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# Global Military COMMUNICATIONS


*Front cover photo courtesy of Blu Wireless*

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GMC


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*If you would like to supply information for future issues of GMC please contact Crispin Littlehales*

*Photo courtesy SPX CommTech*

# Kratos delivers 200th production aircraft of BQM-177A Subsonic Aerial Target System

Kratos Defense & Security Solutions has announced that its Unmanned Systems Division (KUAS) has delivered the 200th production BQM-177A Subsonic Aerial Target (SSAT) for a domestic customer as part of its Full Rate Production (FRP) Lot 3 contract.

"I am extremely proud to accept delivery of this 200th subsonic target system on behalf of the Navy," said Don Blottenberger, Navy Aerial Targets program manager. "Walking the production line, it's clear to me the quality, commitment, and professionalism Kratos brings to their product and our Navy mission."

Deliveries over the past two years have paved the way for activation of four operational sites spread across the globe. Under FRP Lot 2, KUAS delivered 48 additional SSAT aircraft.

The FRP Lot 3 deliveries, that are currently ahead of schedule, will provide the assets to manage several large test programs critical for the Navy in the coming years. "This delivery is yet another significant milestone in the program as we provide world-class training and test capability for our Fleet," said Blottenberger.

"The delivery of this 200th aircraft for our domestic customer, ahead of schedule, represents the hard work of many dedicated government and Kratos unmanned professionals who are all very proud of this achievement," said Steve Fendley, President of Kratos Unmanned Systems Division. "With the recent award of Full Rate Production Lots 4 through 7 for more than 200 additional aircraft in January, KUAS and our highly dedicated team remain deeply committed to – and heavily invested in – this mission, our customers, and continuing to provide the best possible value proposition with our high-fidelity aerial training systems." **GMC**

*Kratos BQM-177A Launches to support Navy Mission*

# New contract for Thales to reinforce airspace surveillance capabilities for the French Armed Forces

Thales is to provide next generation primary and secondary approach radars, STAR NG and RSM NG to renew the fleet of approach radars for French air and naval bases from 2025, as part of the Detection 22 program within the phase 5 of the DGA project SCCOA.

As announced by the Ministry of Defence, the Directorate General of Armaments (DGA) has launched stage 5 of the modernization program with the replacement of fixed and mobile radars and renewal of the command and control air-defence system. Among multiple activities this contract will provide French Air forces with a high performing air surveillance solution from best in class Thales civilian radar portfolio adapted to operate in military environment.

With the provision of Thales next generation primary and secondary approach radars, STAR NG and RSM NG, air surveillance will be guaranteed 24/7, with improved operational capabilities and detection performances, as well as meeting the key objective of combining obsolescence treatment, compliance with national and European regulations.

Since the first delivery in 1970, Thales' portfolio is contributing to airspace protection with a full range of radars to manage air surveillance and airport/airbase terminal areas. With the portfolio of primary, the STAR NG (an approach primary radar) and the TRAC NG (an En-Route primary radar) detect non-cooperative aircraft identification, aircraft without transponders or with faulty transponders, capable of detecting targets of all sizes, conducting wind farm mitigation and providing great operational range. And the secondary portfolio with the renowned RSM and latest innovation the RSM NG to detect and identify co-operative aircraft.

At the forefront of new technologies, investing in R&D and capitalizing on 50 years of Air Traffic Control experience, Thales has introduced many leading innovations for airspace safety to accompany evolving customer needs in both civil and military domains, as well as ensuring compliance with the latest safety regulations to provide safe and accurate, approach and en-route surveillance.

Recent innovations on the co-mounted primary STAR NG and secondary RSM-NG, include a meta-sensor radar, as well as the renewal of its entire portfolio of radars less than 3 years ago. Upgrades and new design include a family of radars with higher performances, especially for precision and detection, development of new features such as electronic protection measures, 3D/ altimetry, detection of low/zero speed aircrafts (such as helicopters), high speed/ high maneuverability aircrafts (such as fighters) or merging traditional Mode S with ADS-B detection to enhance sensor performance. **GMC**

## In brief

Elbit Systems UK has successfully upgraded its Interim Combined Arms Virtual Simulation [Deployable] (ICAVS(D)) system with an advanced simulation software called Defence Virtual Simulation 2 (DVS2). This is the first complex British Army training capability to be fully integrated with DVS2 which utilises Bohemia Interactive Simulations' VBS4, VBS Blue Image Generator and One World Terrain.

Elbit Systems UK's deployable virtual simulator, ICAVS(D), achieved Full Operational Capability in September 2022, and has now passed acceptance testing with DVS2 by both the Land Warfare Centre and the Training and Simulation Systems Programme (TSSP) teams within the Land Equipment Operating Centre at Defence Equipment and Support (DE&S), the procurement arm of the UK armed forces. **GMC**

# Construction begins on Royal Navy's fourth TYPE 26 frigate

UK Minister for Defence Procurement Alex Chalk has attended a ceremony to officially begin construction on the future HMS Birmingham at BAE Systems' Govan shipyard in Glasgow.

