SMARTER MILSATCOM

Intelligent, multi-orbit ground solution set to transform warfighter mobility and mission agility

Author: John Lane, Chief Sales Engineer, ALL.SPACE

Robust, Beyond-Line-Of-Sight (BLOS) communications are a must to meet the connectivity requirements of today's warfighters — however, the military has long struggled with the need for interoperability between disparate communications systems, let alone coordinating a mission while operating on more than one frequency band or satellite.

Depending on the operation, military commanders may need to coordinate operations with hundreds of aircraft or vehicles and thousands of soldiers, often in difficult terrain with limited line of sight to satellites.

Given these battlefield realities, it's no surprise that satellite terminals have struggled to provide assured connectivity. As far back as 2019, the General Accounting Office reported that the ***Department of Defense*** (**DoD**) maintains some 17,000 satellite terminals with more than 100 designs, all operating across multiple platforms and with differing system requirements.

During ***SOF Week 2023*** this past May in Tampa, Florida, ***David Breede***, ***U.S. Special Forces Command***'s new *Tactical Intelligence Systems Program Executive Officer*, said the most difficult technical problem he faced as head of the ***Special Reconnaissance PEO*** was networked, collaborative communications — "*getting individual systems to talk to each other and provide a common operating picture*."

He said operators need to push timely and relevant information "*at the time of need*" over their networks, and, in the face of jamming by adversaries, "*there can't be a single point of failure*," emphasizing the need for "*multiple options in the same theater*."

Breede isn't alone in acknowledging the challenge of interoperable comms for soldiers in the field. ***Major General Robert Collins***, currently deputy for ***Acquisition and Systems Management,*** told *Breaking Defense* in May of 2021, when he was the ***Program Executive Officer for Command, Control and Communications-Tactical*** (**PEO C3T**), "*The last thing we want is a unique terminal for LEO, a unique terminal for MEO*."

But with challenging data demands, Maj. Gen. Collins stated that the Army wasn't likely to get a single terminal to satisfy the requirements of all users, but it nevertheless wanted to move to a compatible terminal family able to communicate over LEO, MEO and GEO.

An agile, interoperable ground infrastructure is key to the U.S. military's vision for a ***Joint All Doman Command and Control (JADC2) framework***. This strategy calls for a common operational picture to better connect sensors to shooters in the future battlespace.

