

Next Generation Space Defense

MILSATMAGAZINE

July / August 2024



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MilsatMagazine is published 11 times per year by SatNews Publishers, 800 Siesta Way, Sonoma, California - 94576 - USA — Phone: (707) 939-9306 / Fax: (707) 939-9235 © 2023 SatNews Publishers

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YOUR STRONGEST ALLY IN THE ELECTRONIC WARFARE BATTLESPACE

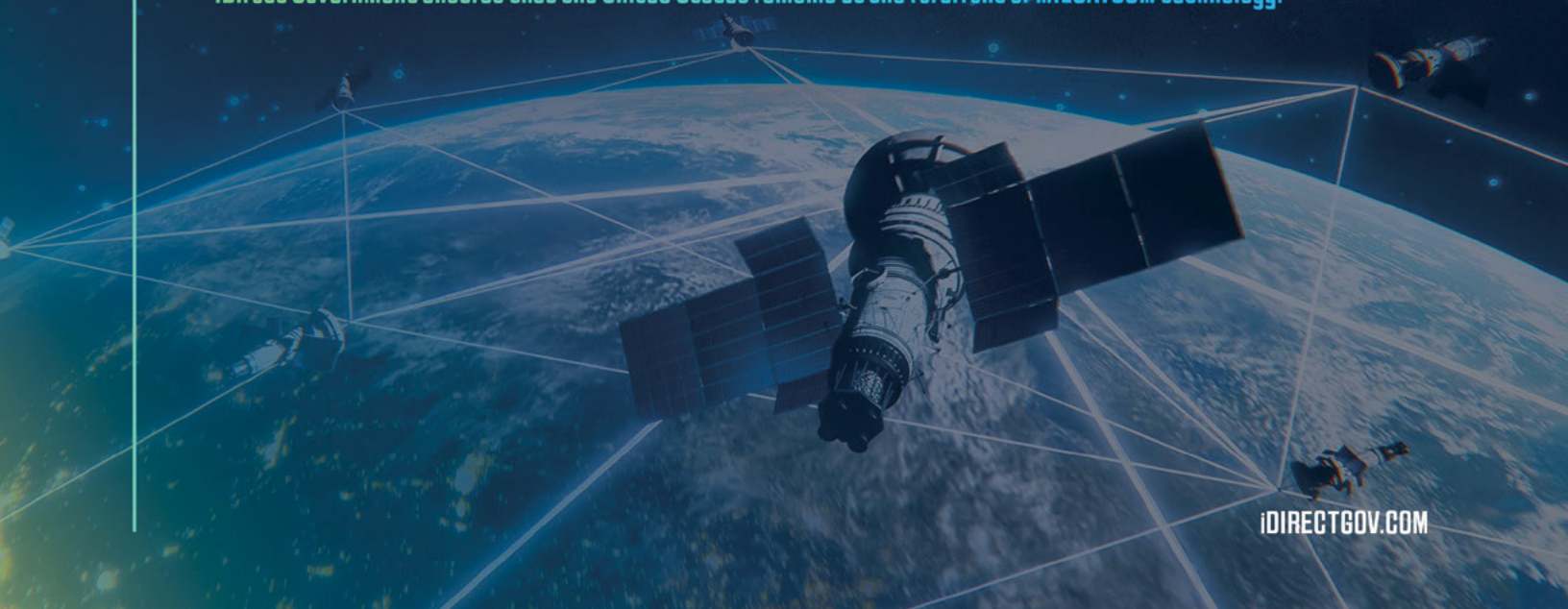
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DISPATCHES



Space Development Agency's layered network of military satellites will now be known as "Proliferated Warfighter Space Architecture"

The Space Development Agency's (SDA) resilient layered network of military satellites and supporting elements is now the "Proliferated Warfighter Space Architecture" or PWSA.

The architecture, formerly known as the "*National Defense Space Architecture*," was renamed to more specifically reflect the agency's mission to deliver needed space-based capabilities to the joint warfighter to support terrestrial missions through development, fielding, and operation of a proliferated *Low Earth Orbit* (pLEO) constellation of satellites.

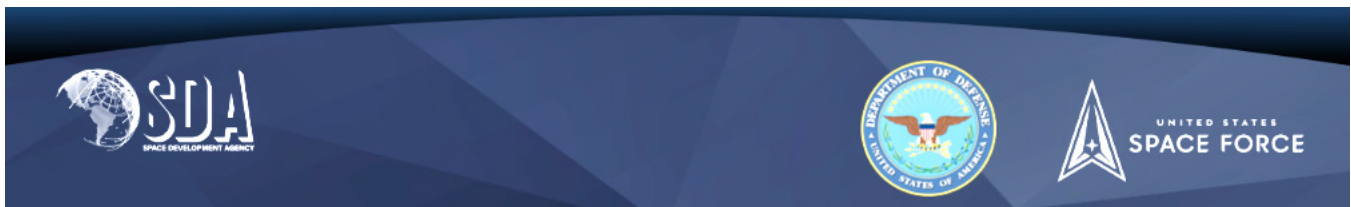
The spiral development and fielding of SDA's mesh network has matured successfully, but the constellations' original name did not accurately convey its current scope and purpose.

The new constellation name became effective on January 23, 2023.

Now integrated within the U.S. Space Force, SDA continues the integration of its space acquisition and operations into the overall national defense hybrid space enterprise, including pLEO advancements to support no-fail missions such as end-to-end missile warning, missile tracking, and missile defense.

Maintaining technological and military advantages in space for the warfighter requires developing a resilient hybrid architecture through an integrated diversification of orbits and proliferation of satellites.

The constellation name change will have no impact to the SDA mission. Leveraging speed, delivery, and agility, SDA will continue to quickly deliver needed space-based capabilities to the joint warfighter to support terrestrial missions through development, fielding, and operation of the PWSA.





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Additionally, Scout will participate in quarterly, in-person meetings to interact with government personnel at classified levels.

“Resilient flight software is imperative to maintaining space superiority and a competitive advantage over adversaries, ensuring seamless operations and bolstering strategic capabilities,” said Philip Hover-Smoot, CEO of Scout Space. “We are excited to support the development of novel technologies for the Department of Defense and look forward to being a strategic partner for the U.S. Government. Scout is committed to navigating the intricacies of space superiority while overcoming the technological challenges that define this critical frontier. We aim to provide solutions that lay the foundation for future advancements, ensuring a resilient and adaptive framework for maintaining dominance in the space domain.”

For more information on the DARPA BRIDGES initiative, visit [DARPA BRIDGES Initiative](#).

Scout Space was founded in 2019 with the mission to enable a new era of space safety and transparency. Scout’s in-space products and services, first launched in 2021, allow spacecraft to see and understand things around them. The orbital distributed sensor network developed by Scout will significantly improve Space Domain Awareness (SDA) and ensure responsible use of the space environment. The company is a Techstars,

MassChallenge, and venture-backed startup with ongoing government and commercial contracts. Scout holds the Established® 2021 Startup of the Year® title.

Scout Space to join DARPA’s BRIDGES consortium for space superiority

Scout Space Inc., an in-space observation service provider focused on space security and Space Domain Awareness (SDA), has been selected by the Defense Advanced Research Projects Agency (DARPA) to join the Bringing Classified Innovation to Defense and Government Systems (BRIDGES) Consortium.

DARPA selected Scout based on the company’s proposal outlining its approach to collaborating on “Advancing Autonomous In-Space Threat Response for Space Superiority.”

The BRIDGES Consortium aims to mitigate the timelines that can potentially limit the Department of Defense’s (DoD) ability to rapidly procure and employ innovative technology. The Consortium will sponsor Scout for a facility clearance, providing access to classified work areas and networks.



DISPATCHES



Company's Class A common stock, par value \$0.0001 per share (the "Class A Shares") not already owned by it for the right to receive \$0.50 per share in cash, as more fully described in the Merger Agreement.

With the completion of the take-private acquisition, the Class A Shares ceased trading prior to the opening of trading on July 18, 2024 and will no longer be listed on the Nasdaq Capital Market ("Nasdaq").

The Company also intends to make the applicable filings with the U.S. Securities and Exchange Commission (the "SEC") to suspend its periodic reporting obligations and to terminate the registration of the Class A Shares underlying the Company's active registration statements.

Astra closes the firm's take-private transaction

Astra Space, Inc. (Nasdaq: ASTRA) has successfully closed the firm's move to take the company to private ownership.

Under the terms of the definitive agreement for the transaction (the "Merger Agreement") that was previously announced on March 7, 2024, Apogee Parent, Inc., ("Parent"), an entity formed by Chris Kemp, Astra's co-founder, chief executive officer and chairman, and Dr. Adam London, Astra's co-founder, chief technology officer and director, will acquire all of the outstanding shares of the

As previously disclosed, (i) on April 17, 2024, the Company received a deficiency notice from Nasdaq that the Company is not in compliance with Nasdaq Listing Rule 5450(a)(1) because the per share closing bid price of the Class A Shares had been below \$1.00 for 30 consecutive business days prior to such deficiency notice; and (ii) on April 23, 2024, the Company received a deficiency notice from Nasdaq that the Company is not in compliance with the minimum stockholders' equity listing requirement set forth in Nasdaq Listing Rule 5550(b)(1) because the Company's Annual Report on Form 10-K for the period ended December 31, 2023, reported stockholders' equity below \$2.5 million.

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DISPATCHES



Microchip unveils industry's highest performance 64-bit HPSC MPU Family for autonomous space computing

Microchip Technology (Nasdaq: MCHP) has launched the first devices in the company's planned family of PIC64 High-Performance Spaceflight Computing (PIC64-HPSC) microprocessors (MPUs).

Unlike previous spaceflight computing solutions, the radiation- and fault-tolerant PIC64-HPSC MPUs, which Microchip is delivering to NASA and the broader defense and commercial aerospace industry, integrate widely adopted RISC-V® CPUs augmented with vector-processing instruction extensions to support Artificial Intelligence/Machine Learning (AI/ML) applications.

The MPUs also feature a suite of features and industry-standard interfaces and protocols not previously available for space applications. A growing ecosystem of partners is being assembled to expedite the development of integrated system-level solutions. This ecosystem features Single-Board Computers (SBCs), space-grade companion components and a network of open-source and commercial software partners.

In 2022, NASA selected Microchip to develop a High-Performance Spaceflight Computing processor that could provide at least 100 times the computational capacity of current spaceflight computers. This key capability would advance future space missions, from planetary exploration to lunar and Mars surface missions. The PIC64-HPSC is the result of that partnership.

The Radiation-Hardened (RH) PIC64-HPSC RH is designed to give autonomous missions the local processing power to execute real-time tasks such as rover hazard avoidance on the Moon's surface, while also enabling long-duration, deep-space missions like Mars expeditions requiring extremely low-power consumption while withstanding harsh space conditions.

