

Next Generation Space Defense

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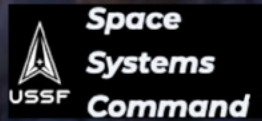
# FEATURES



# — SPACE SYSTEMS COMMAND BRIEFING — FORGING A PURPOSE-BUILT SERVICE

## Integrated Mission Deltas, System Deltas to Help USSF Achieve Unified Mission Readiness, Officials Say

Author: Lisa Sodders, Space Systems Command



*Delivering lethal + resilient space capabilities to defend the nation in the contested space domain.*

**The creation of two new U.S. Space Force Delta prototypes is the next step in the development of America's newest military service to help it achieve Unified Mission Readiness, Space Operations Command (SpOC) and Space Systems Command (SSC) officials said.**

The two new prototypes are **Integrated Mission Deltas (IMDs)** for readiness and **System Deltas (SYDs)** for capability development. IMDs will consolidate all aspects of mission area readiness into a single organization, combining units in SpOC that perform *mission generation, intelligence support, and cyber defense*, with program offices at SSC that handle maintenance.

SYDs will consolidate program offices in SSC that design, develop, and deliver mission systems under a mission-focused command structure

for acquisitions. Pairing IMDs in SpOC with complementary SYDs in SSC will streamline unity of effort for capability development.

**General B. Chance Saltzman, United States Space Force (USSF) Chief of Space Operations**, announced the creation of the two prototypes on September 12, during a keynote speech at the *Air and Space Forces Association's Air, Space and Cyber Conference* in National Harbor, Maryland.



General B. Chance Saltzman



Col. Marc Brock

*"If you look at the evolution of the Space Force, there's really two phases: the first was the major organizational change from the U.S. Air Force to the Space Force, where we went from five echelons (of command) to three, which really*

empowered our leaders” said **Colonel Marc Brock**, Director, Combat Power at SpOC, and the lead for the IMD effort within SpOC. *“It really drove us to understand and embrace mission command and focus on efficiency.”*

*“What we’re doing now is really driving effectiveness,” Brock said. “With the Integrated Mission Delta concept, you make that second organizational change and bring our acquirers, our operators, our cyber professionals, and our intel professionals together. The aim is to improve the effectiveness of these organizations so they can improve our readiness to support the joint fight.”*

Starting this fall, initial IMD and SYD prototypes will support the **electromagnetic warfare (EW) and positioning, navigation and timing (PNT)** mission areas. The IMDs supporting EW and PNT will align under SpOC, while the SYDs will align under SSC.



Col. Andrew S. Menschner

*“I see this as a ground-breaking combination of expertise from operations and acquisitions,”* said **Colonel Andrew S. Menschner**, the PNT IMD Commander and Senior Materiel Leader.

*“We’ve seen limited models of this in the past outside of the National Reconnaissance Office (NRO) but this will be the first time that we have major mission areas combined with operations and acquisition,”* Menschner said.

*“We’re moving as a country from an era of low-intensity conflicts to near-peer or potential peer conflicts in the very near future, as we work against an enemy that has spent the last 20 years specifically designing its military capabilities to counter ours,”* Menschner said. *“We need to be smart about how we move forward and present capabilities to the warfighters.”*

**Colonel Edward Gutierrez** will be Deputy Commander and senior materiel leader of the EW IMD. A typical organizational change either flattens

out a group or tries to eliminate bureaucracy, he said. What makes this change unique is that the new prototypes will combine groups of people with different specialties under one command, eliminate **“stove pipes,”** and allow for better collaboration across groups.



Col. Edward Gutierrez

*“General Saltzman wants to make sure that we consolidate unity of command, unity of effort,”* Gutierrez said. *“This gives the commander all the tools in order to execute the mission flawlessly and seamlessly to reduce the seams within organizations and just put all the subject matter expertise under one command, so that decisions can be made at the lowest level.*

*“That allows for speed and effective communication, and it also will put the warfighters along with the sustainment and acquisition folks together so we get first-hand knowledge of what the problems are and what needs to be solved,”* Gutierrez said.

The current Space Force organizational structures were inherited from expeditionary Air Force constructs and do not provide Unity of Command or Effort within core functions or mission areas. Deltas are the Space Force’s equivalent of the Air Force’s wing and group commands.

In the Air Force, there may be several fighter wings, but they’re all flying the same aircraft platform, Brock said. It wouldn’t make sense to give each wing their own sustainment group. However, the USSF is a smaller service and has Deltas that are all focused on distinct mission sets.

Currently, responsibilities for procurement, maintenance, sustainment, and operations are fragmented under separate chains of command.

Operational commanders in SpOC are responsible for generating readiness that is directly dependent on sustainment resources managed by SSC. However, those operational commanders have no direct

authority over those resources. Program Managers at SSC are responsible for delivering and sustaining systems and equipment to support warfighters but have little ability to engage with the operational community until late in the procurement process.

*“For example, I have a lieutenant colonel responsible for development of the next generation operational control system,” Menschner said. “When he has a challenge determining operational impact in the development program, the current structure has him going up to the SES (Senior Executive Services) or even the three-star level (lieutenant general) across to the equivalent in Space Operations Command, and then down to solve the problem.”*

*“The Integrated Mission Delta puts that lieutenant colonel in charge of operations of GPS satellites on par with the lieutenant colonel responsible for development of GPS capabilities,” Menschner said. “So not only are the two peers, but they work together for the same person. Their charge is to coordinate efforts and make sure they’re in sync moving forward.”*

For PNT, the new **Integrated Mission Delta** will include the operational squadron, the team associated with maintenance and sustainment of operational equipment, the longer-term development of those capabilities, and the operations responsible for launching GPS satellites, Menschner said. All of those will be combined into one unit, under one commander, which will allow the command team to make decisions between when to bring on capabilities and when to push forward with existing capabilities.