The steel cut, marking the official start of build on the fourth of eight Type 26 frigates, was carried out by apprentice burner, Ciaran Baillie, accompanied by fabricator - plater Jamie Finnegan.

All of the Royal Navy vessels will be built by BAE Systems on the Clyde, sustaining around 1,700 jobs in Scotland and 4,000 jobs in total across the wider UK maritime supply chain. BAE Systems plans to recruit a further 400 trades people and 200 apprentices for the programme in 2023.

Work on the first three Type 26 ships is well under way with HMS Glasgow now at BAE Systems' Scotstoun shipyard to have her complex systems installed, HMS Cardiff currently being assembled and HMS Belfast in its early construction phase. HMS Birmingham is the first ship to be constructed under a £4.2bn contract for the remaining five ships secured in November, which reflects the Ministry of Defence's confidence in the programme.

Alex Chalk KC, Minister for Defence Procurement, said: "This is yet another significant milestone for the Type 26 programme, supporting thousands of jobs in Scotland and across the wider UK supply chain. Working closely with our industry partners, we are bringing in a cutting-edge class of warships for the Royal Navy, bolstering our maritime capabilities into the coming decades."

Simon Lister, Managing Director of BAE Systems' Naval Ships business, said: "This is another proud moment for our talented teams across the UK who have played a part in the design and construction of these important vessels. HMS Birmingham will benefit from a range of investments that will transform our digital and physical infrastructure and consolidate a centre of excellence for shipbuilding skills here in the UK. Alongside my teams I'd like to thank our customers and suppliers for their expertise and commitment as we take this programme forward and deliver the next generation City Class frigates for the Royal Navy."

The Type 26 is one of the world's most advanced warships. It is designed for anti-submarine warfare and high-intensity air defence, but can adapt its role quickly to transport high volumes of humanitarian aid and house medical facilities.

The programme is a UK-wide endeavour, with more than 120 British suppliers securing contracts supporting the frigates, including for steering gears in Dunfermline, gas turbines in Filton and maritime LED lighting in Cumbria.

BAE Systems is investing approximately £15m in a new Applied Shipbuilding Academy in Glasgow to support the development of the entire workforce, from apprentices through to senior leaders. In addition, construction has begun on a modern shipbuilding hall worth more than £100m, which will greatly enhance productivity on the Clyde to support the delivery of these eight ships and future orders.

The Commonwealths of Australia and Canada have selected the Type 26 design, which, together with the UK, provide an anticipated 32-ship programme across the three nations. Sharing build and transition into service lessons across all three programmes will benefit all parties in this multinational effort.

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*Photo courtesy BAE Systems*

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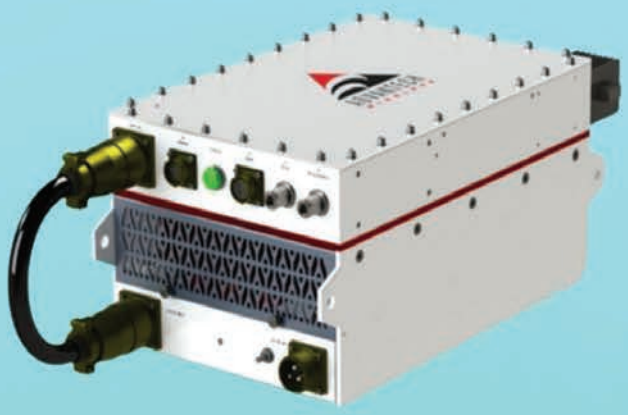

# Introducing ***GENESIS*** - the new series of Ku-band SSPAs and BUCs from Advantech Wireless Technologies.

***GENESIS*** epitomizes the latest in hardware and software technologies, making it the most feature-rich satcom SSPA in the industry. Initially available in 200W, and 250W variants, GENESIS delivers a host of high-end features, including some that are unique to the ***GENESIS*** family:

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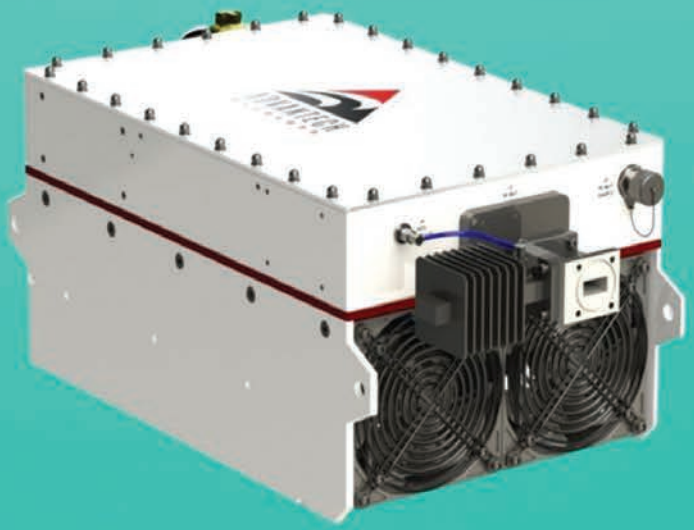
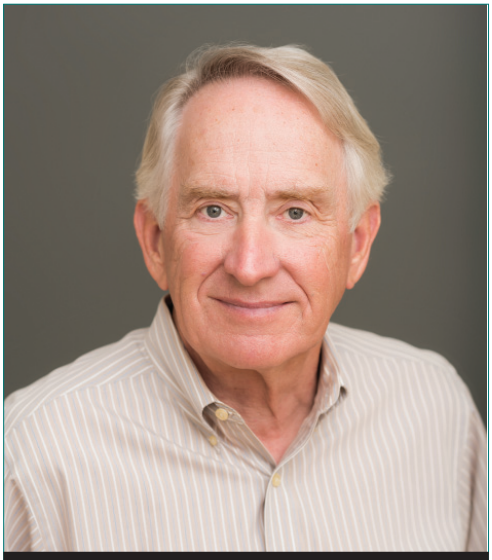
· Device-level monitoring for detailed fault analysis and diagnostics
· Embedded logic to manage multi-amplifier redundant and phase-combined systems, negating the need for any external controllers.

Additional frequency bands and higher power levels based on the ***GENESIS*** platform will become available in the coming months.





*Macy Summers, President and CEO, Blu Wireless*

GMC Q&A

# Stealth communications

The IEEE 5G mmWave-based systems created by Blu Wireless Inc. function as local area tactical networks. They are based on a distributed, peer-to-peer, daisy-chain set up rather than a centralized core which means that there is no single point of failure. Macy Summers, President and CEO of Blu Wireless, explains how undisrupted gigabit communication links can be used between military vehicles to improve tactical communication, particularly in volatile environments.

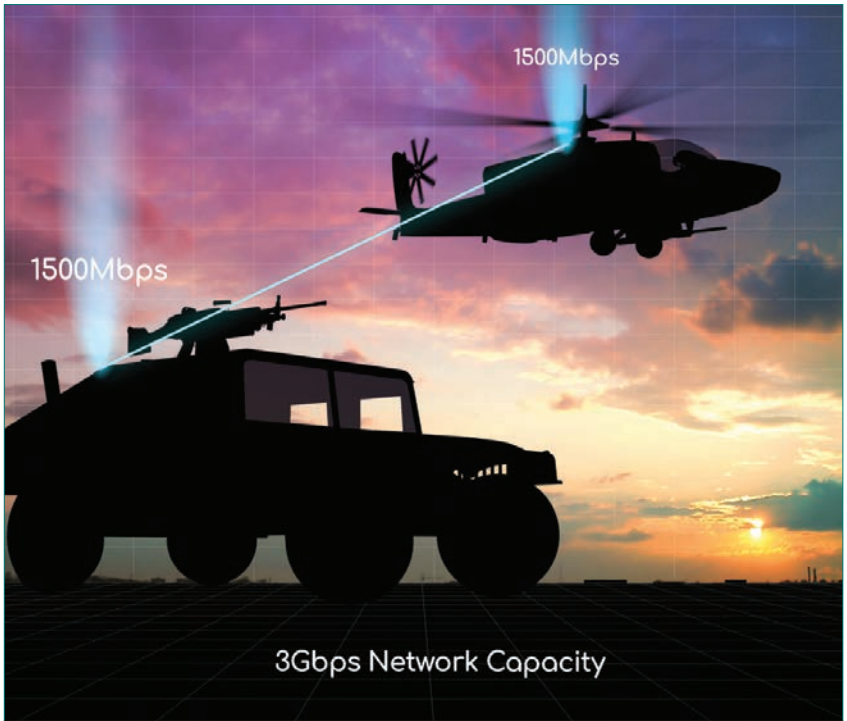
*Crispin Littlehales, Executive Editor, Satellite Evolution Group*

**Question: What does Blu Wireless deliver in terms of wireless technology?**
**Macy Summers:** Think of our solution as a local area private network. Our history has been in the chip designing and manufacturing side, so we are able to deliver an entire solution of millimeter wave (mmWave) radio up to 100 GHz. It's basically mmWave, including the system on a chip. We don't buy our chips, we build our own. We made a conscious choice not to make our chips proprietary. They meet standards that are internationally accepted.

We focused our intellectual property on specialized applications for those radios aimed at the military and high-speed transportation. The other primary market that we serve is in 5G communications—basically backhaul. We connect lots of these 5G cell sites, especially what we call neutral hosts. Those are the ones that are selling their towers and their 5G radios to big carriers.