For the commercial space sector, the RT PIC64-HPSC RT is designed to meet the needs of LEO constellations where system providers must prioritize low

cost over longevity, while also providing the high fault tolerance that is vital for round-the-clock service reliability and the cybersecurity of space assets.

PIC64-HPSC MPUs offer a variety of capabilities, many of which were not previously available for space computing applications.

Microchip's inaugural PIC64-HPSC MPUs were launched in tandem with the company's PIC64GX MPUs that enable intelligent edge designs in the industrial, automotive, communications, IoT, aerospace and defense segments.

With the launch of its PIC64GX MPU family, Microchip has become the only embedded solutions provider actively developing a full spectrum of 8-, 16-, 32- and 64-bit solutions.

Microchip has a broad portfolio of solutions designed for the aerospace and defense market including processing with RT and RH MCUs, FPGAs and Ethernet PHYs, power devices, RF products, timing, as well as discrete components from bare die to system modules. Additionally, Microchip offers a wide range of components on the Quality Products List (QPL) to better serve its customers.

Microchip's new PIC64-HPSC MPUs will be supported by a comprehensive space-grade ecosystem and innovation engine that encompasses flight-capable, industry-standard SBCs, a community of open-source and commercial software partners and the implementation of common commercial standards to help streamline and accelerate the development of system-level integrated solutions.

Early members in the ecosystem include: SiFive, Moog®, IDEAS-TEK, Ibeos, 3D PLUS, Micropac, Wind River®, Linux Foundation, RTEMS, Xen, Lauterbach®, Entrust® and many more. For information visit [Microchip's PIC64-HPSC MPU ecosystem partners webpage](#).



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A large satellite with two long, rectangular solar panel arrays is shown in orbit above the Earth. The Earth's surface is visible, showing continents and city lights at night. The sun is shining brightly from the right, creating a lens flare effect. The background is the dark blue and black of space.

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File photo of US Army FAB.

U.S. Army launches High Altitude Balloons

The U.S. Army Pacific, 3d Multi-Domain Task Force, and the Office of the Undersecretary of Defense conducted High Altitude Balloon (HAB) Training near the Mariana Islands last month.

U.S. Indo-Pacific command joint forces deployed HABs to Guam in support of Valiant Shield 2024.

Several HABs were launched from the Won Pat International Airport before reaching their cruising altitude above 50,000 feet.

The HABs then moved to airspace in vicinity of the Northern Mariana Islands as part of the training. At the conclusion of training, the HABs were recovered in the continental United States.

Coordination for the launch and training were made alongside local government leadership, Joint Region Marianas, the FAA, and Won Pat International Airport management.

The HAB systems include electromagnetic spectrum sensors and radio networking equipment which will enable maritime domain awareness. All operations will be in full compliance with applicable national and international laws and regulations regarding flight operations.

HABs operated under direct control of U.S. operators during the entire time of flight.

The HABs continuously used Automatic Dependent Surveillance – Broadcast (ADS-B) technology to provide real time location and to ensure all operations are conducted safely and within digital observation of other aircraft.

The HAB training will provide the DoD with validation of extended range sensing capability and will enhance maritime domain awareness.

Training with new and innovative platforms such as HABs is a key way the DoD continuously transforms in developing new capabilities in order to protect the United States as well as its partners and allies and to ensure a free and open Indo-Pacific.

Valiant Shield is a biennial, and for the first time, multinational, joint field training exercise (FTX) focused on integration between U.S. and allied forces at the operational and tactical level, while interoperating in realistic environments.





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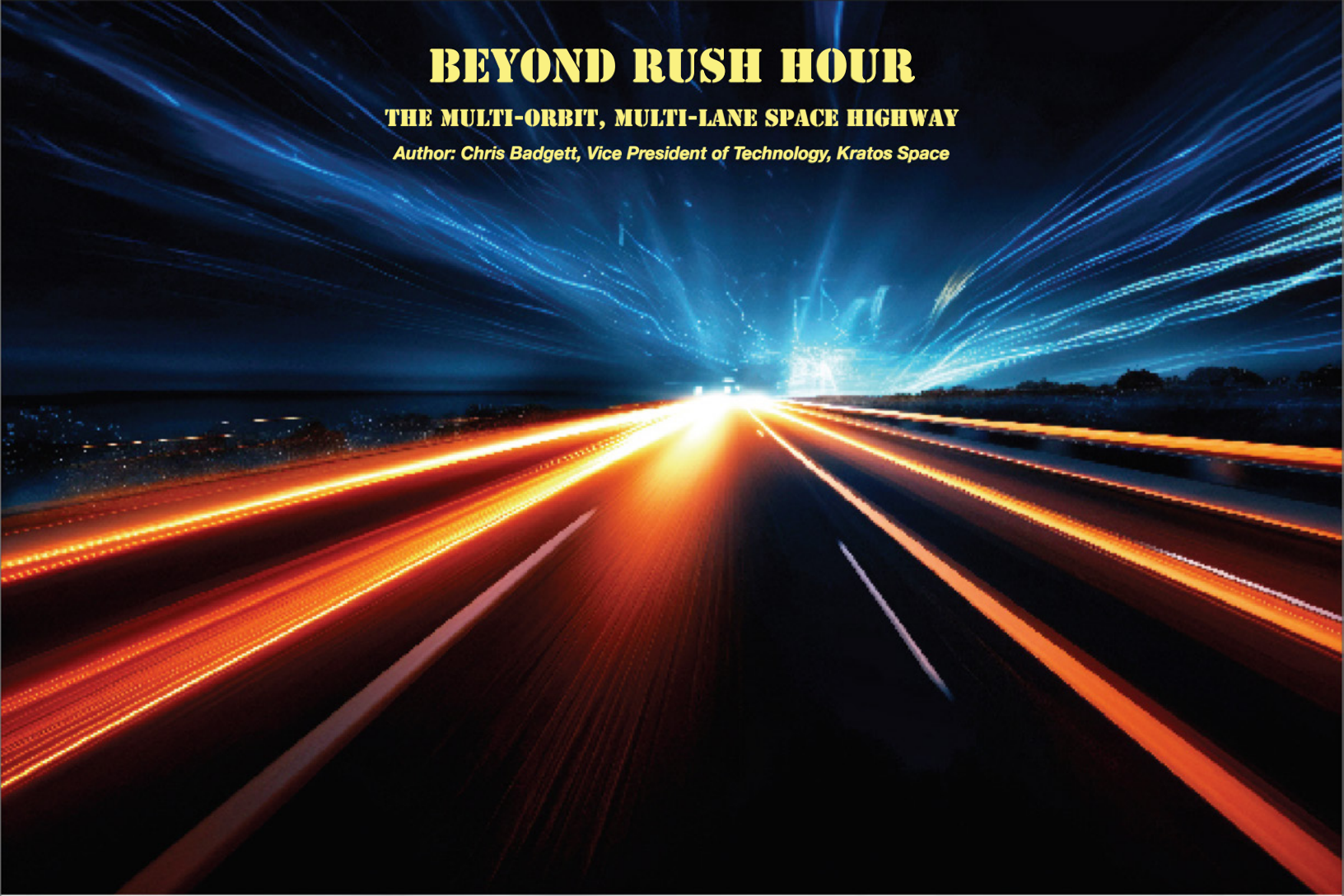
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BEYOND RUSH HOUR

THE MULTI-ORBIT, MULTI-LANE SPACE HIGHWAY

Author: Chris Badgett, Vice President of Technology, Kratos Space



Consider a road network and the options available to deliver a time-sensitive package to a destination. To get there, you may use a combination of routes to avoid accidents, road work and rush hour.

Likewise, the military is exploring traffic routes across various satellites orbits, as a way to contend with space network traffic jams, whose ramifications could be significantly more dire.

MULTI-ORBIT FUNCTIONALITY UNLOCKED

In a series of recent demonstrations for military and commercial entities, [Kratos](#) showed how the company's fully software-defined [OpenSpace Platform](#) supports seamless integration between commercial and military satellite networks at LEO, MEO and GEO. Collaborating with other satellite operators and equipment partners, Kratos successfully tested and verified functionality of OpenSpace as a gateway and edge platform at each of the major orbital belts.



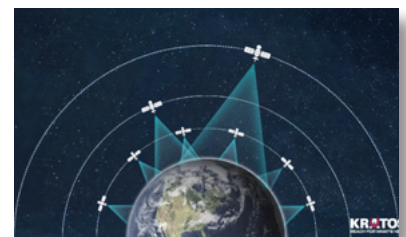
SEAMLESS MEO USING VIRTUALIZED SATCOM

Kratos and [SES](#), a leader in global content connectivity solutions, successfully executed a fully virtualized SATCOM ground system demonstration for the [U.S. Army's Combat Capabilities Development Command](#).

In an industry first, the demonstration showed seamless operation supporting satellites in *Medium Earth Orbit* (MEO) on a "make-before-break" mode over SES's [O3b MEO](#) satellite network. Make-before-break is an essential capability for MEO and LEO satellite constellations referring to the ability to transfer communication sessions while the user transverses the coverage areas of different satellites.

Leveraging the Advantages of Each Orbit

- *Low-Earth Orbit (LEO) satellites offer low latency, ideal for real-time data exchange and rapid decision-making.*
- *High-Throughput Geostationary (GEO) satellites provide persistent, wide area coverage and high bandwidth for data-intensive applications.*
- *Medium-Earth Orbit (MEO) offer a balance of both, they have more coverage and handle more data than LEO and provide lower latency than GEO. Increasingly, MEO is used for mobile and broadband.*



What is the difference between orbits?
The answer: Speed + Performance



OpenSpace OpsCenter image showing spectrum, scheduler, schematic of on-prem and off-prem assets.

FLEXIBLE + DIVERSE OPERATIONS

The demonstration employed a remote terminal in Port St. Lucie, U.S., and a gateway in Lima, Peru, which connected to a software-defined Kratos OpenSpace® **vStar** hub system located more than 3,000 miles away in Virginia, U.S., all orchestrated and conducted over SES's O3b satellite network.

Going forward, military missions will require flexible communication routes based on multiple satellites, networks and network elements. Only a software-defined satellite ground platform will provide levels of adaptability at mission speed along with the openness to maximize available network resources.

DYNAMIC LEO USING VIRTUALIZED SATCOM

Similarly for the U.S. Army's Combat Capabilities Development Command, Kratos and demonstration partners **Telesat Government Solutions** and **Cobham Satcom**, demonstrated a fully virtualized SATCOM ground system, showing dynamic support of simultaneous communication pathways for resilient SATCOM at LEO.