*“First, it allows us to align enabling capabilities right now – both the operational squadron and the traditional acquisition units have cyber and maintenance teams. The ability to combine those capabilities allows us to synchronize their efforts across operations and sustainment,” Menschner said. “Second will be the ability to push operators into the acquisition process in a way that wasn’t possible before.”*

Brock offered another example, *“The Delta 3 Electromagnetic Warfare commander — that commander today, let’s say she has a series of issues with her weapon systems. If she wants to get a deficiency fixed, she has to submit a form called a 1067 and that basically describes what the issue is and what she and her team would like to fix.”*

*“She submits the form to the program office which then has to stack it against other deficiencies,” Brock said. “That program office will come back and notify her that this is the prioritization and timeline for getting after those deficiencies. That’s the process today.”*

Under the new structure, *“The Delta 3 commander is now responsible for the sustainment of the weapons system and will have the ability to set that prioritization, in consultation with the team that she has, including the sustainment folks,” Brock said. “It’ll streamline that discussion amongst the correct, collective professionals to ensure that the teams that have to fight and win our nation’s wars get the capabilities they need.”*

EW and PNT are not tied to any major acquisitions that would be disrupted by changes in the command structure. In addition, the PNT mission largely deploys its forces from an operations center in Colorado Springs, while the EW mission deploys its forces to areas close to conflict, Menschner noted.

*“The contrast is what the CSO is looking for: what’s the optimal structure moving forward?” Menschner said.*

*“You really couldn’t have picked two more distinctly different mission areas than PNT and EW,” Brock said. “The rationale is if you pick the two book ends, as it were, it’ll help inform all the other IMD efforts that come after this. By picking those two, we can move fast, get them activated, and learn lessons from each of them, as quickly as possible.”*

The two pilot IMDs will operate for no more than 12 months, or until objectives are met and ready to scale to other mission areas. The initial effort will not involve the physical relocation of personnel and will

not change the core missions of SpOC or SSC. The basic field command structure — SpOC, SSC, and STARCOM will remain the same.

“The CSO is referring to this as a ‘beta test,’” Menschner said. “With the intent of determining how to best present capabilities in a contested environment going forward.”



SMSgt. Joshua Griffin

“It’s not just the missions themselves, but we have to look at readiness as a whole,” added **SMSgt. Joshua Griffin**, who will be the Senior Enlisted Leader for the new IMDs. “One of the primary charges I have as a senior leader is focusing on the people and the training aspect. These are highly technical career fields; it takes a long time to train these individuals and get them to a point where they should be comfortable going into a conflict because they have all the necessary training.”

“With (the new Deltas) we’re broadening the experience that these individuals have,” Griffin said. “It has been very difficult in the past for us to get new technology into operators’ hands — and just like your iPhone — it could be obsolete in six months because some newer technology came out that replaces your old iPhone and, similarly, we must update. “This is an opportunity for us to be in lock-step between SSC and SpOC and getting that technology and training to our operators, so that they can fight with the most advanced technology we have available to our armed forces,” Griffin said.

Space Systems Command (SSC) 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 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. SSC’s actions today are making the world a better space for tomorrow.



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# — SPACE SYSTEMS COMMAND BRIEFING —

## THE JUNIOR GUARDIANS FORUM HELPS YOUNG OFFICERS GROW THEIR CAREERS

There's a new organization for young U.S. Space Force (USSF) officers who have taken the service's motto to heart - "Semper supra - Always Above."

Author: Lisa Sodders, Space Systems Command

**The Junior Guardians Forum (JGF) is a grassroots organization of USSF Company Grade Officers (CGO) — officers in grades O-1 to O-3, 2nd Lieutenant to Captain — that aims to connect CGOs with space domain experts across the U.S. Department of Defense, civil, space, industry and academic domains to give USSF junior officers an opportunity to learn from subject matter experts that they normally wouldn't have access to in their day-to-day jobs, said 1st Lt. Jonathon L. Gabriel, a member of the Junior Guardians Leadership team.**



1st Lt. Jonathon L. Gabriel

Gabriel said the leadership team — himself, 1st Lt. Kyle Norbert, 1st Lt. Megan Cordone, 1st Lt. Gordon McCulloh and 2nd Lt. Allaire Morgan — created the JGF out of a desire to make sure young officers have all the information they need.

"The whole reason we created the organization is that there's so much happening in the Space Force and the whole national space enterprise that it's very hard to keep up," Gabriel said. "As officers, we ought to be aware of potentially service-impacting events, so we can keep a high-level decision-making perspective in our jobs."

"We want to make sure that the U.S. Space Force has the leadership and the knowledge base among young decisionmakers so they can make high-quality decisions when called upon," Gabriel said.

The JGF organization, which is now a few months old, isn't formally affiliated with the DoD or the USSF, Gabriel said, allowing it to be flexible and free from organizational constraints. It currently has about 150 members.

The JGF recently sponsored a virtual discussion on September 19th, where **Debra Biely**, a senior program analyst at the [Space Development Agency](#) (SDA) and retired U.S. Marine Corps Lieutenant Colonel, provided attendees with a "crash course" on the agency's mission, how it operates and what has led to the SDA's recent successes.



Debra Biely

"The Junior Guardians on this call could be civilian Guardians one day," Biely said. "SDA is all about 'Semper Citius,' 'Always Faster.' While all the great work at SDA is being done and delivered today with fewer than 300 very talented and experienced people, those interested in contributing to cutting-edge technologies, new acquisition processes, and helping us accelerate delivery of new capabilities to the warfighter — should keep us in mind."

"The DoD is working to change the lengthy, detailed, and slow-moving acquisition processes that have developed over many years, and adapt to newer, cleaner, and more streamlined procedures that allow it to keep pace with emerging technologies and threats," Biely said.

Biely spent most of her career in the **Fleet Marine Forces** before turning to a life of program analysis and review in **Headquarters U.S. Marine Corps, Programs & Requirements, Secretary of the Navy Office of Program Assessment**, and serving as a



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legislative fellow on the Hill as a military and space legislative assistant for a United States Senator.

Biely shared with the JGF participants, “*Young professionals like yourselves have grown up with emerging technologies all around you. For that reason, you all are both comfortable and well-suited to bring that mindset into the Department; to embrace and help to expand our continued ability to deliver improved capabilities to the warfighter.*”

More than a dozen Guardians attended the virtual event, which included a question-and-answer session at the end of the event.



2nd Lt.  
Michelle Roca

“*After spending my summer internship with the Space Development Agency and taking note of the organization’s mission-motivated commitment to excellence, I was eager to share their philosophy with the young Guardian community,*” said 2nd Lt. **Michelle Roca**, another JGF member, who moderated the virtual event.