**Question: How does IEEE 5G mmWave technology differ from 3G Public Partnership (3GPP) 5G?**
**Macy Summers:** Although 3GPP 5G has some wonderful applications for government and military, it doesn't have the same characteristics as IEEE 5G. IEEE 5G is focused mainly on private networks while 3GPP 5G standards have evolved from public networks. It doesn't mean that they can't cross over because they do sometimes, but that's the basic premise of it.

We get some security advantages from mmWave, especially when we are in the V-band. You may remember some movies from World War II where the airplanes dropped out these metal strips of aluminium called chaff which would




*Multi-gigabit covert communications for defense. Photo courtesy Blu Wireless*

confuse the enemy's radar. That is what's happening at the V-band for radio communications. There is something called the oxygen absorption line that doesn't allow the radio transmissions to go very far. It's like having a bubble of security because anywhere that oxygen exists this resonance blocks the signal. This is why the V-band is ideal for covert communications and why it has been used in space for secure satellite crosslinks. Those big ground snooping antennas cannot intercept the signals since the oxygen basically shuts them out like a brick wall.

**Question: The US Department of Defense (DoD) and the UK Ministry of Defence (MoD) have initiated programs to improve military communications. What are the key challenges they are addressing and how much progress have they made?**

**Macy Summers:** Most of the radio systems that are spread out among the forces were designed decades ago. They are very limited in their bandwidth, and many are low frequency, say 6 GHz which is C-band and 2 GHz or lower which is the L-band. These signals can be detected and intercepted by near peer adversaries both in the short and long range. An adversary with long range artilleries, such as those that are being used in Ukraine, can sniff out your 5G low frequency radio or 5G phone signal, take aim, and fire.

The militaries need higher bandwidth to support video taken by drones so that the warfighters can see the enemy tanks or the formations that are on the ground in real time. Our terrestrial systems don't have that ability today. Nor do they have the ability to support the use of specialized sensors that you need at the front line which require significant bandwidth.

Warfighters today, especially the young ones that would be employed in any new conflict, are oriented to visual communications. Little walkie-talkies which are pre-programmed to a very narrow frequency are not sufficient in a volatile environment. Once you get into battle you don't want to be figuring out what's happening by interpreting what five different people are saying, you want to see what's going on first hand.

**Question: What are the advantages that Blu Wireless mmWave technology can deliver to the battlefield?**

**Macy Summers:** Our systems are covert, meaning that the adversary cannot easily detect those signals. Since the element of surprise is the most important thing on any battlefield, this feature is key. We are also able to deliver high-quality, gigabit signals at a fast rate. So, when Navy or Army forces are in formation, it's possible to communicate lots of information, including video. Each unit can stream video back and forth. I can see what my neighbor is doing and vice versa.

In addition, IEEE 5G mmWave meets the necessary pass-through governance and cybersecurity standards and can exploit licence-exempt, non-commercial spectrum frequency bands, such as the V-band at 57-71 GHz. Using our systems it is possible to switch from a super covert bubble to longer range communication.

Let's say a warfighter is in a zone and sees an adversary who is within range. That soldier can switch channels very quickly to shrink his communications bubble to make it impossible for the near peer adversary to detect. Conversely, our range can be quickly extended by relaying information from one unit or team member to another using a daisy chain technique.

**Question: Blu Wireless 5G mmWave systems have been tested in a variety of simulated battlefield scenarios. What were the results and how are those results informing the development of solutions moving forward?**

**Macy Summers:** One of the advantages of all 5G communications is low latency. Latency is a very important thing when you are responding to threats. If I can fire my missile first, I will take out my adversary before they can fire back. We've figured out how to reduce the latency of our systems to absolute

minimum amounts that are unperceivable to the ear and to the eye. You can imagine how important this is to military applications.

We tested our 5G mmWave systems by interfacing them with the networking systems in land vehicles which were then put through the same kind of scenarios one would encounter in the battlefield. We wanted to make sure that the system would support undisrupted gigabit communications links between vehicles driving over rough terrain, stuck in congested areas with multiple obstacles, and even in high-speed chases. The result was that our systems were able to maintain secure communications throughout.

**Question: How long do you think it will take for battlefield communications to be truly interoperable, resilient, secure, and capable of handling vast amounts of data?**

**Macy Summers:** I spent a lot of years at Lockheed Martin where we served all the branches of the Armed Forces so I'm familiar with military communications. Typically, when the military purchases a new system, they don't throw away the old one. This is especially true with the US Army which as something called PACE which is Primary, Alternate, Contingent, and Emergency.

I think that some solutions will be adopted more quickly than others. I think there will be a quick uptake in space, but with the Army, for example, there are hundreds and thousands of older SATCOM terminals in KU-Band left over from Afghanistan and Iraq. It's likely that those systems will continue to be used. What is more, the Army, the Navy, and the Air Force each have a different idea when it comes to what a WAN should look like.