The demonstration showed a flexible network architecture that allowed soldiers to connect **Telesat's LEO 3 satellite**



through **Cobham antennas**. Kratos' **OpenEdge™ 2500 digitizer** was integrated with Cobham's **Tracker 1300TT (image, right)** antenna, enabling standardized traffic (DIFI) to pass directly from Cobham's digital-ready antenna through virtualized modems at the network's edge to the LEO 3 satellite.

The OpenEdge 2500 is a digitizer that converts radio frequency (RF) signals into Internet protocol (IP) data streams to help satellite antenna manufacturers digitally enable their products. The OpenEdge 2500 can enable digital IF (DIFI) within almost any parabolic, electronically steerable, or flat panel antenna.



The more resilient a strategic communication network is to disruptions — enemy jamming, disconnected environments, or limited bandwidth — the greater its effectiveness.

By using a variety of transport pathways across different orbits, such as MEO and LEO, communication becomes more diverse and adaptable. This type of network makes it harder for adversaries to completely disrupt or deny access.

These demonstrations showed that, regardless of the orbit, Kratos OpenSpace can offer a variety of software-defined form factors to existing ground segments (both gateway and edge) including on-prem, off-prem or a hybrid variation.

Unlike traditional SATCOM equipment that are limited to **Geosynchronous Earth Orbit (GEO)** satellites, a multi-orbit approach provides a redundant, robust communication backbone, ensuring critical information flows even in the face of adversity.

The single most important aspect of each of these demonstrations was the versatility and adaptability of OpenSpace as a ground segment system. The gateways themselves could be moved from cloud to hardware, as needed, and the digitizers could be collocated to the gateway or remotely located at a teleport.

MULTI-BEAM, MULTI-ORBIT MISSION OPERATIONS

Recently, Kratos also revealed ongoing progress in successfully supporting a large military program, using the OpenSpace virtualized SATCOM ground system as part of a milestone demonstration that will provide the backbone for multi-beam, multi-orbit space operations.

This capability will allow the military to instantiate new services in minutes instead of the weeks, or even months, commonly required with traditional hardware-based ground systems.

In all three cases, Kratos showed a flexible network architecture facilitating simultaneous communication pathways for resilient SATCOM with a virtualized and containerized architecture enabling soldiers to position their **radio frequency (RF)** hardware and software-defined hubs anywhere across the globe.

THE ROAD TO MULTI-ORBIT CONNECTIVITY IS BUILT WITH SOFTWARE

Kratos' OpenSpace platform revolutionizes satellite communication by enabling seamless, multi-orbit connectivity through software-defined orchestration. By breaking free from traditional hardware limitations, OpenSpace unlocks the full potential of ever-evolving commercial satellite networks, paving the way for a future of dynamic, resilient and adaptable ground infrastructure.

www.kratosdefense.com

Chris Badgett is the Vice President of Technology for Kratos Space. He has been instrumental in designing the capability for the military to take advantage of virtual ground solutions and the ability to securely leverage the power of cloud computing and global antenna networks. Prior to Kratos, Mr. Badgett served in the Air Force Research Lab and Space and Missile System Center enabling technologies for UAVs, datalinks, small satellites and ground systems. Mr. Badgett holds a BS in Electrical Engineering from University of Tennessee and an MS in Space Systems from the Air Force Institute of Technology.



Chris Badgett

DISPATCHES



GAT-5530

Viasat to deliver secure b'band SATCOM on the Airbus C295 MPA fleet for the Spanish MoD

Viasat Inc. (NASDAQ: VSAT) is expanding the firm's work with Airbus Defence and Space to provide its secure, flexible broadband Ku- and Ka-band airborne technology for the Airbus C295 Maritime Patrol Aircraft (MPA) that have been acquired by the Spanish Ministry of Defence (MoD).

(GEO, MEO, HEO), multi-network communications architectures.

"We are excited to expand our work with Airbus to support the Spanish Ministry of Defence with our highly flexible, multi-band terminal on the C295 Maritime Patrol Aircraft. Our connectivity solutions are designed to support modern military operation requirements with advanced, secure and resilient satellite communications. This includes enabling seamless roaming between sovereign and commercial networks to provide superior resilience beyond the capabilities of traditional single-band or single-network access solutions," said **Victor Farah, Senior Vice President, Viasat Government.**

"This selection by the Spanish MoD underscores the trust and confidence in our ability to deliver enhanced mission connectivity solutions and to help global government customers significantly improve reliability and continuity across a range of operational environments."



Viasat and Airbus Defence and Space will collaborate on the integration of Viasat's dual-band (Ku/Ka) broadband terminal, the **GAT-5530**, into the Spanish C295 MPA fleet to provide a highly flexible, multi-band and multi-orbit, broadband SATCOM capability to support missions using the

High Throughput Tactical FlyAway & Gateway

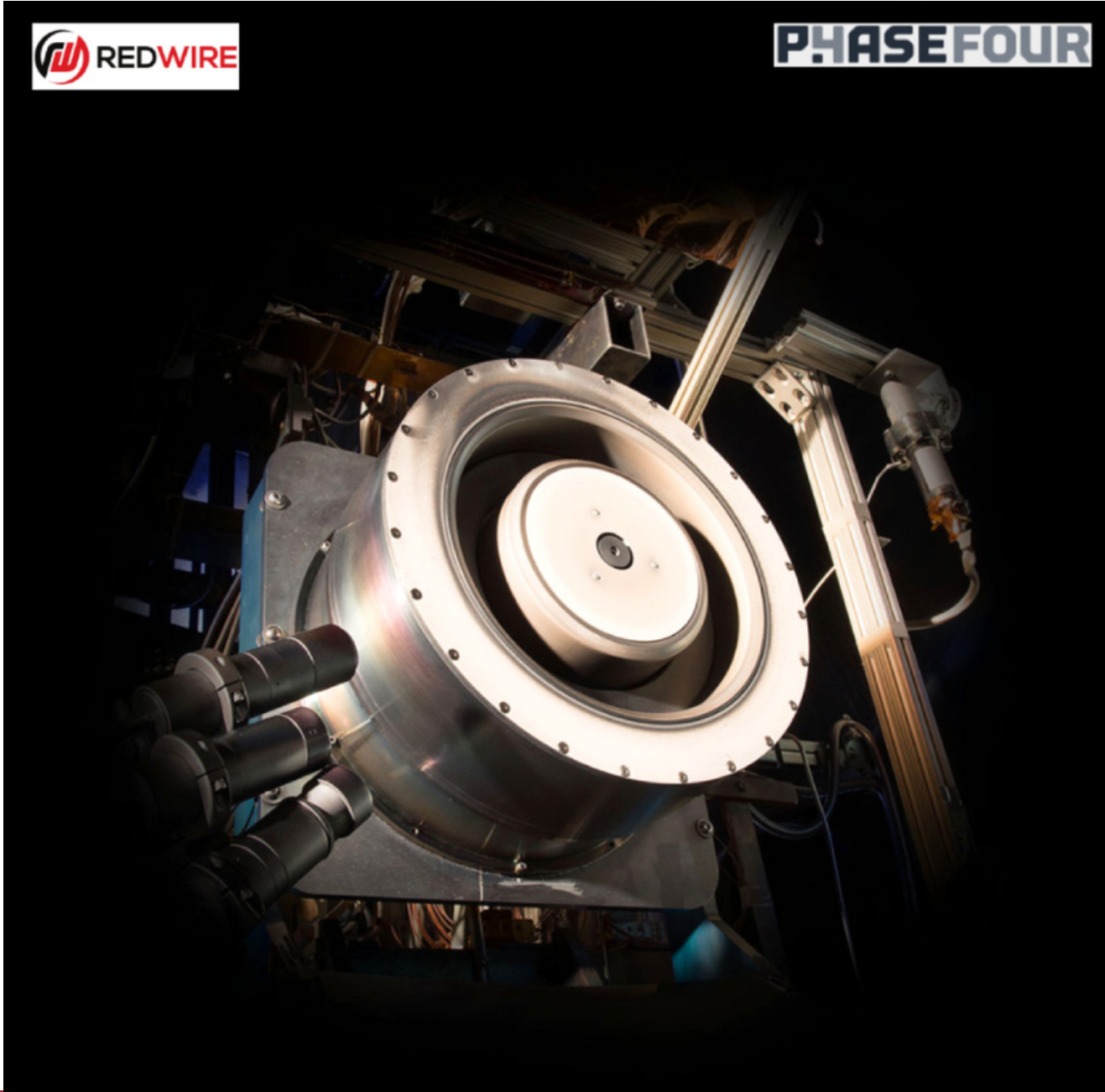
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Redwire and Phase Four will leverage their expertise to manufacture the power processing unit hardware, thruster, propellant management software, and software control, which both companies will integrate into flight panels.

Redwire will leverage its business operations at scale, marketing resources, and extensive heritage as a trusted space systems supplier to bring this in-space propulsion system to market.

The Valkyrie thrusters are anticipated to go into full rate production in 2025.

“Redwire offers a range of solutions designed to support high-volume small satellite manufacturing, and through this partnership, we are focused on delivering an optimal in-space propulsion technology that can specifically address the challenges in the propulsion supply

Redwire Developing advanced thruster tech to support the DoD smallsat supply chain

Redwire Corporation (NYSE: RDW) has signed a strategic cooperation agreement (SCA) with **Phase Four** to build and deliver advanced thruster technology designed for reliable, high-volume production to meet the surge in demand across national security space programs — the SCA provides a framework that allows for joint development of this advanced thruster.

Redwire and Phase Four will design and develop a reliable and efficient **Hall Effect Thruster (HET)**, called the **Valkyrie Thruster**, based on an existing design. The highly flexible and streamlined design will yield a shorter production schedule enabling reliable, high-volume production.

chain,” said Redwire’s President of Space Systems Adam Biskner. “This reliable, mass producible design will offer a scalable in-space propulsion solution within DoD’s small satellite supply chain and will serve many other national security space applications.”

“The partnership between Phase Four and Redwire provides both civilian and military space operators another stable and reliable domestic source of electric propulsion systems,” said Steve Kiser, Phase Four CEO. “Phase Four’s market differentiating capabilities and history of propulsion innovation, coupled with Redwire’s mission and engineering expertise, will meaningfully expand the types and volume of Hall Effect Thrusters to an industry that is increasingly challenged to deliver enough propulsion supply. We look forward to exploring all the opportunities this partnership presents.”

DISPATCHES



General Atomics awarded SSC follow-on contract for 2nd EO/IR EWS support satellite + services

General Atomics Electromagnetic Systems (GA-EMS) has been awarded a contract modification by the United States Space Force's **Space Systems Command** to help alleviate on-orbit risks for the Government through the delivery of a second weather satellite— the contract also calls for three years of operations service for each of the two satellites to support the **Electro-Optical Infrared (EO/IR) Weather System (EWS)**.