“*Debra was the perfect spokesperson because I knew she would eloquently and expertly describe how SDA is a trailblazer within the rapid acquisitions community,*” Roca added. “*It was encouraging to see both new and experienced Space Force professionals alike attend the event. It really spoke to the widespread interest in cutting-edge organizations, like SDA, that exist within the Space Force.*”

“*It’s groups like the JGF that demonstrate how the Space Force — and its servicemembers — are hoping to do things differently,*” Roca said. “*While I’ve only just begun my career in the Space Force, it’s clear that Guardians have an intense passion for their career and an insatiable thirst to learn more. I’m eager for the next JGF event to continue to learn as much as I can about space defense.*”

Gabriel said the JGF has had several virtual speaker events in recent months, showcasing experts from NASA, an expert on AI, and military launch innovators. As the membership is spread out on different bases and, often, in different time zones, hosting the events virtually has worked well, but the group hopes to eventually organize more localized events at various locations.

While the membership is company grade officers, Gabriel said it’s not unusual for a Colonel or other senior leaders to attend.

Chief of Space Operations, Gen. Chance Saltzman, has talked about how he’s expecting the young leaders of the service to exercise mission command and understand how all the pieces of the space enterprise fit together, Gabriel said.

“*Our job is to be decisionmakers day one on the job and the current generation of CGOs represents the change in the Space Force that is needed to build the service,*” Gabriel said. “*At our core, we have members taking time out of their busy day to learn about something that may not impact their day today, but might one day allow them to make better decisions.*”

Company Grade officers interested in joining the group can visit the webpage [www.juniorguardiansforum.com](http://www.juniorguardiansforum.com)

or follow the group on LinkedIn [www.linkedin.com/company/junior-guardians-forum/](https://www.linkedin.com/company/junior-guardians-forum/)



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# SPACE SYSTEMS COMMAND UPDATE

**Security Space Launch Phase 2 Procurement assignments completed by SSC**

**Space Systems Command (SSC) has assigned 21 new launch service mission assignments for the FY24 National Security Space Launch (NSSL) Phase 2 Launch Service Procurement contract following completion of the NSSL Mission Assignment Board (MAB)'s assignment process for FY24 launch service awards – this is the fifth, and last, order year in the Phase 2 contract.**



**United Launch Alliance (ULA) received 11 mission assignments and Space Exploration Technologies Corp. (SpaceX) received 10. These Order Year 5 (OY5) missions are scheduled to**



launch over the next two to three years and focus on a variety of mission areas.

The 11 missions assigned to ULA include... GPS III-9, NROL-73, NROL-56, STP-5, SILENTBARKER 2/NROL-118, GPS IIIF-1, NROL-100, USSF-95, NROL-109, SDA T2TL-B, and USSF-25.



*Artistic rendition of a GPS III satellite on-orbit, courtesy of Lockheed Martin.*

The 10 missions assigned to SpaceX include... SDA T1TL-F, SDA T1TR-A, USSF-57, NROL-77, SDA T1TR-E, GPS III-10, USSF-75, SDA T2TL-A, SDA T2TL-C, and USSF-70.



NROL-77, NROL-73, NROL-56, NROL-109, and NROL-100 are missions being conducted in partnership with the National Reconnaissance Office (NRO).

T1TL-F is the last mission of six Space Development Agency (SDA) *Tranche 1 Transport Layer* launches; T2TL-A, T2TL-B and T2TL-C are the first three *Tranche 2 Transport Layer* launches. SDA's Transport Layer will provide assured, resilient, low-latency military data and connectivity worldwide to the full range of warfighter platforms.



T1TR-A and T1TR-E are the last two SDA *Tranche 1 Tracking Layer* launches. SDA's Tracking Layer will provide global indications, warning, tracking, and targeting of advanced missile threats, including hypersonic missile systems.

The GPS III-9 and GPS III-10 missions are the final projected GPS III missions. The GPS IIIIF-1 is the first launch of the follow-on GPS III satellites. **GPS Block IIIIF** introduces several improvements and novel capabilities compared to previous GPS satellite blocks. USSF-57 will launch the first of three **Next Generation Overhead Persistent Infrared GEO (NGG)** satellites. These satellites will deliver survivable, resilient missile warning, tracking, and defense in a highly contested and congested space domain.

SILENTBARKER 2/NROL-118 is a joint NRO and SSC **Space Domain Awareness** mission to meet DoD and intelligence community space protection needs.



Artistic rendition of the SILENTBAKER / NROL-118 satellite on-orbit, courtesy of Boeing.

USSF-25 will launch the **Defense Advanced Research Projects Agency's (DARPA) Demonstration Rocket for Agile Cislunar Operations (DRACO)**.



The goal of the DRACO program is to demonstrate a nuclear thermal rocket in orbit.

USSF-95 will be the first launch of a Missile Track Custody (MTC) prototype satellite. The MTC prototype effort will evaluate the ability of various Next Generation Overhead Persistent Infrared sensor designs to meet missile tracking requirements.



Missile Track Custody artistic rendition.

**STP-5** is the latest mission in support of SSC's Space Test Program (STP). The STP performs mission design, payload-to-bus integration, space vehicle-to-launch vehicle integration, and on-orbit operations for Science and Technology payloads that exhibit potential military utility. STP-5 will launch two satellites in support of the Department of Defense Strategic Capabilities Office.



Artistic rendition of STP5 on-orbit.

*“Over the five-year Phase 2 contract, we will have ordered a total of 48 missions, a significant increase over the 34 missions originally estimated leading up to Phase 2.*

*“The increase in launch tempo is a clear reminder of how vital space-based capabilities are in providing our warfighters and our nation’s decision-makers with the information needed to stay ahead of and to deter adversarial forces.”* — Brig. Gen. **Kristin Panzenhagen**, Program Executive Officer, Assured Access to Space.

*“We maintain a close partnership with our mission customers and our domestic launch industry to protect our nation. Under our Phase 2 contract, ULA and SpaceX have been committed partners, and our combined team remains dedicated to delivery of critical assets to our warfighters as we complete this phase of the NSSL program and embark on NSSL Phase 3 starting in FY25.”* — Col. **Chad Melone**, SSC senior materiel leader, Mission Solutions Space Acquisition Delta.