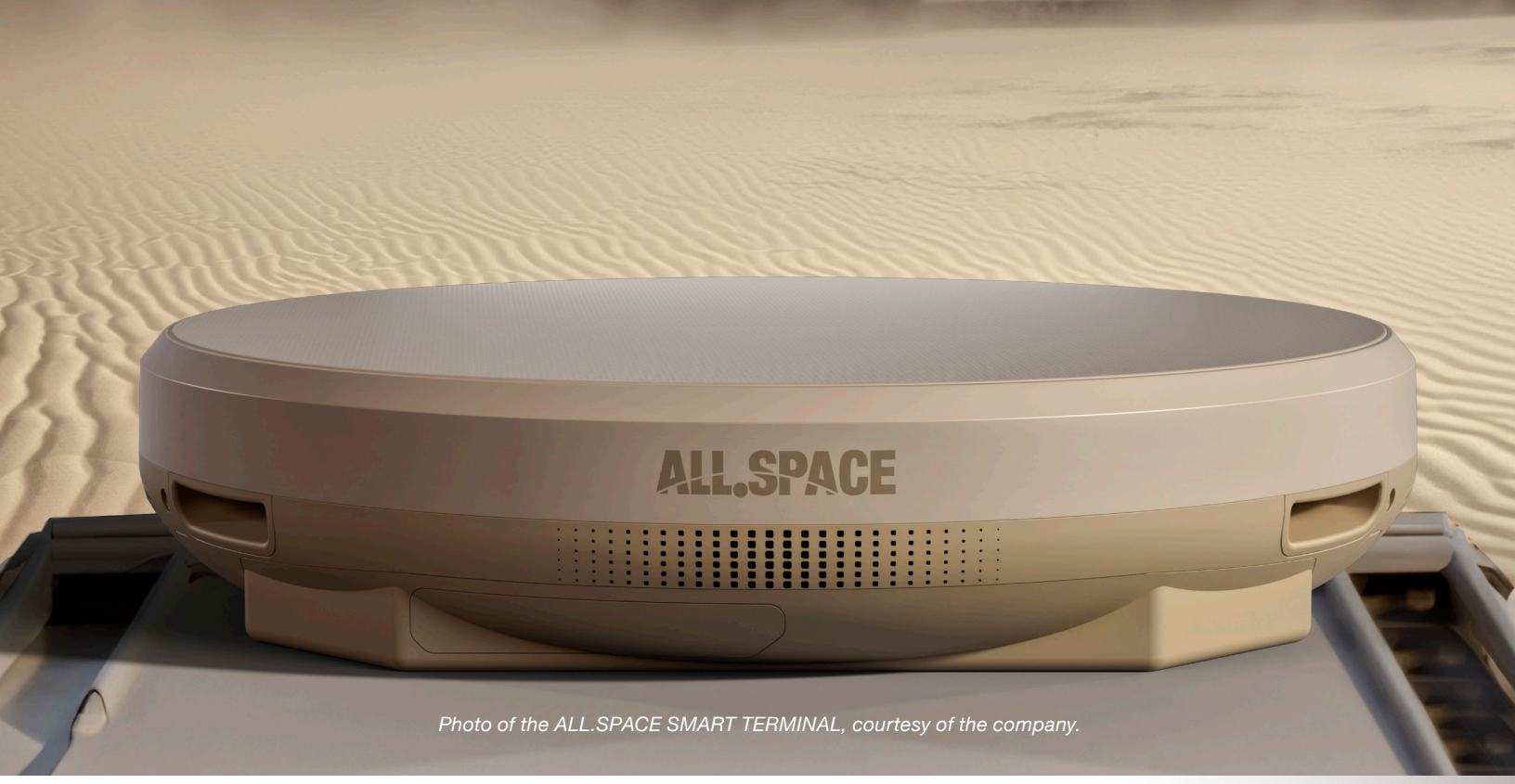

Photo of the ALL.SPACE SMART TERMINAL, courtesy of the company.

JADC2 promotes agility and adaptability by enabling rapid decision-making and the ability to dynamically allocate resources. In the context of connectivity challenges, JADC2 helps identify and prioritize communication requirements, allowing for flexible deployment of communication assets to address connectivity gaps.

Fulfilling JDAC2's Connected Sensor-to-Shooter Vision

Fortunately, innovative multi-orbit, multi-link terminal technology will soon give warfighters a new level of assured communications and agility on the battlefield.

With a solution that encompasses both hardware and software capabilities, ALL.SPACE's ***SMART*** range (***encompassing five key components – SATELLITE, MULTI-NETWORK, AI, REAL-TIME and TERMINAL***) will help the military realize its vision of JADC2 at a time when geopolitical tensions in the space domain are at an all-time high.

> ***ALL.SPACE Vision: At the heart of global connectivity, ALL.SPACE unites networks, space and ground, redefining seamless communications with secure, dependable and intelligent insights.***

Founded in 2013 and led by O3b veteran ***John Finney***, ALL.SPACE has successfully raised more than $100 million in funding and is about to close its C-round as the firm prepares for the global launch of its multi-orbit terminal this year.

ALL.SPACE's connectivity capabilities, tailored to global defense needs, are resonating with the defense community, from the U.S. DoD to the Royal Air Force and NATO in Europe as well as allies in the Indo-Pacific region.