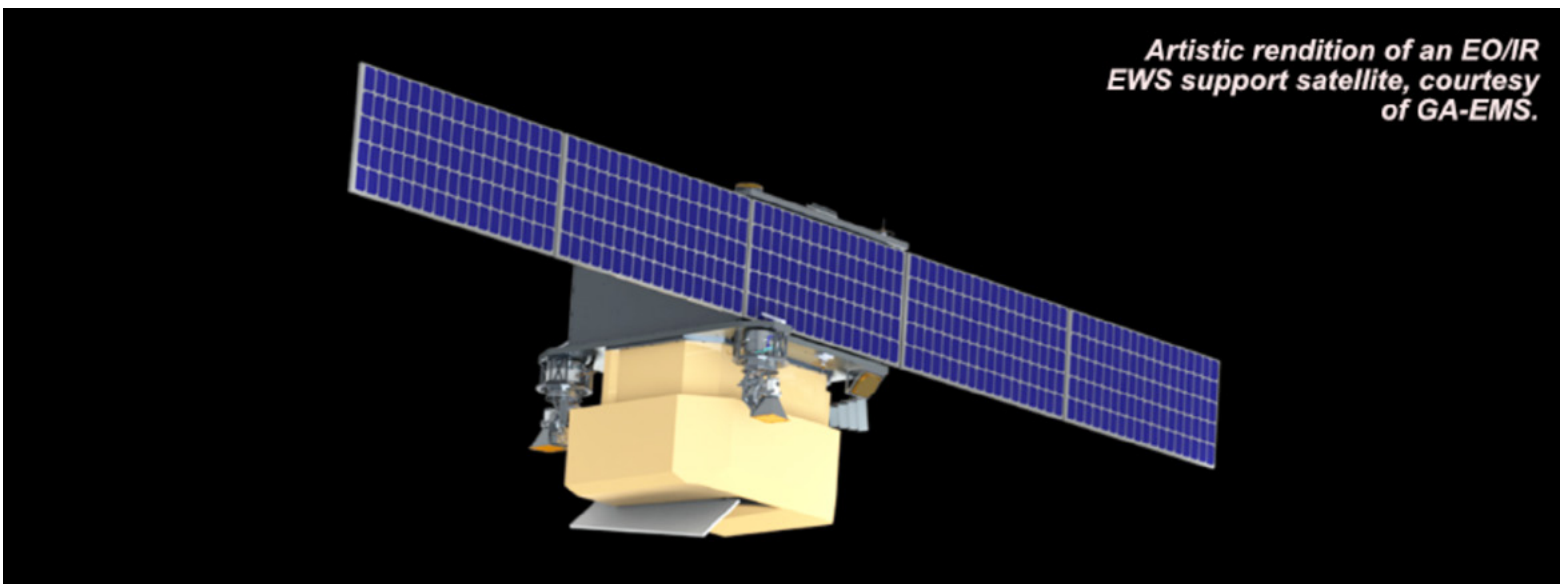
This award modifies the current GA-EMS contract to design and deliver an operational EWS spacecraft with integrated EO/IR payloads to support the transition of the USSF's aging **Defense Meteorological Support Program (DMSP)** on-orbit systems to a new generation of affordable, high performance, small weather satellites.

As the prime contractor, GA-EMS is responsible for the spacecraft bus and EO/IR payload design development, build, Assembly, Integration and Test (AIT), and has assembled a highly experienced, best-in-class team to deliver the EWS satellites.

The team includes **Atmospheric and Environmental Research (AER) Inc.** for weather product expertise, and **Parsons Corporation** (NYSE:PSN) to provide Enterprise Ground Station command and control and operations support.

"This contract is a testament to GA-EMS' ability to design and deliver advanced EWS satellites that will provide timely, accurate weather data to support Department of Defense operations across all domains," said **Scott Forney, president of GA-EMS**. "We are currently working toward the delivery of the first EWS satellite and associated ground systems, with spacecraft build and EO/IR payload testing well underway. We are excited to begin the build and integration of a second EWS satellite to help support USSF efforts to extend EO/IR data collection capabilities as legacy DMSP satellites are retired."

"From our initial 2020 contract award to develop an EWS satellite design to today's contract modification to deliver two EWS satellites and on-orbit operations services, our team continues to make excellent progress toward meeting EWS mission requirements," said **Gregg Burgess, vice president of GA-EMS Space Systems**. "After decades of providing exemplary weather support to military operations and the nation, DMSP is sunsetting. It is imperative that modern, advanced EO/IR weather satellites enter service to ensure accurate, uninterrupted weather data affecting daily operations, mission planning, and intelligence gathering reaches military decision-makers in a timely manner. We look forward to delivering our exquisite solutions for on-orbit weather data collection, high-resolution weather imagery and environmental monitoring data products that will help keep our warfighters on the cutting edge of mission overmatch."



MILITARY LASER SYSTEMS

A BILLION DOLLAR MARKET

Author: MarketsandMarkets



The Military Laser Systems Market is estimated to be approximately \$5.0 billion in 2023 and is projected to reach \$7.5 billion by 2028, at a CAGR of 8.7% during the forecast period, according to [MarketsandMarkets](#), a research and analysis firm.

The driving factor for the military laser systems market is the significant investments in modern weapon systems by governments — laser technology is widely used in military communication systems, directed energy weapon systems as well as target designation and ranging system, among other uses.

Laser systems are also used to enhance military mission success rate by providing knowledge of target locations, protecting armed forces personnel, and for countering and destroying hostile forces.

According to MarketsandMarkets, a research and analysis firm, the top, key players, in alphabetical order, in this market include...

- [BAE System plc \(UK\)](#)
- [Lockheed Martin \(US\)](#)
- [Northrop Grumman Corporation \(US\)](#)
- [Raytheon Technologies Corporation \(US\)](#)
- [Thales Group \(France\)](#)

MILITARY LASER SYSTEMS MARKET SEGMENTATION

The platform segment has been segmented into land, airborne, naval, and space. Based on platform, the naval laser market segment is expected to grow at the highest CAGR during the forecast period. The growth of the naval segment can be attributed to the increasing development of shipboard weapon systems to strengthen maritime border security.

Based on application, the weapons segment is projected to grow at the highest CAGR during the forecast period. The growth of this segment is attributed to the growing disagreements between neighboring nations and that factor led to an increase in demand for modern weaponry.

The weapons segment has been further classified into lethal and nonlethal weapons. The lethal weapon has ability to kill or destroy land, naval and aerial threats.

Based on technology, the fiber laser technology is expected to grow at the highest CAGR during the forecast period. The technology segment has been segmented into solid-state laser, fiber laser, semiconductor laser, gas laser, liquid laser, and free-electron laser.

Among these, fiber laser witnesses strong growth during the forecast period. Fiber lasers are highly compact, robust, efficient, low maintenance, reliable, and long-lasting high-energy lasers. It is widely used in directed energy weapons. The applications of fiber lasers typically include tactical directed energy and power beaming. Electrical fiber lasers can be spectrally combined to produce a high-power, weapon-grade beam.



LASER SYSTEM EXAMPLES

BAE SYSTEMS

BAE Systems offers a combat-proven APKWS® laser guidance kit that redefines

precision munitions by hitting targets with pinpoint accuracy and minimal collateral damage.

The company's APKWS guidance kit transforms unguided 2.75-inch (70 millimeter) rockets, such as the *Hydra 70 Mk 66* and others, into *precision-guided munitions* (PGMs).



A light, tactical vehicle fires an APKWS® laser-guidance kit. Photo is courtesy of BAE Systems.

Qualified on numerous *U.S. Department of Defense (DoD)* platforms, APKWS laser guidance kits provide affordable surgical-strike capability to multiple rotary-wing and fixed-wing platforms. Development, testing, and demonstrations are underway for UAS aircraft, as well as ground-based platforms.

According to BAE Systems, the APKWS system bridges the gap between unguided rockets and larger anti-armor munitions, with commonality across U.S. military service.

The APKWS guidance kit equipped rocket consistently hits their intended targets with pinpoint accuracy, while limiting collateral damage. The guidance section is designed to lock onto targets from more than 6 kilometers away, supporting survivability and mission success by keeping the launch platform at a safe, standoff distance from threats.

A recent *Single Variant Block Upgrade* optimized flight trajectory, enabling the rocket to hit targets at a steeper angle of attack for enhanced lethality. The APKWS Kit has been in full-rate production for more than six years and, to date, more than 50,000 units have been delivered.



Another company engaged in laser weapon production is General Atomics-Electromagnetic Systems Group (GA-EMS).

The company offers their HEL weapon system that offers significant power-on-target, thereby enabling shortened engagements and rapid retargeting.



Artistic rendition of the GA-EMS HEL weapon system in operation, courtesy of the company.

The increased power provides lethality at longer ranges and increased effectiveness against hard targets. The system's modular, scalable design also offers significant reductions in size, weight, and power consumption to suit air, land, and sea-based platforms.



In August of 2020, **Lockheed Martin Corporation** delivered **Helios**, an advanced, 60+ kW-class, high-energy laser weapon solution to the US Navy to enhance their naval capabilities.

The HELIOS was the first tactical laser weapon system to be integrated into US Navy existing ships and provides directed energy capability to the fleet. Integrated and scalable by design, the multi-mission HELIOS system provides tactically relevant laser weapon system warfighting capability as a key element of a layered defense architecture.



Lockheed Martin's HELIOS, a transformational laser weapon system, provides directed energy capability to the US Navy. Image is courtesy of Lockheed Martin.

The laser system provides for an additional layer of protection for the fleet with a deep magazine, low-cost per kill, speed of light delivery and precision response.



Northrop Grumman Corporation (NYSE: NOC) continues their multi-year involvement with laser weaponry and, last year, delivered a miniaturized high-energy laser source to the U.S. government. This ruggedized laser is for field use and the miniature size of the unit allows for rapid placement in tactical situations.

The 10kW class, high-energy laser, known as Phantom, is about 12 cubic feet (nearly the size of a mini fridge) and weighs less than 200 pounds, enabling two personnel to lift, carry and install the unit.

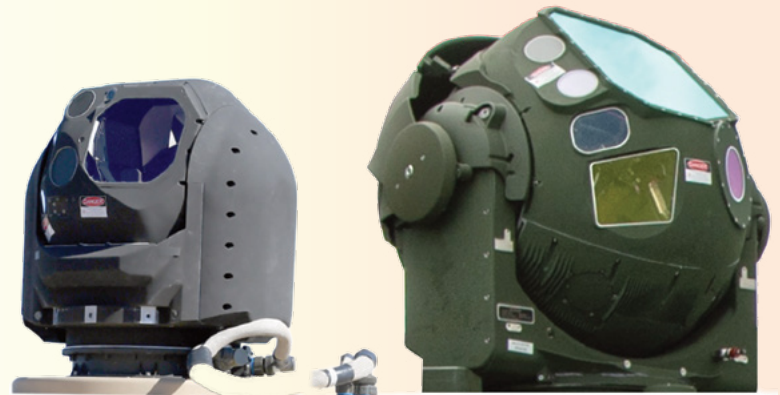


The Phantom system in transportation configuration (within ruggedized enclosure). Photo is courtesy of Northrop Grumman.