# A NEW ERA OF DIGITIZATION

Author: Simon Swift, Engineering Director - Digital Technologies, ETL Systems,  
and Vice Chair of the DIFI Working Group



**As stated in a report published by the UK Military of Defence (MoD) exploring the increasingly complex nature of combat, “the pace of technological change and proliferation is rapidly broadening and deepening the threat spectrum.”**

Not only have these technological advancements changed the character of warfare, with equipment less expensive to manufacture and easier to transport and operate, they have also impacted the ground stations and networks responsible for important surveillance, tracking and mission critical information gathering.

## **Increasing Capacity + Service**

Increasing capacity and service is now a key aim for global militaries, and in the summer of 2022, the [U.S. Space Force’s Commercial Satellite Communications Office](#) (CSCO) said that, “over the next two years, it would spend more than \$2 billion in commercial satcom contracts,” buying capacity and services.

Since then, we’ve seen a desire from the U.S. government to use non-military satellite constellations where such makes sense. In fact, only a few weeks ago, it was reported that **SpaceX** will be providing **Starlink** services to the [Department of Defense](#) (DoD) under ‘unique terms and conditions,’

as part of a \$70 million contract. Under the one year agreement, SpaceX will provide, “a best effort and global subscription for various land, maritime, stationary and mobility platforms and users.”

## **Analog To Digital**

There’s no doubt that the industry is changing, and significant investment is going into how the ground station can better support military organizations as we enter a new era of digitization. We are currently working with the [European Space Agency](#) (ESA) as part of the [Digital Intermediate Frequency Interoperability](#) (DIFI) **Consortium** to effectively translate our analog RF signals into digital versions. These digital versions can then be transported through secure private IP networks to anywhere in the world.

## **The Benefits**

For governments and military organizations looking to gain the upper hand, digitising the spectrum will help overcome many of the common hurdles associated with transporting RF signals on the ground. This includes the inherent limit to the distances RF signals can travel from the antenna via the terrestrial networks, before they begin to degrade. Unlike analog RF signals, no signal conditioning is required for an IP data stream. In addition, if you’re running RF signals over long distances over fiber, you’re going to need amplifiers, and there will be isolation challenges and return loss. The resulting simplification of

digitizing the signal means there is a significant reduction in the numbers of antenna feeds, so rather than having a large elephant trunk coming off of an antenna, this can be replaced by a single RJ45.

Another benefit of Digital IF/RF is the added flexibility, allowing the physical decoupling of antennas from modems. For example, a control center in Washington, D.C. could easily switch between antennas located on the other side of the world.

This would enable encryption equipment to remain on home soil, allowing militaries to retain full control of critical operational assets and reduce exposure to risk during combat. The impact here will be significant.

Governments would also no-longer have to have their encryption and decryption codes physically in a building on the other side of the world, which have to be manned. As digital signals do not radiate in the same way as analog signals do on coaxial cable, there's a further security benefit as the act of intercepting the signal becomes far more difficult. Finally, once the signal is digitized it's also very easy to change the encryption quickly, making transmissions more flexible and secure.

## Change Won't Arrive Overnight

Alongside the clear security benefits, improving operational efficiency will lead to significant cost savings. This is because you're centralizing all encryption, decryption and modems, which, from an efficiency point of view, makes a lot of sense.

By swapping all localized modems, encoders and decoders, and having one set of them in a home country, the need to maintain large infrastructure is removed. This simplifies many of the operational elements including the size and requirement of the skilled team to maintain and operate the network. That being said, this new technology won't make traditional RF architecture redundant, especially for applications with less onerous security requirements. In some cases analog RF will make the most sense, and militaries and governments will be keen to maximize their existing investments. Operators with huge investments in analog RF processing equipment

will not be looking at an immediate requirement to switch to a digital environment.

Instead we anticipate that the flexibility of Digital IF technology will enable a gradual transition from analogue equipment to the digital realm over the medium term, with an interim hybrid approach in which both analog and digital technologies work cooperatively.

## Standardization

While the possibilities of Digital IF stand to have a big impact, standardization is key for interoperability. Relevant standards include **5G 3GPP**, **MEF**, and **DIFI**, and **ETL** has been working with DIFI to ensure the development of a universally accepted IP communications standard. The **DIFI Standard (IEEE-ISTO Std 4900-2021: Digital IF Interoperability Standard)** will ensure that Digital IF vendors and future digital software defined virtual modem vendors all work with a common IP protocol.

We have learned from the challenges faced by **VITA 49.2**, on which the DIFI standard is heavily based. As a result, it's intended to balance adaptability to the demands of varying use cases with firm regulation or guidance to enable true interoperability.

## The Future

While governments and militaries are likely to be the first adopters of new technology, as the price drops and the economies of scale increase, the commercial sector will follow suit.

While the first working Digital IF products are coming on stream now, it will likely take several years before we see a mature, digitized ground standard. Nevertheless, it's an exciting time in the SATCOM industry as we continue to innovate and find new solutions to improve resilience and versatility in the network.

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# GOVERNMENT SATELLITE REPORT

## New technologies Enabling JWC and CJADC2

Author: David Pesgraves

a critical theme that Adm. Grady underscored during his recent keynote address at the **2023 Air, Space & Cyber Conference**, where he discussed the importance of the JWC in deterring and defeating military adversaries and the role that both the Joint Force and commercial industry will play in making the JWC a reality.

### The Joint Force + JWC

During his keynote, Adm. Grady explained that the character of today's modern warfighting and security environments is the most

challenging the U.S. has faced in

recent history. This is attributed to the challenges the military is currently combatting, which “*transcend the ability of a single service, a single combatant commander, a single industrial partner, or a nation or government to address alone.*”

Today's warfighting environments that the U.S. military operates in have an “*enduring nature to the strategic competition*” that must be carefully and tactically managed. “*Our task is clear: bolster our defense, strengthen our global network of allies and partners, and accelerate the development of cutting-edge capabilities and new operational concepts,*” stated Adm. Grady.

To achieve the goals set forth by the JWC, Adm. Grady explained that the Joint Force will require ready, responsive, and resilient air and space capabilities that give a competitive advantage in a multi-domain fight.

