keysight](#)

Investments in test solutions for Electrification Technologies

Industry News

Collaborations - Communication Networks

March 13th, 2024 –RAPA and Anritsu Collaborate on B5G/6G Technology Verification

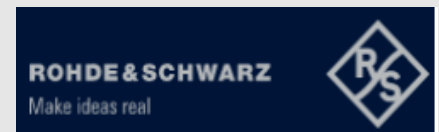
- The Korea Radio Promotion Association (RAPA) and Anritsu Corporation have signed an MoU defining cooperation on Beyond 5G (B5G) and 6th Generation Mobile Communication Systems (6G)
- RAPA plans to establish an “Anritsu B5G/6G Test Lab” at its Technical Support Center in Incheon where it will build test infrastructure to enable verification of 6G mobile communication technologies using Anritsu's MT8000A 5G test equipment, now extended with 6G capabilities.

The Anritsu logo is displayed in a green, sans-serif font.

Source: [Anritsu](https://www.anritsu.com)

July 9th, 2024 – EMITE and Rohde & Schwarz join forces to support OTA measurements on Wi-Fi 7 and 5G RedCap

- EMITE and Rohde & Schwarz will collaborate to enhance EMITE’s Over-the-Air (OTA) measurement solutions by fully integrating the latest test capabilities of the R&S CMX500 multi-technology, multi-channel one-box signaling tester.
- The integration enables support of LTE, FR1 and FR2 along with full compliance with the cutting-edge WLAN standard IEEE 802.11be as well as 5G RedCap



Source: [Rohde & Schwarz](https://www.rohde-schwarz.com)



DoD Investments - Advanced Cellular 5G, 6G and Beyond

- The FutureG Office resides within the Office of the Under Secretary of Defense for Research and Engineering
- Responsible for research & development and strategic assessment of 5G and beyond cellular technologies
- FutureG investment areas include . . .
 1. Expeditionary & Tactical Use
 - Advance FutureG technology to develop integrated warfighting networks composed of commercial cellular and traditional military equipment
 2. Ubiquitous, Secure, and Instant Access
 - Ensure Department of Defense (DoD) personnel and systems have access to secure mobile communications anywhere they operate
 3. Resilient and Open Commercial Solutions
 - Leverage advances in FutureG hardware, software, and other applications for the warfighter through experiments and industry collaborations

Cellular Initiatives

5G Networks, Open6G, and Naval Post-Grad Program

- [5G Private Networks](#)
 - Contract award to EchoStar for 5G Deployments at bases in Washington and Hawaii to help DoD evaluate 5G applications and LEO/GEO SATCOM resiliency
 - The contract supports continued deployment of private 5G networks at Joint Base Pearl Harbor-Hickam (JBPHH) in Hawaii and at the Naval Air Station Whidbey Island (NASWI) in Washington State
- [Open6G](#)
 - Open6G is a US Department of Defense (DoD) supported industry-university cooperative research center hosted by Northeastern University's College of Engineering
 - Research collaborations focused on "beyond 5G" systems will incorporate a range of industry partners including T&M companies such as National Instruments, Keysight Technologies, and VIAVI
- [Naval Post-Graduate School Program](#)
 - On April 22, FutureG approved a \$1.8 million investment in NPS for workforce education and research in expeditionary applications of 5G and beyond networks
 - The project establishes a graduate-level education and research program to develop advanced 5G and FutureG expertise in the active-duty force



Commercial Liaison Report

What other technology trends are you interested in hearing more about?

- Artificial Intelligence
- Robotics and Autonomous Vehicles
- High-Energy Weapons
- Other