RTX (Raytheon)'s high-energy laser (HEL) systems use photons, or particles of light, to carry out military missions and civil defense.

This directed energy technology enables detection of threats, tracking during maneuvers, and positive visual identification to defeat a wide range of threats, including unmanned aerial systems, rockets, artillery and mortars.



15kW

50kW

Photo is courtesy of RTX (Raytheon).

Raytheon laser weapon systems work on land, in the air and at sea, providing 360-degree coverage that protects bases, airports, stadiums and other high-value military or civilian targets.

The system's open architecture adapts to the demands of the mission, while ruggedized packaging means it can be used as a standalone system or rapidly installed on a variety of military platforms. Raytheon completed full installation and testing on Army combat vehicles as well as an Apache attack helicopter.

HEL is an affordable and viable option to protect military and critical infrastructure, and rapidly defeat threats. With a low cost-per-shot ratio, lasers offer a nearly infinite number of shots, minimal logistics and precision accuracy with very low collateral damage. It is an affordable alternative to traditional munitions.



For more than 40 years, **Thales** has been a world leader in the design, development and manufacturing of high-energy diode-pumped and flashlamp-pumped nanosecond lasers for industrial applications.



Thales solid-state lasers, photos courtesy of the company.

The company is also engaged in the production of powerful, ultrashort pulse Ti:Sa femtosecond laser systems, boasting power of up to 10 petawatts, for scientific applications.

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MarketsandMarkets was founded in 2009 and explored emerging and fast-growing opportunities and evolved from being a market research publisher to a growth enabling firm. Earlier this year, the company made a formal transformation into one of America's best management consulting firms as per a survey conducted by Forbes.

DISPATCHES



NSA's Artificial Intelligence Security Center and partners are releasing:

DEPLOYING AI SYSTEMS SECURELY: BEST PRACTICES FOR DEPLOYING SECURE AND RESILIENT AI SYSTEMS

CYBERSECURITY INFORMATION SHEET

NSA publishes guidance for strengthening AI system security

The **National Security Agency (NSA)** has released a **Cybersecurity Information Sheet (CSI)** – **“Deploying AI Systems Securely: Best Practices for Deploying Secure and Resilient AI Systems.”**

The CSI is intended to support National Security System owners and Defense Industrial Base companies that will be deploying and operating AI systems



Artificial Intelligence Security Center

designed and developed by an external entity.

The CSI is the first release from NSA's **Artificial Intelligence Security Center (AISC)**, in partnership with the **Cybersecurity and Infrastructure Security Agency (CISA)**, the **Federal Bureau of Investigation (FBI)**, the **Australian Signals Directorate's Australian Cyber Security Centre (ACSC)**, the **Canadian Centre for Cyber Security**, the **New Zealand National Cyber Security Centre (NCSC-NZ)**, and **United Kingdom National Cyber Security Centre (NCSC-UK)**.



America's Cyber Defense Agency
NATIONAL COORDINATOR FOR CRITICAL INFRASTRUCTURE SECURITY AND RESILIENCE

While intended for national security purposes, the guidance has application for anyone bringing AI capabilities into a managed environment, especially those in high-threat, high-value environments. It builds upon the previously released *Guidelines for Secure AI System Development and Engaging with Artificial Intelligence*.

This is the first guidance led by the AISC and postures the center to support one of its central goals: improving the confidentiality, integrity, and availability of AI systems.

NSA established the AISC in September of 2023 as a part of the **Cybersecurity Collaboration Center (CCC)**. The AISC was formed to detect and counter AI vulnerabilities; drive partnerships with industry and experts from U.S. industry, national labs, academia, the IC, the DoD, and select foreign partners; develop and promote AI security best practices; and ensure NSA's ability to stay in front of adversaries' tactics and techniques.



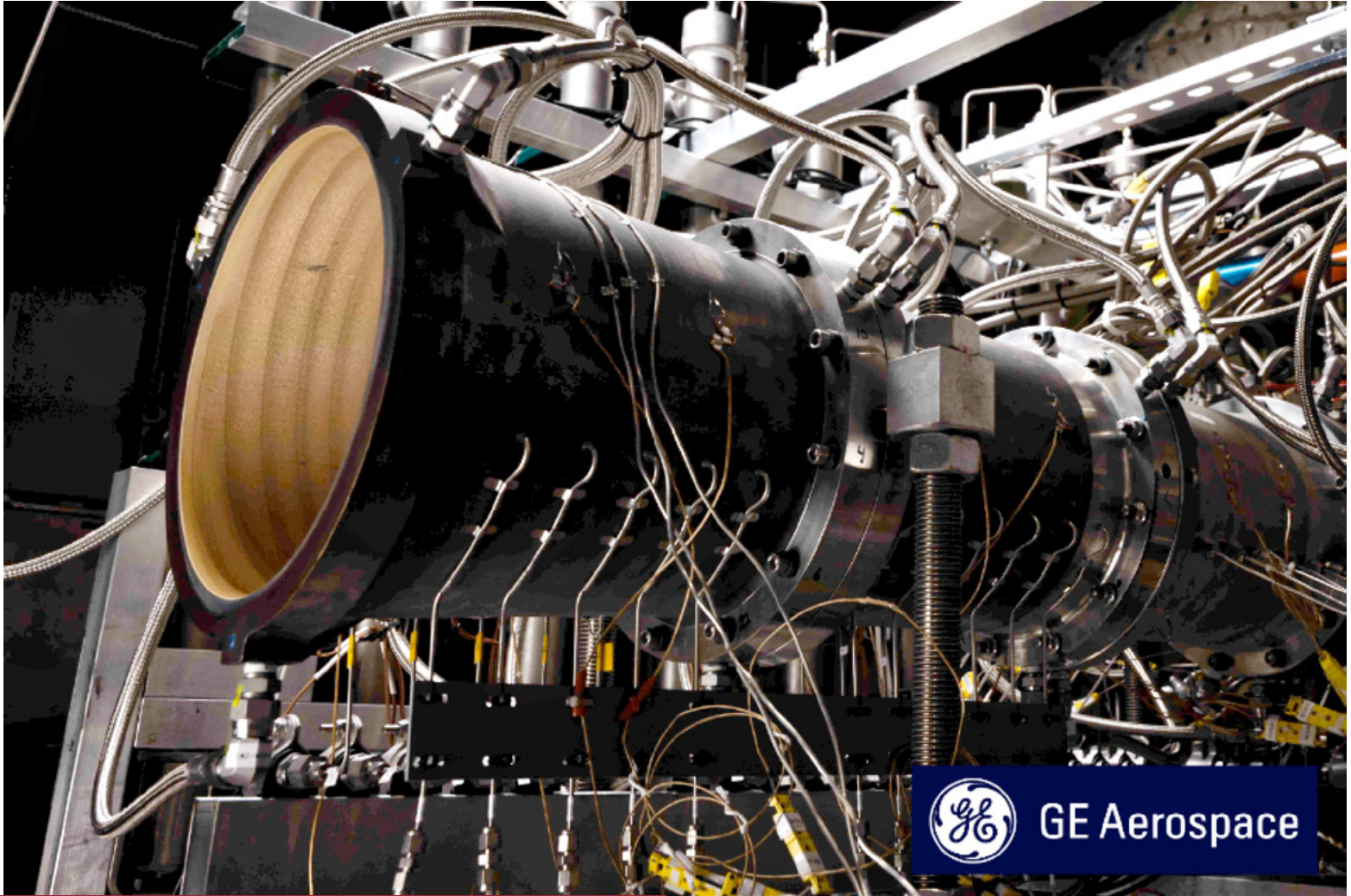
NSA Cybersecurity Collaboration Center

Intel driven cybersecurity through open, collaborative partnerships.

The AISC plans to work with global partners to develop a series of guidance on AI security topics as the field evolves, such as on data security, content authenticity, model security, identity management, model testing and red teaming, incident response, and recovery.

“AI brings unprecedented opportunity, but also can present opportunities for malicious activity. NSA is uniquely positioned to provide cybersecurity guidance, AI expertise, and advanced threat analysis,” said NSA Cybersecurity Director Dave Luber.

DISPATCHES



GE Aerospace develops + test new hypersonic dual-mode ramjet

GE Aerospace has successfully demonstrated a new, cutting-edge, hypersonic dual-mode ramjet — this achievement — which could enable high-speed flight and longer range across numerous multi-mission aircraft — represents the most recent milestone in a diverse portfolio of hypersonic programs.

The dual-mode ramjet began testing in March of this year in the clean air, continuous flow, high-speed propulsion testing facility in Evendale, Ohio, just 11 months after the launch of the design effort.

The testing delivered promising results, exceeding performance expectations and demonstrating robust operation of a dual-mode ramjet with a threefold (3X) increase in airflow compared to previously flight-tested hypersonic technology demonstrators.

The successful development and testing of the dual-mode ramjet in such a short period of time was made possible through the collaboration of GE Aerospace's team of engineers, ***Innoventing*** — a company acquired by GE Aerospace in 2022 that specializes in hypersonic propulsion — and ***GE Aerospace's Research Center***.

"The rapid progression from design to testing underscores our commitment to driving innovation in hypersonic technologies," said Amy Gowder, president and CEO of Defense & Systems at GE Aerospace. "This milestone not only shows the exceptional talent and dedication of our team but also reaffirms our position as a leader in the pursuit of hypersonic flight."

"The technology's robust performance paves the way for the next phase of development, which will focus on continued testing and technology demonstration in alignment with our roadmap for integrated high-speed propulsion solutions," said Mark Rettig, vice president and general manager of Edison Works Business & Technology Development at GE Aerospace.

DISPATCHES



Northrop Grumman builds next generation hybrid electric uncrewed X-Plane for DARPA

Northrop Grumman Corporation (NYSE: NOC) has announced the design and construction of the **Series Hybrid Electric Propulsion Aircraft Demonstration (SHEPARD)** vehicle — this uncrewed air system developed for **DARPA** recently received an official X-plane designation of **XRQ-73**.

Built in collaboration with **Scaled Composites**, a Northrop Grumman subsidiary, the XRQ-73 SHEPARD is a DARPA “X-prime” program leveraging hybrid electric architecture and component technologies to quickly mature a new mission-focused aircraft design with propulsion architecture and power class for the Department of Defense (DoD).