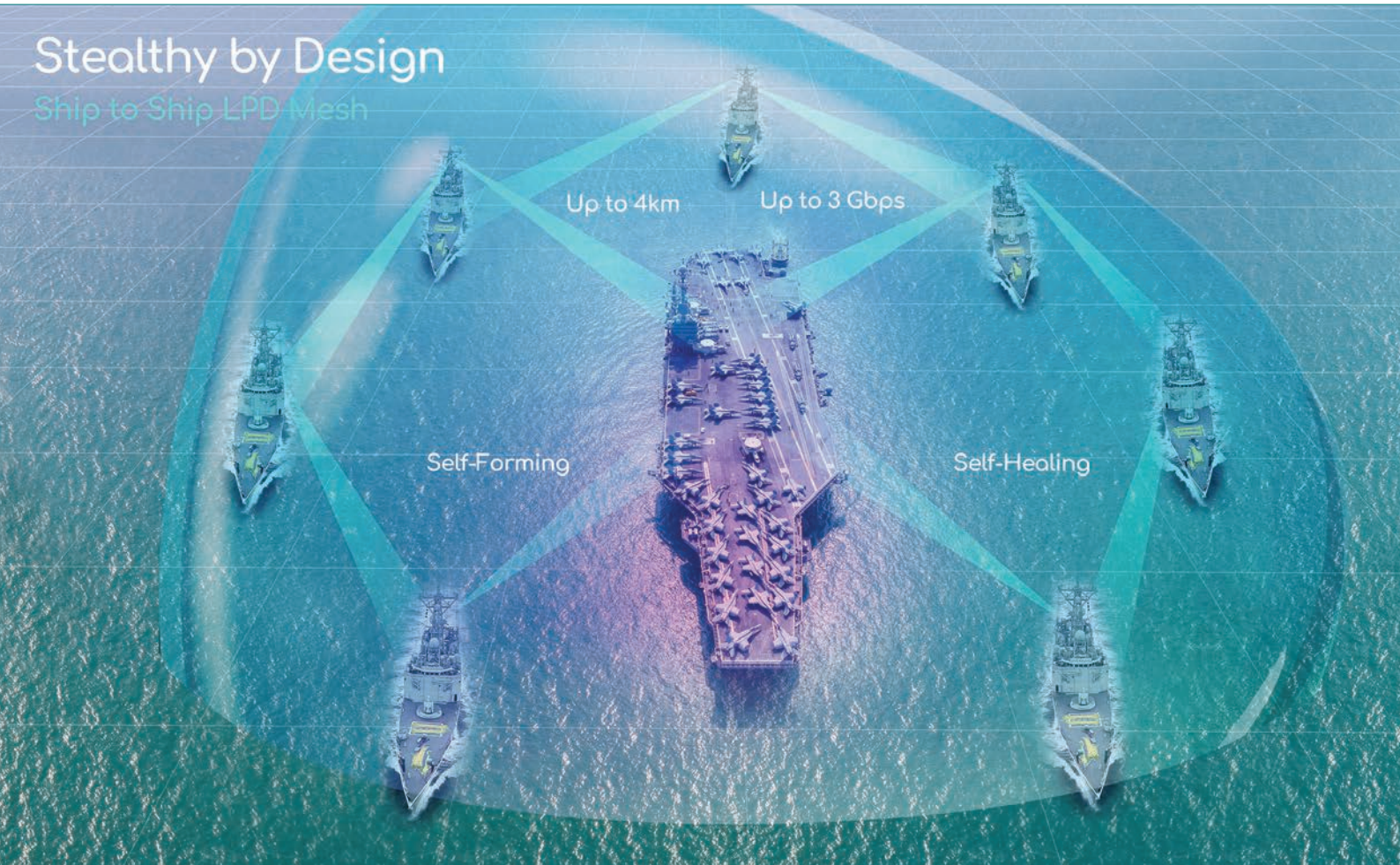
Right now with the way things are connected on the ground with fiber optics, a drone that is looking at a target sends the information via KU-Band over a couple of hops back into the Pentagon which is then distributed over a designated network and then goes to a command site where the commander sends it over to the brigade team which then calls the SEAL team—all of which takes a while. In my opinion, the military will find ways to reduce the time it takes to communicate, but interoperability may be much farther off.

There is a driver that might accelerate the timetable and that is Manned-Unmanned Teaming (MUM-T) which couples manned and unmanned autonomous vehicles. Drone technology has advanced to the point where it's now fairly mature. Drones must talk to each other and that requires very good communications. A lot of drones are WiFi connected but WiFi is very easily detected. MUM-T is all about covert operations in hostile environments, thus making MUM-T the perfect candidate for interoperable, resilient, secure communications capable of handling vast amounts of data.

Another possible accelerator is the Other Transaction Authority (OTA). This is a procurement authority that allows US federal agencies such as the DoD to enter into agreements with non-traditional defense contractors making it easier to contract new technologies.