***In 2019, the U.S. Secretary of Defense directed the Department of Defense (DoD) to conceptualize and develop a vision of how the Joint Force can combat the growing military threats posed by near-peer U.S. adversaries.***

With military expectations and strategic direction already defined by the **National Security Strategy**, the **National Defense Strategy**, and the **National Military Strategy**, an integrated and threat-informed **Joint Warfighting Concept (JWC)** would serve as the blueprint of how the DoD would fully realize and meet those expectations.



According to **Admiral Christopher W. Grady**, the Vice Chairman of the Joint Chief of Staffs, “*Joint Force integration is uniform agnostic.*” This was

*“We will win by integrating all of our nation’s strengths,” said Adm. Grady. “To do this... it is an absolute imperative that our warfighters, technology, and our strategies be attuned to the high-end fight.”*

Modernization and the investment in digitally transformed technologies and capabilities are paramount to the realization of the JWC. According to Adm. Grady, the JWC will rely on a “flexible, innovative and tech-enabled” Joint Force. This is especially critical, as Adm. Grady pointed to the founding of the **U.S. Space Force** and how the military branch now plays a critical role in providing a large set of capabilities required to fulfill the JWC mission.

*“We created a service meant to realize the joint alignment and integration that is necessary for reliable and resilient space-based capabilities,” said Adm. Grady. “The competencies of the Space Force enhance our domain awareness, our communications...and support the capabilities of our collective efforts.”*

To Adm. Grady, having an integrated, modernized, and tech-enabled JWC, “...steers the Joint Force to ensure that we have the right people, the right equipment, the right training and ...to deter and if necessary to win in any future conflict.”

## CJADC2

One sub-component that falls under the JWC capability set umbrella is the **Combined Joint All-Domain Command and Control (CJADC2)** initiative. CJADC2 is a vision set forth by the DoD that would provide the Joint Force with a full, common operating picture of warfighting environments across the entire military. The **Congressional Research Service** describes CJADC2 as a “concept to connect sensors from all of the military services—Air Force, Army, Marine Corps, Navy, and Space Force—into a single network.”

The success of the CJADC2 initiative requires modernized and tech-enabled sharing of mission-critical data across DoD agencies, which would enable real-time, threat-informed decision-making for military leaders.

*“CJADC2 will integrate our next-generation platforms and break down seams between domains for a truly globally integrated and informed force,” explained Adm. Grady. “As space and cyber and strike are not constrained by national boundaries or borders between combat and commanders, neither will our C2 networks.”*

## Extending CJADC2 to Space

But there is more to interoperability than simply getting disparate military networks to work together. Mission success in the future also relies on the military developing an integrated space architecture.

This integrated network would increase assuredness and resiliency by enabling warfighters to seamlessly roll across multi-orbit, multi-band satellite capabilities provided via disparate military and commercial constellations.

To Adm. Grady, the overall success of CJADC2 and the Joint Warfighting Concept will greatly rely on the innovation and new technologies coming out of the commercial industry.

*“It is imperative that our partners of the defense industry see themselves in this as part of the value proposition,” explained Adm. Grady. “We need their innovative approaches to discovery and design. We need their operational expertise, efficiencies, and ability to right-size capacity and production to meet our needs. We cannot do it without them.”*

That innovative approach extends beyond companies manufacturing terrestrial communications equipment

and solutions, to those that deliver satellite services. The commercial satellite industry has heeded the call from the DoD, and stands ready to provide the technologies and capabilities to ensure a readied, prepared, and integrated Joint Force.

Solutions such as the **Information, Communications, and Technologies (ICT) Portal** by **SES Space & Defense** are specifically designed to deliver the network management, performance monitoring, and security capabilities that are needed for the creation of an integrated satellite architecture.

According to SES Space & Defense's Senior Director of Strategic Initiatives, **Ram Rao**, the ICT Portal enables DoD leaders to gain visibility into thousands of different network data points on a singular, consolidated interface, which would ensure the U.S. military maintains a one-step-ahead, competitive advantage over its adversaries.

*"The ICT Portal will be a window that will enable visibility into the network's capabilities, how it is built, and how it is operating,"* said Rao. *"This will deliver complete resiliency to military networks and support the DoD's CJADC2 initiative."*

To learn more about the multi-domain functionalities that ICT Portal provides to the DoD, [select this direct link...](#)

## ICT PORTAL

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The post **New technologies Enabling JWC and CJADC2** appeared first on GovSat and is reprinted with permission from [Government Satellite Report](#) and [SES Space & Defense](#).

*Author David Pesgraves is a Staff Writer for GovSat Report, in addition to several other online publications dedicated to defense, military, and federal government agency technologies.*



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# D-ORBIT SECURING OUR SPACE INFRASTRUCTURE

## The case for government subsidies in debris mitigation

Author: Stefano Antonetti, Vice President, Business Development, D-Orbit

**The situation of space debris in Earth's orbit is quickly reaching a tipping point, as the amount of debris continues to increase at an alarming rate. According to the European Space Agency, there are currently more than 34,000 debris objects larger than 10 cm, with millions of smaller particles also posing a significant risk to operational satellites and crewed missions.**



**NSR's Global Satellite Manufacturing and Launch Markets, 11th Edition,**

report forecasts that 24,700 satellites will be ordered and launched by 2030, further exacerbating the

space debris problem. This rapid expansion of space activity highlights the urgent need for effective and sustainable debris mitigation solutions to ensure the long-term viability of the space industry.

To comply with current debris mitigation regulations, satellite operators are required to reserve a portion of onboard fuel for end-of-life decommissioning,

ensuring that their satellites have enough resources to be safely deorbited or placed in a graveyard orbit. However, this solution does not account for scenarios where a satellite is "dead on arrival" or experiences a sudden malfunction that renders it inoperable before its planned decommissioning.

In cases where satellites become inoperable, active debris removal and other on-orbit servicing activities, such as on-orbit repair, *attitude and orbit control system (AOCS) takeover*, and refueling, are crucial for reducing the risk of collisions and preventing further debris accumulation.

Government subsidies can play a vital role in supporting the development and implementation of these kinds of services and technologies by providing financial incentives for private companies to invest in innovative solutions, sharing the costs associated with cleanup efforts, and ensuring that the removal of hazardous debris becomes a priority for the space industry. These technologies may include robotic systems for capturing and deorbiting large debris objects, electrodynamic tethers for changing the orbits of smaller debris, and advanced on-orbit servicing solutions for end-of-life satellite management.