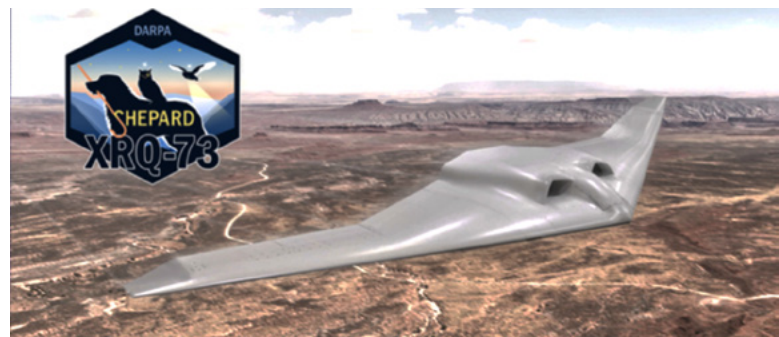
DARPA adds...

The Series Hybrid Electric Propulsion Aircraft Demonstration program, known as SHEPARD, has received its official X-plane designation: XRQ-73.

SHEPARD is an “X-prime” program, leveraging the series hybrid electric architecture and some of the component technologies from the earlier **AFRL/IARPA Great Horned Owl (GHO)** project.

The DARPA team includes members from the **Air Force Research Laboratory (AFRL)**, the **Office of Naval Research (ONR)**, and our warfighters. The prime contractor for SHEPARD is Northrop Grumman Corporation’s Aeronautics Systems sector in Redondo Beach, California. Scaled Composites, LLC is a major supplier, along with **Cornerstone Research Group, Inc.**, **Brayton Energy, LLC.**, **PC Krause and Associates**, and **EaglePicher Technologies, LLC.**

The XRQ-73 aircraft will be a Group 3 UAS weighing approximately 1,250 pounds. First flight of the XRQ-73 is expected by year-end 2024.



DISPATCHES

HUGHES Europe

Hughes Europe expands into Military, Defence & Government sectors with launch of Konnect VHTS Services in collaboration with Telespazio

Hughes Europe, a subsidiary of **Hughes Network Systems, LLC**, an EchoStar company (Nasdaq: SATS), has announced the company's strategic expansion into the Military, Defence, and Government sectors across pan-European nations — **Troy Truman** has joined Hughes and will act as the head of this initiative.

The initiative will meet the increasing demand for high-speed connectivity and the growing security concerns around Europe's advancing military and governmental requirements for **Intelligence Surveillance and Reconnaissance (ISR)** and **Beyond Visual Line of Sight (BVLoS)** connectivity, high data rate requirements of modern operations, and robust managed communication networks.

Drawing on the experience of **Hughes US Defense and Government Systems Division (DGSD)** and collaborating with **Telespazio**, Hughes Europe's new business unit will provide leading communications solutions to government communications ministries and military operators, as well as blue light services.

Introducing fully managed, multi-orbit network solution software, an SDR waveform agnostic ISR terminal and a secure standalone 5G solution in the hope of boosting military **Command, Control, and Communications** in the operational environment, as well as servicing the high data demands of government bodies.

Satellite systems and operations

TELESPAZIO
A LEONARDO and THALES COMPANY

Hughes Europe and Telespazio will offer cutting-edge services leveraging the innovative **Eutelsat Konnect VHTS (K-VHTS)** satellite. Built on the Hughes JUPITER™ System series 3, the K-VHTS satellite provides high-speed service across Europe, and the companies will use Hughes JUPITER terminals. Telespazio is the exclusive commercial provider for defence and governmental security services and Hughes will provide expertise in satellite broadband managed services.



Artistic rendition of Eutelsat Konnect VHTS satellite on-orbit.

Chris Britton, managing director of Hughes Europe, said, "The Hughes JUPITER System is the de facto standard for satellite implementations worldwide. The Konnect VHTS satellite utilizes our JUPITER System, and we are thrilled to collaborate with Telespazio to deliver reliable, high-speed connectivity solutions to our customers. This announcement underscores the value of our longstanding relationship and our shared commitment to providing extraordinary technology and exceptional customer service."

Alessandro Caranci, head of Satellite Communication Line of Business at Telespazio, said, "I am pleased to share with a champion like Hughes Europe the ambition to provide revolutionary services for the government and B2B market. Our respective expertise and geographic presence form the ideal basis for achieving our goals."

DISPATCHES



Shield AI



Coast Guard Cutter David Duren was commissioned on June 27, 2024, in Astoria, Oregon, where it will be homeported. U.S. Coast Guard photo by Petty Officer 2nd Class Steven Strohmaier.

Shield AI's V-BAT selected for million\$\$\$ contract for USCG UAS services

Shield AI has announced that the U.S. Coast Guard has awarded the company a \$198,106,876 IDIQ firm, fixed-price contract to provide Contractor Owned Contractor Operated (COCO) Intelligence, Surveillance, and Reconnaissance (ISR) services. This service will be implemented using the V-BAT unmanned aircraft system (UAS).

The V-BAT series aircraft is the only operationally deployed, single-engine, ducted fan, vertical takeoff and land (VTOL) UAS that can launch and recover from a hover and fly on wing in horizontal flight. With more than five years of persistent operational experience at sea, U.S. and international customers view the V-BAT as a flexible platform capable of performing Group 2 to Group 5 UAS missions and beyond.



UNITED STATES COAST GUARD
U.S. DEPARTMENT OF HOMELAND SECURITY



"We're excited to support the U.S. Coast Guard with their ISR operations. All maritime vessels will become drone carriers as maritime forces move to deploy distributed, affordable, intelligent drones. V-BAT's selection by the U.S. Coast Guard is indicative of a broader market movement where increasingly customers are recognizing they can accomplish the vast majority of their mission sets with affordable drones rather than exquisite, expensive crewed or uncrewed aircraft," said Brandon Tseng, Shield AI's President, Co-founder, and former Navy SEAL.

DISPATCHES

SATCOM GLOBAL | AuraNow



Satcom Global awarded a GSA contract extension to supply SATCOM to US Government

Satcom Global Inc. has secured a new five-year GSA (General Services Administration) Contract, which permits the supply satellite airtime and equipment to US Government departments and agencies.

This contract extends Satcom Global's experience of supplying the federal, state, local and Indigenous governments with commercial satellite communications services to over 25 years. Satcom Global Inc. is honored to be among a select group of pre-approved suppliers offering products and services to help maintain essential and secure communications where terrestrial infrastructure does not exist.

The GSA Contract (or Schedule), makes it quicker and easier for government departments to buy a range of services from approved suppliers such as Satcom Global Inc, with pre-established pricing and terms. With the GSA Contract extension in place, Satcom Global can bid for and fulfill new government contracts, with customers confident in our capabilities as a

transparent, vetted and pre-approved supplier with a multitude of experience in supplying the government sector.

Satcom Global's varied portfolio of land-based satellite communications includes both contract and prepay airtime services along with a wide range of associated hardware, many of which are military grade. Equipment ranges from portable handheld satellite phones such as the Inmarsat IsatPhone2, Iridium 9555 to the rugged and reliable Iridium Extreme 9575.

Satcom Global has also made it easier for customers to purchase and manage their satellite communications on an ongoing basis with our management platform GlobalNet. This online portal enables customers to purchase their own prepay vouchers and top-up their accounts in a quicker, more convenient way.

Bo Feely, Vice President Americas, said, "We are pleased to share that we have been awarded a new GSA contract, allowing us to continue providing satellite communications equipment and services to the US Government. This new 5-year contract reflects our dedication to delivering reliable and advanced solutions, ensuring we can meet the government's communication needs well into the future."

DISPATCHES



BAE Systems awarded \$111 million in contracts to bring modernized, secure communications to the Republic of Korea

BAE Systems received multiple contracts totaling \$111 million to provide the second-generation, Anti-jam, Tactical, Ultra-high Frequency Radio for NATO, or SATURN waveform, to the Republic of Korea (ROK).

As part of the country's national communications modernization strategy, SATURN will bring secure and interoperable command and control capabilities to the ROK's military for fixed-wing and rotary aircraft.

As the modern-day battlespace becomes more sophisticated, advancements in tactical waveforms are required. BAE Systems' next-generation, *software*

defined radios (SDRs) will leverage SATURN's fast frequency hopping waveform. SATURN will deliver new advantages to operators who rely on timely and accurate communications to inform key decisions in the field.

The ARC-232A is a SATURN-capable SDR, which is upgradeable, small, and lightweight, making jamming more difficult in the increasingly complex threat environment. The radios offer optimal receiver sensitivity in severe operating conditions and a broad range of configurations for potential countermeasures.

With more than 100,000 radios deployed globally, BAE Systems' battle-proven communications products offer nearly double the reliability of legacy products. The company's compact radio sets also offer multi-band, secure anti-jam voice, data imagery transmission, and network-capable communications.



The radios will be produced at BAE Systems' state-of-the-art facility in Fort Wayne, Indiana. BAE Systems will provide the ARC-232A to Korean manufacturer **LIG Nex1** for final build, testing, and aircraft integration.

"In today's complex and contested battlefields, superiority on the ground, in the air, and at sea is mission critical," said Dave Logan, vice president and general manager of C4ISRS at BAE Systems. "This tailored solution for the Republic of Korea will equip its forces with state-of-the-art, secure, and modern communications for a variety of tactical missions while allowing them to maintain interoperability with the U.S. and coalition partners."



GOVSATCOM PUTS GLOBAL MILSATCOM IN THE SPOTLIGHT

AN SES DEFENSE & SPACE REPORT

Author: SES Space & Defense Editorial Team

For decades, space was widely viewed as an uncontested environment for the U.S. and its allies.

Today that notion would be considered inconceivable as the domain is now at the heart of nearly every military operation, playing key enabling roles in providing critical communications and connectivity capabilities to militaries across the globe.



Eric Kimery

“We were playing in an uncontested environment for so long, and we quite frankly, got comfortable operating that way,” said USEUCOM (United States European Command) J63 SATCOM NC3’s Eric Kimery at this year’s GOVSATCOM Conference. “We’re paying the price a little bit for that now.”

During the GOVSATCOM session, *“Protecting Space Communications – From a Solution’s Perspective,”* Kimery joined representatives from [Integrasys](#), [SES Space & Defense](#), and the [Luxembourg Directorate of Defense](#), to delve into what it will take to meet the resiliency, domain awareness, and capability requirements that will ensure the protection and security of MILSATCOM assets in space.

THE MILSATCOM SECURITY GROUNDWORK

According to [Geoffroy Beaudot](#), Head of Space for the Luxembourg Directorate of Defense, before global militaries begin identifying solutions for protecting MILSATCOM, there are a few initial considerations that must be made about the space domain.

First, U.S. and allied governments must have a complete understanding of the assets that are operating in the environment.

“We need to know what is in space,” said Beaudot. “Space domain awareness is, from my point of view, the starting point.”