War itself is also a powerful driver. The Ukraine is a great example. Nobody in the military was using LEO communications. Then, when Russia invaded Ukraine, we saw first-hand how crucial the Starlink and Viasat satellite communications were to the war effort.

Although our current offering is terrestrial, we are believers in LEO satellite communications. In the future, adding a Wide Area Network (WAN) to IEEE 5G mmWave is the ultimate solution. Not only would the Army, Navy, and Air Force be able to share large amounts of data with one another securely, they would be able to communicate with allied forces from other nations. **GMC**




*Ship to ship LPI/LPD communications. Photo courtesy Blu Wireless*

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*Intelsat equipment being used by Help.NGO in Haiti. Photo courtesy Help.NGO*

# Satellite provides crucial crisis connectivity

Speed, reliability, and collaboration are the critical communications watchwords when a catastrophic event occurs anywhere across the world. They can make the difference between life and death in many situations.

*Joel Schroeder Director of Land Mobile for Intelsat*

**A disaster can take shape in many forms -** most are natural, but some can be driven by human error or even behavior such as in warzones. Whatever their origin, they have potentially devastating impacts on communities and people. Speed of response is vital in these situations and reliable communications are a critical cornerstone to supporting emergency services on the ground.

Physical infrastructure such as roads, power grids, or buildings are often severely hit in disaster zones but so too are communications networks. Government organizations, first responders, non-governmental organizations (NGOs), volunteer relief groups, reporters, and other individuals need to have access to reliable communications to conduct their critical work.

This is where satellite technology has a vital role to play in terms of providing targeted, dependable, and seamless connectivity. An obvious advantage is that satellites beam connectivity from space and therefore are not impacted by the fallout of a disaster situation on the ground which can wipe out terrestrial networks and other communications infrastructure.

## Aiding first responders

One of the first actions in response to a disaster is the establishment of secure communications around an area as this allows teams on the ground to start to organize their plans. It also means local and remote personnel can be linked together and activities such as coordination of aid supplies or search and rescue missions can begin.

This was the approach in September of last year when Hurricane Ian struck Florida as a Category 4 storm causing widespread damage across the state. It was the deadliest hurricane to hit the state since 1935 and left much of Southwest Florida in chaos.

In communities where Hurricane Ian rendered cellular networks unavailable, satellite connectivity was crucial in arming first responders with a technology solution that enabled critical voice and data communications. This supported the deployment of essential personnel and mission-critical resources.

*L*ocals using Intelsat equipment outside The University of the South Pacific. Photo courtesy The University of the South Pacific

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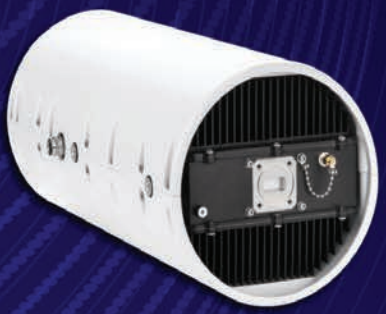

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*Joel Schroeder Director of Land Mobile for Intelsat*

In situations such as these, partnerships and collaboration are paramount in ensuring swift and targeted responses are possible. At Intelsat, we have worked extensively with HELP.NGO, an experienced international disaster response team trained to act quickly when existing communication networks fail in emergencies.

With our technology, NGOs all around the world can quickly be deployed to a disaster zone and have immediate access to reliable, ready-to-use, high-speed connectivity. From connected mobility solutions for vehicles to portable connectivity solutions for temporary network access in a fixed location, Intelsat and its partners have a range of services to meet connectivity needs in a disaster zone.

Users can establish an internet connection within minutes with minimal technical training required. As an end-to-end managed service, the solution is ideal for emergency teams that need to respond at a moment's notice. By decreasing network setup and knock-down time, NGOs, public safety organizations, emergency response agencies, and even remote broadcast teams around the world can focus on what matters most during a crisis—saving lives.

## At the ready

We also worked with HELP.NGO during the magnitude 7.2 earthquake which hit the Tiburon Peninsula in the Caribbean nation of Haiti causing severe damage to terrestrial communication networks. Once our team arrived at the earthquake's epicenter to assess the damage, high-speed internet was set up and used to support intelligence coordination for the United Nations with survey shots of topography and aerial images of multiple disaster sites. As a result, local authorities and government agencies were able to quickly determine where to deploy resources based on intelligence, video feeds, and photos gathered.

In some cases, satellite connectivity can combine with cellular networks to make a dramatic difference in a disaster situation. The eruption of the Hunga-Tonga-Hunga-Ha'apai volcano on 15 January 2022 was the largest recorded since the eruption of Krakatoa in 1883. The volcanic explosion and subsequent tsunami knocked out the undersea internet cables, disconnecting the region of 100,000 as residents sought higher ground with the onslaught of rising water and dangerously high waves.

For five weeks, the nation was cut off from communication with the outside world except for one university with a satellite connection.