Many governments, including nearly all EU member states, are already providing fiscal support to stimulate the market uptake of electric vehicles to mitigate climate change.

The 2022 update of ACEA's comprehensive overview highlights the various fiscal measures available in the 27 EU member states, such as tax benefits related to vehicle acquisition and ownership, company cars, and purchase incentives like bonus payments or premiums for buyers.

This approach could serve as a model for addressing the space debris problem. In addition to directly funding the development and operation of on-orbit servicing technologies, governments could also focus on subsidizing the adoption of advanced decommissioning systems for new satellites or incentivize satellite operators to contract active debris removal and in-orbit services from private companies.

This market-driven approach could foster competition and innovation in the sector, ultimately leading to more cost-effective and efficient solutions for space debris mitigation.

Despite the potential benefits of government subsidies for on-orbit servicing activities, critics argue that such interventions may not be the most efficient use of public funds and that the cost of active debris removal services is too high for satellite operators to feasibly adopt them.

To counteract this objection, it is important to consider the potential costs of inaction. While it is true that the cost of active debris removal services can be significant, the increasing density of space debris means that the likelihood of collisions and the resulting damage to satellites and other space assets is also on the rise.

By subsidizing the adoption of technologies like active debris removal, governments can help mitigate

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this risk and avoid the potentially much higher costs associated with replacing or repairing damaged services that depend on satellite infrastructure.

A comprehensive cost-benefit analysis should be conducted, considering the expenses of government subsidies, the economic benefits of maintaining a functional satellite infrastructure, and the potential losses incurred due to inaction.

Another objection raised by some industry players is that private industry should be responsible for addressing the space debris problem, rather than relying on government subsidies.

While it is true that private industry certainly has a role to play in addressing space debris, there are limits to what it can achieve on its own. Many satellite operators may be hesitant to invest in active debris removal services if they don't see a clear economic benefit.

By providing subsidies, governments can help create a market for these services, incentivize private sector participation, and encourage innovation in the industry.

This collaboration between public and private entities can foster a more comprehensive and effective approach to tackling the growing challenge of space debris.

One potential concern is the “*moral hazard*” problem, where satellite operators may become incentivized to launch more satellites with less regard for their end-of-life disposal.

This is a valid concern, as seen in the banking sector during the 2008 financial crisis, where financial institutions engaged in risky behavior taking for granted that the government would bail them out in case of failure.

However, appropriate regulation and oversight can mitigate this risk. Governments can require satellite operators to provide a plan for end-of-life disposal before launching new satellites, monitor compliance with these regulations, and impose penalties or more stringent requirements for operators who fail to comply.

Moreover, any plan of launching a mega-constellation should be conditional to the adoption of a proper decommissioning or debris removal strategy, which will be subsidized.

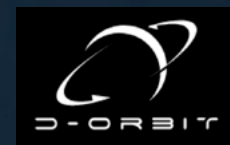
By providing subsidies for active debris removal and decommissioning technologies, governments can encourage operators to adopt best practices in space debris mitigation, rather than relying solely on end-of-life disposal as a solution.

In conclusion, addressing the growing challenge of space debris requires urgent and effective solutions to ensure the long-term sustainability of the space industry.

Although concerns exist regarding government subsidies for active debris removal, a multifaceted approach incorporating financial incentives, regulatory oversight, and private sector collaboration can lead to a more robust and enduring strategy.

By subsidizing the adoption of on-orbit servicing, active debris removal services, and decommissioning technologies, governments can stimulate innovation, promote best practices, and establish a thriving market for space debris mitigation. This combined effort of public and private stakeholders is crucial to protect our shared orbital environment and guarantee the continued success of space activities.

[www.dorbit.space](http://www.dorbit.space)



*Stefano Antonetti is the VP Business Development of D-Orbit. Stefano holds a master's degree in space engineering in a collaboration between the University of Rome "La Sapienza" and the Delft University of Technology. He worked as space system engineer in Paris for 7 years, focusing on feasibility studies for space exploration and the environmental impact of space activities. When he came back to Italy in 2014, he immediately joined D-Orbit as program manager for most of the activities done in collaboration with the European Space Agency. Today, Stefano is VP of Business Development, drawing the future of space transportation.*



Stefano Antonetti

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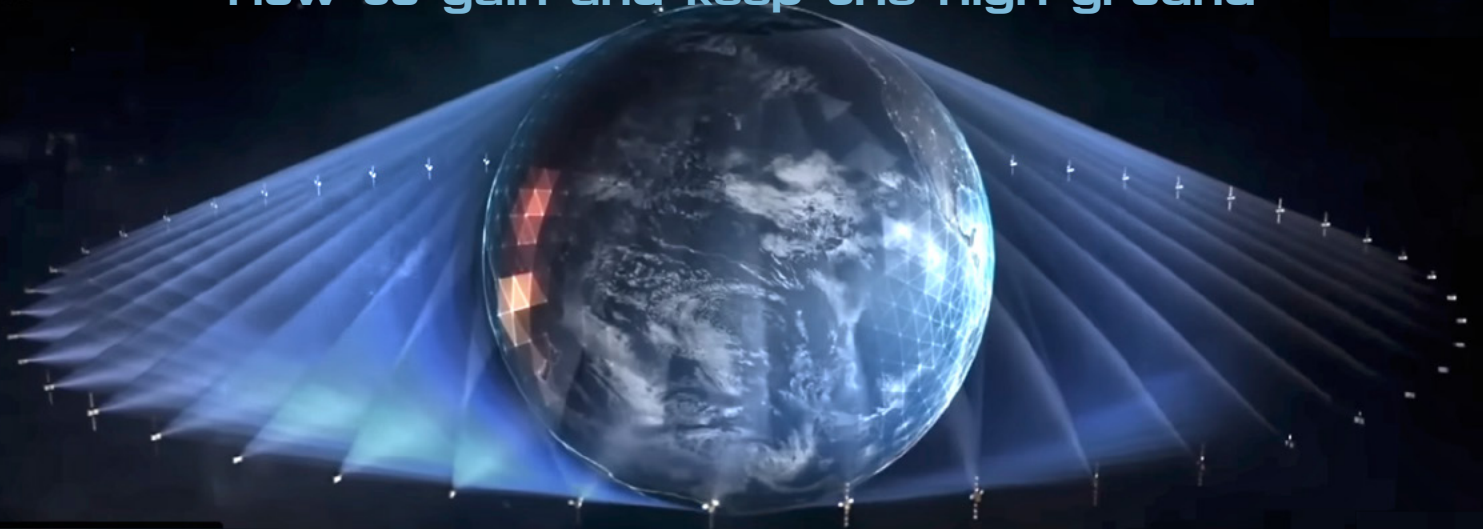
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# SSPI PRIME

## How to gain and keep the high ground



Authors: SSPI Editorial Team

*The high ground has always mattered. It's where we put our places of learning, our houses of worship and our military strongholds.*

Today, the high ground is much, much higher.