However, identifying every single satellite is just the tip of the iceberg of space domain awareness, according to Beaudot.



Geoffroy Beaudot

Global militaries must go a step further by categorizing these space assets and coming to a complete understanding of each satellite’s vulnerabilities.

After that preliminary work is completed and all risks have been identified, governments can then pivot to adopting systems that can bolster an asset’s security and ensure that vulnerabilities are unable to be exploited by adversarial interference.

The next step to secure MILSATCOM involves being able to identify where interference is coming from and being prepared to react, should it occur.

“If you are interfered by something, you need to know where the interference is,” Beaudot pointed out. “A good geolocation system is important in order to know where interference is coming from.”

For Beaudot, the best defense against adversarial satellite interference is having a space architecture that has resiliency baked in via multi-orbit capabilities.

“Resiliency is definitely key,” said Beaudot. “What we do in Luxembourg is leveraging O3b mPOWER. Using the MEO constellation with the MEO Global Services (MGS) project provides resilience and access to multi-orbits and protects our satellite communications system.”



Alvaro Sanchez, CEO of Integrasys, echoed Beaudot’s points about domain awareness, identification of asset vulnerabilities, as well as leveraging multi-orbit solutions to thwart adversarial actions in space.

Sanchez also added that deploying automation security tools throughout MILSATCOM networks could provide increased levels of asset protection.

Alvaro Sanchez

“As the complexity of networks grows exponentially with new orbits, [mitigating threats] needs to be completely automated,” said Sanchez. “It needs to be driven by an AI machine that helps to mitigate all those threats, while also interconnecting with each other. [Full automation] by having design interconnected with anti-jamming, geolocation interconnected with threat mitigation, while also having observational tools to understand when interference is happening...[will allow us] to react very well.”

LEVERAGING GOVERNMENT-INDUSTRY PARTNERSHIPS

One of the hats that Kimery wears at the combatant command level within the J-6 is primarily focused on influencing capabilities that are coming into the theater, and the commercial industry is playing a pivotal role in providing those capabilities to the military.

“We very recently have had some funding for COMSATCOM,” said Kimery. “What we’ve been trying to do is partner with industry... [to enable] the theater with COMSATCOM...in hopes that the U.S. Space Force can then come in later and leverage that technology or capability and build upon it.”

He explained that the U.S. military is at the point where there is not a single satellite communication system solution that is going to provide the level of persistency to capability on the battlefield when it is needed.

A truly resilient space architecture is going to rely on proliferated systems and capabilities that enable **PACE** plans and multi-orbit solutions to fall back on in the event of adversarial interference.

On the industry side of the partnership equation, SES Space & Defense’s Senior Vice President of Engineering, **Nitin Bhat**, laid out the commercial industry’s answer to heeding the call for secure and resilient MILSATCOM capabilities.

For Bhat, implementing hardened security standards and guidelines across systems and networks is key to ensuring a resilient and protected space architecture.

He pointed to **FedRAMP**, **STIGs** (Security Technical Implementation Guides), and **RMF** (Risk Management Framework) NIST controls as the first lines of defense when trying to balance between cost and risk, quantifying the impact levels of asset vulnerabilities, as well as maintaining a strong security posture.



Nitin Bhat

“When you have a wave form or data that you need to transport, independent of whether it’s virtualized or not, you want to make sure the appliance is locked down from a cyber perspective,” explained Bhat. “A STIG helps you do that. From a security standpoint, it’s important that we have things that are FedRAMP certified and that it’s in the cloud with the right impact levels, so you can maintain the security posture.”

Bhat also pointed to leveraging open architectures to enhance space system security.

“[Open architecture] allows you to implement transit FIPS (Federal Information Processing Standards) encryption and also hide in the noise with LPX.”

He also believes that working toward a more hybrid space architecture can better support capabilities that will provide bolstered security and protection to military space systems.

“[A hybrid architecture] will help with the PACE plan,” said Bhat. “[Users] can move from one frequency band to the other, or one orbit to the other, or one constellation to the other.”

Moving between frequency bands or orbital planes has become a critical component of secure resilient SATCOM that the commercial space industry has been working hard toward.



Michael Geist

In a recent interview with the **Government Satellite Report**, SES Space and Defense’s Vice President of Product Management, **Michael Geist**, also touched upon the consequential role multi-orbit capabilities are playing in securing military space assets.

“Any application where SATCOM is the primary tether to a remote user’s network is going to benefit from multi-orbit solutions,” said Geist.

“Our near-peer adversaries are going to attempt to eliminate our communications options, so as long as we have resilience relative to networks and orbits, then we’ll be in a better position, especially when our warfighters are on the front line. In some cases, SATCOM is the only option they have as far as reach back goes, so resilience is critical.”



DISPATCHES



Artificial Intelligence & Machine Learning



Lockheed Martin awarded contract to develop AI tools for DARPA

Lockheed Martin (NYSE: LMT) was recently awarded a \$4.6 million contract by the **Defense Advanced Research Projects Agency (DARPA)** to develop **Artificial Intelligence (AI)** tools for dynamic, airborne missions as part of its **Artificial Intelligence Reinforcements (AIR)** program.

This project aims to provide advanced **Modeling and Simulation (M&S)** approaches and dominant AI agents for live, multi-ship, **beyond visual range (BVR)** missions. It is a critical step in prioritizing and investing in breakthrough technologies for national security and to meet the evolving needs of customers.

DARPA's AIR program will improve the government-provided baseline models' speed and predictive performance to better match how the Department of Defense's systems perform in the real world.

During the 18-month period of performance, Lockheed Martin will apply AI and Machine Learning (ML) techniques to create surrogate models of aircraft, sensors, electronic warfare and weapons within dynamic and operationally representative environments.

"In complex airborne missions, our customers need access to advanced technologies that connect critical systems quickly across all domains. The DARPA AIR program will use state-of-the-art scientific ML technology and Lockheed Martin's ARISE™ infrastructure to deliver unprecedented amounts of data that service members can use to make faster and more informed decisions," said Gaylia Campbell, vice president of Engineering and Technology for Lockheed Martin Missiles and Fire Control. "This will provide significant cost savings opportunities for the Department of Defense and serve as a foundation for future AI defense solutions, ensuring the U.S. and its allies maintain their competitive advantage no matter the circumstances."



DISPATCHES



The **United States Space Force (USSF) Chief of Space Operations, General Chance Saltzman** has announced a new addition to the Space Force headquarters staff, bringing a member of the **United Kingdom's Royal Air Force** to the organization.

Air Marshal Paul Godfrey accepted the position on June 17th, and will serve the U.S. Space Force as assistant chief of Space Operations for Future Concepts and Partnerships after three years as the first commander of the **U.K. Space Command**.



"This is a significant step forward in promoting closer cooperation with an important ally, and it exemplifies the kind of partnership we need to internalize as a service," Saltzman said in a letter distributed to Guardians. "AM Godfrey's integration into a senior service staff is unprecedented, and it pushes the boundaries of what it means to be Integrated by Design."

In his new role, Godfrey assumes the rank of air marshal, equivalent of lieutenant general, and will advise Saltzman in all matters related to the achievement of space superiority and resilience through international partnerships.

"The U.S. has a long history of international cooperation and collaboration in all domains, including space," Godfrey said. "Partnerships allow us to build trust, share information and truly integrate operations to maximize resilience and defend against aggressive behavior. It is a real honor to serve in this new position alongside my U.S. counterparts to deepen allied relationships and promote safety and security in space."

One of the Space Force lines of effort is **"Partner to Win"** – emphasizing the importance of mutually beneficial relationships across the international community, joint force and industry.

"Partnerships are integral to the success of the Space Force," Saltzman added. "We depend on the Air Force for vital infrastructure and mission support functions, we leverage commercial partnerships for technical acumen and a robust industrial base, and we rely on our international allies as critical force multipliers who expand our resilience and competitive advantage."



Left, Air Marshal Paul Godfrey
Right, General Chance Saltzman
Photo is courtesy of USSF.

Godfrey was the inaugural commander of the U.K. Space Command, which was established April 1, 2021. Prior to this role, he served in the Middle East within the U.S. Air Force's Combined Air and Space Operations Center, was head of Carrier Enabled Power Projection for the U.K.'s Ministry of Defence, and was Station Commander of RAF Lossiemouth, a Typhoon base in Scotland.

The Air Marshal was also a previous exchange pilot with the U.S. Air Force, serving on the 55th Fighter Squadron, Shaw Air Force Base, South Carolina, from August 2000 to May 2003.

DISPATCHES



infiniDome showcases battlefield-proven GPS protection & resilience

infiniDome has recently experienced a significant increase in demand, mainly due to the issue that has escalated over the past two years — GNSS interferences has become a critical concern in conflict zones, such as Israel, Ukraine, and many parts of Europe.

The company's extensive experience on the battlefield, particularly in recent conflicts in Israel and Europe, has positioned infiniDome's products as trusted and reliable navigation resiliency solutions defending UAVs and other platforms.

Infini Dome's newest solution — ***GPSdome2*** — is officially recognized for its battlefield readiness and offers flexible GNSS protection of two bands



GPSdome2

(L1/E1+L2 or L1 + G1 or L1/E1 + L5) from as many as three directions of simultaneous jamming, all in a small box.

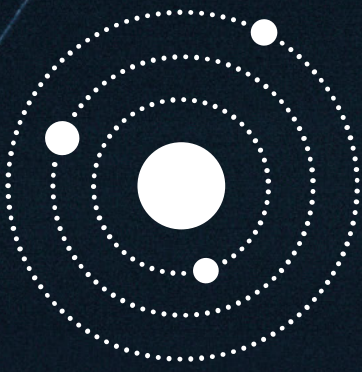
The unit is C-SWaP (Cost, Size, Weight, and Power) optimized and fully retrofit, making it ideal for protecting almost any platform, even small Class II UAVs, without the need for major modifications.

As GNSS interferences continue to rise all over, infiniDome has responded fast with pioneering a new anti-jamming approach they call "software- defined GNSS anti-jamming."

This approach allows infiniDome to leverage its flexible SW core to adapt to different and rapidly evolving threats in the field with simple SW upgrades even to fielded units before going into battle.

This proactive approach has led to a surge in inquiries from both defense and commercial sectors which are looking for robust solutions capable of sustaining operations under the most challenging conditions in the face of EW attacks.

"Compared to other solutions in the market, the fact that our company focuses only on GNSS anti-jamming solutions, allows us not only to be experts in what we're doing, but also to leverage our flexibility and agility to meet, head on, new threats and challenges from the field, a significant advantage at wartime when the spectrum is rapidly changing," said Omer Sharar, CEO, and Co-founder. "With our deep understanding and thorough analysis of the challenges faced in these warzones, we design our solutions to meet not only the most stringent C-SWaP (Cost, Size Weight and Power) requirements but also to be fully battle-ready - ensuring reliability and allowing our customers to complete their mission when it matters most."