The University of the South Pacific (USP) is a regional university with locations owned by 14 member countries in the geographic region of Oceania, including Tonga. Because of its wide reach of established campuses located on each island, the university makes sure there is always a reliable network for students and staff. In addition to the use of submarine cables, the university leveraged Intelsat's Ku-band satellite networks to connect to remote sites outside of the main campus.

The following morning after the devastating eruption, the university's network operator in Ha'apai took photos of the aftermath and posted them on Facebook. Word quickly spread that there was a working network connection at the campus in Ha'apai and people from all over the island started queuing up to connect to the network to send a message to family and friends.

The university's Ku-band connection on the Ha'apai and Vava'u islands in the central part of the nation of Tonga was the only network that was able to communicate with the outside world. Without the Intelsat satellite connection, no calls or messages would have been able to get out. Other satellite phone connections could not penetrate the volcanic ash cloud to send messages or make calls.

## One step ahead

Looking ahead, Intelsat is determined to continue to provide communications support where and when it is needed. Last year, we joined the Partner2Connect Digital Coalition. The coalition is a multi-stakeholder alliance launched by the International Telecommunication Union (ITU) and the United Nations (UN). Intelsat's participation creates new opportunities for telecommunications to make a positive economic and social impact in the world.

Under the pledge of inclusion, we have signed a memorandum of understanding (MoU) providing up to $500,000 of airtime, as well as the necessary equipment to be utilized during disaster situations.

Satellite connectivity is also playing a role in preparation for potential disasters. Some countries around the world are now using monitoring in remote locations to strengthen their ability to predict when a natural disaster might occur. This allows time for greater preparation and movement of local populations which could be impacted. Satellite also has a role to play in tracking migration movements which can be important in terms of disaster preparedness.

From a developing technology standpoint, multi-orbit connectivity will also play an increasingly vital role in disaster relief. Satellites at low, medium, and geostationary Earth orbit all offer different capabilities and benefits. How these technologies work together will be important in further ensuring those at the forefront of disaster response can work as effectively as possible.

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*Intelsat equipment being used by Help.NGO in Florida. Photo courtesy Help.NGO*

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Kristofer Alm, CMO, Ovzon

GMC Q&A

# Communications in a crisis

With ecological concerns more critical than ever, experts are intimately aware of all manner of natural disasters on our horizon. As consensus forms upon the increasing frequency and severity of catastrophes on our planet, emergency response organisations are eager to adapt to the ever-increasing scale of threat we face. Speaking to Kristofer Alm, CMO of Ovzon, we discussed how they've supplied the right technology to support these efforts, and how this worrying market may evolve in the years ahead.

*Laurence Russell, Associate Editor, Global Military Communications*

**Question: Climate experts are unanimous in their conclusion that natural disasters such as wildfires and drought will increase in frequency and severity across the 21st century, which puts a far greater strain on emergency services and specialist disaster response groups. What will be the connectivity demands of expanding these organizations to be strong enough to handle what's coming?**

**Kristofer Alm:** Yes, absolutely a lot of experts have published reports warning of a harsh future. This year has been filled with natural disasters that have surprised many. Emergency services work with four main phases: prevention, preparedness, response, and recovery:

- **Prevention Phase:** This phase focuses on preventing fires from occurring in the first place. This can include education and awareness programs, regular maintenance and inspection of buildings and equipment, and enforcing fire safety codes and regulations.
- **Preparedness Phase:** This phase involves preparing for potential emergencies, including developing emergency response plans, training emergency responders, and conducting regular drills and exercises to ensure readiness.
- **Response Phase:** This phase involves the actual response to a fire or emergency situation. Emergency responders will work to contain and extinguish the fire, evacuate people from the area, and provide medical assistance if needed.
- **Recovery Phase:** This phase involves the aftermath of the fire or emergency situation, including cleanup, assessment of damages, and the process of rebuilding or repairing any structures or equipment that may have been damaged or destroyed. This phase may also involve providing support and resources to those who were affected by the fire, such as temporary housing or financial assistance.

Ovzon T6 terminal. Photo courtesy of Ovzon

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Responders' main demand has traditionally been during the response and recovery phases. But we see an increase in connectivity demand in the prevention and preparedness phases. So yes, the demand is increasing and Ovzon SATCOM-as-a-Service serves these needs perfectly as we deliver a complete solution.

**Question: Last year you secured a 14-month Ovzon SATCOM-as-a-Service order with the Italian Fire and Rescue Service, leveraging the entire broadband capacity of one of your steerable satellite beams. You also offer customised mission-critical services like Ovzon Hero, Ovzon Go, and Ovzon Plus connecting mobile terminals to high-throughput service worldwide. Could you expand on their capabilities, and speculate on their suitability and affordability for relief missions, Non-Governmental Organisations (NGOs), and critical emergency response?**

**Kristofer Alm:** Yes, the Italian Fire and Rescue Service is the perfect example. We have been helping them during the landslide on the island of Ischia in Italy and lately during the earthquake in Turkey and Syria. Their contemporary needs are performance, mobility, and resiliency for these critical missions and as with the rest of the industry those needs are increasing in the other phases.