### Protecting Vital Lines Of Communication

Because satellites are vital, they are targets for enemy action. That led the United States in 2019 to create the [U.S. Space Force](#).



This new branch of the military has an ambitious goal to make certain that military satellite networks stay online, even as enemies interfere with them, try to hack them or knock them out of the sky.

Due to those actions, that requires something completely new: an integrated enterprise level view of the satellites, the secure networks that connect

Satellites have become critical to defense, from monitoring for signs of attack to connecting war fighters and the machines that go with them.

them and the forces deployed on the ground, sea and air, so that enemy action can be met with immediate reaction.

The challenges are immense as each branch of the U.S. military operates its own part of the communication and surveillance systems.

They also work with private sector companies whose networks and systems need to be included.

Creating this kind of integrated satellite planning and operation system has never even been attempted.

The work is as basic as making certain that every satellite terminal can connect securely to all its assigned satellite networks.

This is also as complex as building an enterprise level platform that can stand up to severe attack and to ensure communications continue to flow.

connections working, adapting automatically to change, keeping the network secure and protecting it from cyberattacks.

Depending on it will be more than one million active-duty personnel operating from 800 bases, 5,000 aircraft and nearly 500 ships around the world.

By protecting satellite communications, companies such as Network Innovations U.S. Government are also protecting the peace.

When no nation believes it has the ultimate advantage in space, no nation will want to be the first to bring conflict here.

Securing the high ground gives military leaders their best chance to keep it safe for communications, navigation, weather forecasting and the hundred other ways that satellites make a better world.

## Protecting Space Assets To Protect the Peace

Development of this new global communications and control platform is the job of [Network Innovations U.S. Government](#).

Produced for SatNews by [Space & Satellite Professionals International](#). See more stories and videos of satellite making a better world at [www.bettersatelliteworld.com](http://www.bettersatelliteworld.com).

The platform will connect the broadest range of terminals and satellites and will match up requirements and resources on the fly to keep those



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# COMMAND CENTER HUEY WYCHE II

Technical Director, GuardianSat



Huey Wyche II is the Technical Director at GuardianSat™ and holds a two-decade background in defense system integration and technical expertise. His knowledge spans the installation, implementation, and instruction

of cutting-edge technologies within the Department of Defense (DoD).

During his career, Huey served as the avionics lead for various Special Operations Forces, Personnel Recovery, and Electronic Attack weapons systems across multiple tours supporting Operations ENDURING FREEDOM, EARLY VICTOR, IRAQI FREEDOM, RESOLUTE SUPPORT, and FREEDOM'S SENTINEL.

Notably, Mr. Wyche played a pivotal role in the successful combat fielding of the Avionics Viability Program (AVP) upgrade for the EC-130H "COMPASS CALL" electronic attack weapons systems.

Mr. Wyche is a retired combat veteran who, throughout his service, demonstrated a knack for solving complex problems and earned multiple Commendation Medals for his ability to develop innovative solutions while deployed to combat zones and subjected to hostile fire.

Mr. Wyche's academic background includes graduating from Embry-Riddle Aeronautical University with a Bachelor of Science degree in Aeronautics, where he focused on Space operations.

**Good day, Mr. Wyche. Would you please provide an overview of your company's mission and GuardianSat™'s specific area of focus within the satellite industry?**

## HUEY WYCHE II

The GuardianSat™ (GSAT) foundation is built upon the rich legacy of Mr. Robert Briskman, a co-founder of Sirius/XM and a distinguished thought leader in the satellite industry with more than seven decades of experience. GSAT's mission is succinctly captured in the phrase, "**Keep Space Open.**" To fulfill this mission, GSAT concentrates its efforts on **Space Domain Awareness (SDA)** and **On-Orbit Defense (O2D)**, encompassing passive and hostile GEO challenges and beyond..



GSAT's approach to achieving its mission involves the development of patented, on-board satellite systems that serve the dual purpose of identifying, cataloging, tracking, mapping, maneuvering, and repositioning satellites to proactively avert catastrophic events such as collisions or hostile attacks. In doing so, GSAT safeguards physical assets through its patented payloads as well as offers **data-as-a-service** in GEO through its generative-AI pathfinder program.

Recognizing the paramount importance of expanding space operations for the advancement of humanity, GSAT plays a pivotal role in its effort to "KeepSpace Open" within four critical areas:

- **Improving Space Domain Awareness**

GSAT's expertise contributes to a heightened understanding of the space environment, ensuring safer and more efficient satellite operations.

- **Mitigating Orbital Collisions**

By actively monitoring and mitigating collision risks, GSAT helps maintain the integrity of valuable satellite assets and orbital space.

- **Repelling Hostile Attacks on Satellites**

GSAT's efforts provide essential security measures to protect satellites from hostile actions, enhancing the resilience of space infrastructure.

- **Enhancing High-Value Operations through Data Engineering & Artificial Intelligence**

Leveraging cutting-edge data engineering and artificial intelligence, GSAT empowers high-value space operations with valuable insights and optimized performance.

GSAT, rooted in the legacy of Robert Briskman, is dedicated to ensuring the openness and safety of space by excelling in Space Domain Awareness, preventing satellite collisions, defending against hostile threats, and elevating space operations through innovative data engineering and AI solutions.

***What unique technologies or innovations does your company bring to the satellite industry, and how do they differentiate you from established competitors?***

## **HUEY WYCHE II**

GSAT, at its core, is a SPACE Innovations company focusing on the new, the novel and the transformative — furthering the legacy of Mr. Briskman and his track record of commercializing innovative research into profoundly critical applications.