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NSSL 86 SBIRS GEO-5 Atlas V.

USSF NATIONAL SECURITY SPACE LAUNCH PHASE 3 A NEW LANE TO ENCOURAGE INNOVATION AND GROWTH

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With the selection of three launch providers for the newest iteration of [National Security Space Launch \(NSSL\)](#), and the opportunity for additional “on-ramps” for other emerging space companies, [Space Systems Command’s Assured Access to Space \(AATS\)](#) organization is taking [U.S. Space Force \(USSF\)](#) launches to the next level.

“Phase 3 is an important next step for driving space launch resilience in the continued evolution of our NSSL program,” said [USSF Brig. Gen. Kristin Panzenhagen](#), [Space Systems Command’s quad-hatted program executive officer for Assured Access to Space \(AATS\)](#); [Commander, Space Launch Delta \(SLD\) 45](#); [Director of the Eastern Range](#); and [Director of Launch and Range Operations](#). “It offers more flexibility for getting critically important space capabilities on orbit while also encouraging a robust space launch industrial base.”

NSSL is a USSF program designed to provide assured access to space for the [Department of Defense \(DoD\)](#) and other U.S. national security payloads. SSC’s AATS organization manages the program, which launches satellites for NSSL, the USSF, as well as other organizations such as the [Missile Defense Agency](#), [Space Development Agency](#) and the [National Reconnaissance Office](#).

“Because NSSL payloads are vital to securing U.S. interests in space and defending our Nation, mission success is vitally important,” said [USSF Col. Jim Horne](#), [Launch Execution Delta Commander](#). “It is also becoming increasingly important to balance the need to deliver capability at pace for Great Power Competition; accepting appropriate risk. To ensure mission success, we have very stringent requirements for providers launching high value, non-risk tolerant missions, but we’re excited to start creating avenues that allow us to adjust mission assurance for more risk tolerant payloads and leverage innovation in the expanding industrial base.”

Unlike previous iterations, such as [NSSL Phase 2](#) launched in 2020, NSSL’s Phase 3 includes two lanes: [Lane 1](#) covers less-demanding missions with higher risk tolerance and is designed to encourage new launch providers with annual “on ramps.” [Lane 2](#) requires each provider to be able to handle the most challenging NSSL requirements.

“Phase 2 was ground-breaking on its own because it marked the first time in twenty years the United States had two independent providers of launch vehicles that could meet NSSL requirements,” [Horne](#) said. “With Phase 3, we look forward to increasing this even further, and have an additional Lane designed to help other innovative companies grow and mature.”

[Bonnie Triezenberg](#), policy analyst and senior engineer at the [RAND Corporation](#), a nonprofit, public policy, research organization, said [Phase 3](#) was a good progression for USSF NSSL, but noted that, despite technological progress in the commercial space industry, space launch is still extremely difficult.

“It’s just tremendously difficult to make a repeatable, reliable launch vehicle,” [Triezenberg](#) said. “It’s mostly the engines where people get stuck in manufacturing, but it’s also putting the whole rocket together around that engine. When (RAND) did its 2019 launch study, we looked ahead to 2024 and projected there would be 19 different launch vehicles capable of taking you to orbit. We haven’t reached that number yet.”



NSSL 90 — NROL-87 (the last A-6S) FalconBlock 5 NRO

“When we did our study, we recommended that the USSF try to support a wide number of providers to come into the market because we were looking ahead and saying in 2023 and 2024, it looks like we’re going to have a shortage of launch vehicles,” Triezenberg said. “Phase 3, Lane 1 is a good attempt. They’ve identified the set of launch vehicles for which they have more risk tolerance, and for which they’re willing to lower some of the fairly stringent standards they’ve traditionally had for national security space launch.”

For decades, only large countries, such as the United States and the Soviet Union, had the funding, engineering capacity, and infrastructure to conduct space launches.

Through block-buy economic ordering quantities, on-ramping competition, and implementing innovations, the NSSL program has greatly reduced the cost of U.S. space launch.

Commercial space companies have also helped bring the cost of space launch down, making it more affordable for contenders.

In June, the DOoD announced that **SpaceX**, **Blue Origin**, and **United Launch Alliance (ULA)** were selected to compete for the initial onboarding of NSSL Lane 1. There will be annual onboarding opportunities for contracts for Lane 1 launches across fiscal years 2025 through 2029.

The launch vehicles for Phase 3, Lane 1, include **SpaceX’s Falcon 9**, **Blue Origin’s New Glenn** and **ULA’s Vulcan Centaur**, all heavy-lift vehicles capable of delivering payloads to orbits that include LEO, GEO and polar.

Launch vehicles for Lane 1 could also include medium-lift rockets or multiple launches capable of placing at least 15,000 pounds of payload mass into LEO.

Contenders would need to demonstrate that their systems are mature and be able to demonstrate launch capability that will meet mission needs in 12 months from award. Lane 1 will include at least 30 missions to LEO.

*“What’s exciting about this is, as we move into the future space architecture, we’re going to have multiple types of missions,” said **USSF Col. Douglas Pentecost**, **SSC’s deputy program executive officer for Assured Access to Space**. “We’re going to have the critical, super-secret, billion-dollar payloads that are going to unique, military-only orbits, but we also have a bunch of proliferated constellations being developed that are going to be all around LEO.*

“That’s really what we’re trying to get at with these Lane 1 capabilities -- new providers can come on and bring whatever technology or innovation they can bring, and get us lower launch costs and more launches,” Pentecost said. “If you go back even just a couple of years ago, we were launching maybe five times a year, military satellites. Looking at next year, we have 25 that we’re hoping to launch. Having more providers that can get our capabilities into space is good for us and for the Nation.”



NSSL 93 — SBIRS GEO-6 Atlas V

“What we’re learning with today’s Great Power Competition is having multiple, diverse ways into space, multiple locations to launch from, will be key to whatever future challenges we have,” Pentecost said. “What Lane 1 and Lane 2 have allowed us to do is increase our stable of launch vehicles and locations that we can launch from to be able to provide to the warfighter the needed delivery of capability.”

USSF Col. Chad Melone, senior materiel leader for [SSC’s Mission Solutions Space Acquisition Delta](#), said that while Lane 1 space launch providers won’t be held to the same exacting standards as Lane 2, Lane 1 is still part of USSF’s overall strategy for NSSL launches, and provides assured access to space and mission assurance in a different way.

“Lane 1 is for the DoD’s missions that are more commercial-like,” Melone said. “It allows companies that are already going after the commercial market to go after that portion of the DoD’s mission set that is most similar to those commercial missions. So they don’t have to change anything to be able to compete for those missions.”

“We designed Lane 1 the way we did, in order to be able to leverage the innovation, the price competition, the diversity of those commercial systems for the DoD’s mission set. Companies can on-ramp on an annual basis, whenever they are ready, when they have launched those systems that they are out there developing, and they can do it from any geographic location.”

“Lane 1 comes at assured access to space in a different way than just having two launch providers in two locations for every single design reference mission (a plan used to guide early development efforts that was part of Phase 2,” Melone noted. “These space launch vehicles are smaller, lighter, less expensive and easier to replace (than the heavy lift rockets of Lane 2) and that means more than one provider naturally will be able to do that.”

“So just like when a commercial satellite operator puts out a request for proposal to launch its own satellite, there might be a Rocket Lab or Relativity or ABL that might bid on that. We’re looking to take advantage of that same sort of diversity for Lane 1, so we get assured access to space, but in a different way than in its traditional meaning.”

“Typically, emerging launch providers are striving for excellence. They can’t stay in business long-term if they’re not successfully delivering capabilities into space. So, we know they are incorporating a lot of their own mission-assurance type work when they do the work that they do.”

“Lane 1 also includes multiple levels of mission assurance – the full lifecycle process providing confidence to proceed. The missions that are on Lane 1 can choose the mission assurance tier that is most relevant for them. That gives those companies an opportunity to start with missions that have lower levels of mission assurance, and then graduate up to increasing levels of mission assurance, so that one day, if they have the desire, they can compete for a Lane 2 in the future.”



NSSL 95 USSF-44 Falcon Heavy

“In the commercial world, there’s been a similar shift to include proliferated architectures. Companies are responding to a commercial demand signal for medium-lift space vehicles. We know the DoD is not going to have a set satellite architecture – it will evolve over time. In the past, the systems were very large, expensive – and they were hard to deliver to the locations where they needed to be.”

“There is shift now to include these proliferated architectures, and launch operators are building systems to respond to that,” Melone added. “We still have these very large missions that are going to need things like direct inject to Geosynchronous Orbit, which commercial doesn’t typically do. And we’re going to need providers who have those very robust capabilities. But we also recognize that if there’s an opportunity to partner to win these other companies, on a much more tight-turn approach, that’s what Lane 1 is all about. I think it very much supports Chief of Space Operations Gen. B. Chance Saltzman’s view for Partnering to Win,” Melone concluded.

In addition to the tiered mission assurance, Phase 3 also will include rideshare, Pentecost said; again, matching what occurs in the commercial marketplace to bring the cost of launch down.

“Our goal at the end of Phase 3, in the 2030 timeframe, is to have a lot of companies that can meet all of our requirements and will be able to do all kinds of great things, at a lower price,” Pentecost said.

Triezenberg said government support — such as USSF’s NSSL program — is essential for space launch providers.

“If you want to make it long-term in this business, you must have someone with deep pockets who can bring you through the tough times – or even get you started,” Triezenberg said. “A lot of people think that SpaceX never had any government support and this is absolutely wrong. You need seed money, you need support.”

“Until you get those successful launches under your belt, almost anything can go wrong — and almost everything does go wrong. When you look across the delays that each of the different companies have had as they try to bring their launch vehicles to market, there’s not a lot of similarity there. They all go wrong in different ways and it just takes a long time to get a new launch vehicle into the market.”

“In this era of Great Power Competition, and with so much of our nation’s way of life depending on U.S. space assets, having assured access to space is more important than ever,” Panzenhagen said. “With the help of our commercial space industry partners, we’re looking forward to becoming more resilient, cost-effective and efficient, and to delivering capabilities to the warfighter whenever and wherever they are most needed.”

Space Systems Command is the U.S. Space Force field command responsible for acquiring, developing, and delivering resilient capabilities to protect our nation’s strategic advantage in, from, and to space. SSC manages a \$15.6 billion space acquisition budget for the Department of Defense and works in partnership with joint forces, industry, government agencies, academic and allied organizations to outpace emerging threats. Our actions today are making the world a better space for tomorrow



For additional information, contact Space Systems Command at SSC@spaceforce.mil and/or follow on [LinkedIn](#).

Author Lisa Soddors writes the monthly Space Systems Command column for MilsatMagazine.

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