> *"A lot of the features we are looking to include in the future will help you streamline and continue missions despite enemy capabilities," said* ***Emil Reynolds****, a former warfighter who served multiple tours in Afghanistan and Iraq and who is currently ALL.SPACE's United States Government (USG) Business Development Executive.*

The terminal supports resilient communications because, even if an adversary jams or disrupts one network, another link can still support the mission. Being able to communicate in a contested environment ensures the warfighter's real time or near real-time decision-making ability.

ALL.SPACE's terminal features plug-in components, software-defined modems, edge compute modules and intelligent software overlays to provide unprecedented flexibility and resilience in the face of evolving threats. The scalability of the terminal design offers new pathways to gather, analyze and disseminate data to better understand what the data means and getting the data where it needs to go quickly.

Partnering Smart

Satellite operators, including ***SES***, are an important ecosystem partner for ALL.SPACE. SES operates the only multi-orbit constellation consisting of 70 GEO and MEO satellites, delivering global coverage and high-performance connectivity services. Leveraging SES's global satellite fleet, ***SES Space & Defense*** provides mission assurance connectivity to government customers operating at the tactical edge.

> ***"Pairing multi-orbit operations with a terminal that can access multiple orbits unlocks powerful benefits. In conjunction with our next-generation MEO system, O3b mPOWER, and ALL.SPACE's smart terminal, we will unlock connectivity for the U.S. military and government, unleashing the full performance and flexibility of SES's global fleet." — David Fields, President and CEO of SES Space & Defense.***

SES's upcoming MEO constellation, ***O3b mPOWER***, is set to deliver high-throughput, low-latency, and resilient communications designed specifically for government mission partners. In addition, O3b mPOWER is easily scalable and provides an automated solution, giving government mission partners more control of their satellite service. Similarly, ALL.SPACE's terminal is plug and play, and includes a user-friendly terminal interface and advanced automation.

Embracing Digital Modem Standards

In addition to partnering with satellite operators to serve defense users, ALL.SPACE is also working with industry associations to push for open digital standards that will benefit military and commercial SATCOM consumers.

As the ground segment continues to evolve, modem vendors must embrace a common digital IF standard. Fortunately, the satellite industry has started to come together through efforts like the DIFI Consortium, which counts the U.S. Navy as a founding member.

John-Paul (JP) Szczepanik, Chief Technology Officer of ALL.SPACE, was recently named co-chair of the Consortium's ***Specification Working Group***. He said, "*DIFI has gotten a lot of the right player involved who are showing a commitment to standardization, which is key to achieving interoperable and highly resilient space architectures*."

One way of preventing ground terminals from getting stovepiped is having flexibility with the modem — that is, not requiring a different physical modem every time one needs to switch networks.

> ***"Even if you can swap modems, it's time consuming and difficult for the military to go into the field and get those new modem cards out to the edge. But if you have the hardware to run virtualized modems on general purpose compute, then using the multi-link capability, you can push new virtualized modems or software updates over one of the satellite links in the background without affecting primary communications to access different networks or new security features as they evolve." — Eric Clague, Director of Product Management for the U.S. Government, ALL.SPACE.***

Driving New MILSATCOM Multi-Orbit Requirements

To take advantage of digital transformation of the ground segment, ALL.SPACE and other industry partners are pushing for new procurement practices to fuel faster deployment of breakthrough technology.

For instance, if simultaneous, multi-link connections were included in future MILSATCOM program requirements, it could accelerate how quickly advanced capabilities get deployed, ensuring safer, more resilient comms for U.S. and allied militaries.

For additional information about ALL.SPACE's breakthrough smart terminal capabilities for the defense and government market, visit ***www.all.space***

Author John Lane is Chief Sales Engineer at ALL.SPACE and he supports Product Development, Sales and U.S. Government Programs. John spent 25+ years supporting PEO C3T's tactical SATCOM efforts. Prior to John's retirement from the government, he was PdM SATCOM's Technical Management Division Chief.