GSAT holds two globally recognized patents that secure our unique technologies and innovations for the satellite industry:

***Patent No.: US 11,662,183 B1 - “Systems and Methods for Autonomous Protection of Satellites From Hostile Orbital Attackers”***

***Patent No.: US 8,833,702 B2 - “Autonomous Satellite Orbital Debris Avoidance System and Methods”***

These patents, along with a STTR Phase I effort through “America’s Seed Fund,” the **National Science Foundation** validates, verifies and differentiates our position as a thought leader as well as a solution provider for space domain awareness and satellite defense.

***What do you perceive as the most significant threat or challenge that your company and the industry as a whole currently face, and how is your company working to address it?***

## **HUEY WYCHE II**

The most significant challenge facing our industry today, as we strive to ensure the rapid growth, acceleration, and maintenance of a robust space economy, is the dual threat of orbital debris and hostile attacks.

Mitigating these threats is of paramount importance to secure and extend our industry’s potential as well as to enhance the overall safety and sustainability of our society. It’s crucial to recognize that space is not an empty void, and the excessive risk posed by debris and attacks could potentially jeopardize this global commodity and our industry’s future.

At GSAT, we are committed to addressing these critical challenges, and we have a comprehensive plan in place:

- ***Enhancing Satellite Safety***

*We will provide full spherical awareness for satellite systems by developing and delivering cutting-edge systems and processes directly integrated into host satellite systems. This integration will enable predictive and reactive collision avoidance, ensuring that our satellites can navigate through the increasingly crowded orbital environment safely.*

- ***Real-time Debris Monitoring***

*GSAT will create a dynamic map of the orbital debris environment. This map will provide stakeholders with real-time, pinpoint, and accurate data, supported by advanced artificial intelligence. Armed with this information, decision-makers can proactively plan missions and make informed choices to avoid potential collisions with debris, thus safeguarding valuable assets in orbit.*

- ***Countering Hostile Attacks***

*Recognizing the rising threat of both direct ascent and co-orbital anti-satellite attacks, GSAT is dedicated to developing innovative solutions. Our goal is to detect and track potential threats and to also deploy effective countermeasures to neutralize them, using O2D. By doing so, we aim to enhance the security and resilience of our satellite systems against hostile actions.*

GSAT is fully committed to ensuring the continued growth and sustainability of the space industry by actively addressing the challenges posed by orbital debris and hostile attacks. Our multifaceted approach, encompassing collision avoidance, real-time debris monitoring, and advanced threat detection and mitigation, will play a pivotal role in securing the future of space exploration and utilization.

***How does your company plan to address global challenges, such as the ongoing and intensifying conflicts, through satellite technology?***

## **HUEY WYCHE II**

GSAT is actively taking on two critical global challenges through our innovative satellite technology initiatives. The first challenge we address is debris mitigation and ownership, which encompasses both tactical/operational and political aspects.

Our primary goal in this regard is to minimize the propagation of debris and mitigate its impact, particularly concerning sub-10 cm debris on satellites in GEO. This “*deadly ghost threat*” is a significant concern for the satellite industry. To tackle this issue effectively, we emphasize the importance of enhanced SDA.

Enhanced SDA, at the core of our efforts, enables us to properly identify, track, map, and tag debris. This comprehensive cataloging of the space environment not only aids in developing effective mitigation and avoidance strategies but also plays a crucial role in determining debris ownership. This ownership delineation is vital for making pragmatic global policy decisions and assigning responsibility, ultimately fostering a safer space environment.

The second major challenge we confront is the intensification of conflicts or hostile attacks in space, which has significant strategic implications. Our approach to minimizing conflict intensification involves raising political awareness, implementing strategic deterrence measures, and employing tactical On Orbit Defense(O2D) countermeasures.

Here again, enhanced SDA proves invaluable by providing real-time insights into the operational space environment and enabling the implementation of defensive measures when needed.

At GSAT, our commitment to addressing these global challenges is manifested through our patented on-board systems. These systems provide enhanced SDA capabilities, collision avoidance systems, data awareness, and data-driven O2D countermeasures against hostile attacks. These initiatives are thoroughly detailed within our patents and form the foundation of our initial product offerings.

Our overarching mission is clear: “Keep Space Open.” Through our innovative technologies and solutions, we aim to contribute significantly to creating a secure and sustainable space environment and foster the peaceful growth of the global commons.

***What partnerships or collaborations have been pivotal in the growth and development of your satellite company?***

## **HUEY WYCHE II**

Mr. Chris Rohe (CEO) heads GSAT’s team of industry-proven experts across complementary fields, each boasting impeccable track records in development and fielding of next-generation solutions for government and commercial applications. Our company is firmly grounded in this wealth of expertise and experience.

Inspired by the pioneering work of commercial space visionary Mr. Briskman (President), I guide our team of subject matter experts and principal investigators, driving the swift transformation of our patented solutions from concept to reality.

Critical to our team have been the relationships, collaboration and/or guidance from a few key industry experts and companies that include...

- *Mr. Alex Fielding, Privateer Space*
- *The Aerospace Corporation, A Federally Funded Research and Development Center (FFRDC)*
- *The University of South Florida, Institute of Applied Engineering*
- *“America’s Seed Fund”-The National Science Foundation*

Our success is further bolstered by support and assurance from several large prime contractors. Additionally, our active interface and collaboration with public and private space accelerators and government agencies ensure that GSAT remains at the forefront of innovation and progress in the space industry.

***What do you see as the future of the satellite industry, and how does your company aim to shape or adapt to that future?***

## **HUEY WYCHE II**

The space industry is poised for significant growth and expansion, and its importance in our daily lives will continue to increase, profoundly impacting all aspects of our existence and driving us toward the future.

Society, the economy, global stability, and our way of life are becoming increasingly dependent on a robust and fully functioning space industry. However, this vital industry faces two well-publicized and existential threats: orbital debris and hostile attacks.

At GSAT, we are committed to actively shaping the future by offering critical solutions and services that assist space operators in preparing for the challenges ahead. Our primary focus is on directly and proactively mitigating the risks posed by orbital debris and hostile attacks. By doing so, we aim to ensure the continued success of this industry, the stability of our economy, and the preservation of these global commons.

Our goal is to keep space unfettered, undeterred, and open for the benefit of all.

***gsat.space***