**Question: One of the most critical threats of natural disasters is the ensuing confusion as responders strive to recognize the nature and scope of the catastrophe. With the high-definition video your service provides, responders can get a moving picture of the situation ahead of in-depth data analyses. How do you enable and ensure a high-demand capability like that?**

**Kristofer Alm:** Video streaming is one of many kinds of new technologies that substantiate the increases in connectivity demand we're seeing lately.

The Italian Fire and Rescue had to use drones when they arrived on the island of Ischia to assess the situation and start to organize the rescue. They also needed to connect to other applications allowing them to communicate on the island with different rescue teams. They used an Ovzon T6 terminal to build a command center, so they were able to connect to their headquarters in Rome and start to send live video streaming from the drones. The headquarters was able to receive and analyse information quickly which allowed quick decisions and precise organization of the rescue efforts.

**Question: When fighting natural disasters, a well-equipped response is vital, but a far stronger weapon is prediction. Are your services appropriate for environmental monitoring and analytics purposes, so responders can prepare with comprehensive warning systems in place?**

**Kristofer Alm:** Technologies serving the prevention phase is a fast-growing sector with growing demand. We see an increase in the usage of technologies which need to be always on, and always connected, so the need for capacity and reliability has become a need to have.

The usage of sensors, and live streaming—both static, like simple cameras, and mobile like drones—has increased a lot. For example, we see more and more drone usage across prevention phase solutions. A couple of examples are control and maintenance for electrical lines or on-site measures at nuclear plants.

**Question: The ecological threat we face can surface anywhere on the planet, meaning we need to be able to see and react anywhere. You intend to launch the Ovzon-3 satellite this year, could you recap its history, and explain what it can do to help?**

**Kristofer Alm:** Addressing these ecological threats requires a comprehensive and coordinated global response which was one of the reasons why we developed the disruptive Ovzon 3 that will be launched later this year. Ovzon 3, with its new in-house developed on-board-processor, will bring unprecedented performance and functionality including a multitude of steerable

*Photo courtesy Ovzon*

beams that can be moved in an instant over the Earth when and where needed, regardless of whether it's travelling over air, land, or water.

Ovzon 3 enables ultra-small mobile satellite terminals with resilient high-throughput real-time data transfer capabilities that, with the connection of high-resolution sensors on land, sea, and air, significantly enhance the ability to monitor and respond to ecological threats, providing crucial information to inform policy decisions and support conservation efforts.

Some use cases examples:

- **Early detection and monitoring:** Imagery from sensors connected to Ovzon SATCOM-as-a-Service can help detect and monitor the development of natural catastrophes in their early stages.
- **Emergency communication:** During disasters, terrestrial communication networks can become damaged or overloaded, making it difficult for emergency responders to communicate effectively. Ovzon SATCOM-as-a-Service provides a reliable and resilient means of communication, enabling efficient coordination of rescue and relief efforts.
- **Damage assessment:** Post-disaster, information forwarded by our system can be used to assess the extent of the damage and identify affected areas, infrastructure, and populations. This information can help authorities allocate resources for recovery and reconstruction efforts more effectively.
- **Remote sensing for hazard analysis:** Ovzon's satcom capability can resiliently transmit large amounts of data in real-time from remote sensors that monitor hazards, such as changes in ground movement, temperature, or moisture levels. This information can help authorities identify areas at risk for future disasters and implement preventive measures.

**Question: From what you've seen delivering for disaster response end-users, what are their main priorities when equipping themselves with communications technology, and how do you expect those demands will evolve as we face increasingly serious disaster scenarios in the years ahead?**

**Kristofer Alm:** The demand will increase because the need for capacity, throughput and performance is increasing and will continue to do so. Nothing new here. I can also predict that the need for resiliency will be more and more important in future requirements.

Last but not least I believe that the need for mobility will also increase demand for smaller terminals because one of the rescue teams' weapons is to be able to move quickly to assess and report and by doing so save more lives. **GMC**


*Comms on the move. Photo courtesy Ovzon*

*Military teams using the SPX CommTech BLACKTALON Counter-UAS and COMINT solution, developed by TCI and ECS. Photo courtesy SPX CommTech*

# Countering UAS threats and strengthening critical communications in the modern battlefield

Communication and information are core to today's defence teams. As Unmanned Aircraft Systems (UAS) develop, they are enabling agile information sourcing, fueling this advantage. At the same time, increased development and has led to a proliferation of their weaponization causing all sorts of unauthorised disruptions. Applications and experiences are still underway. Alongside, there will undoubtedly be a set of new unintended consequences.

*Misho Tkalcevic, CTO and David Beckett, Business Development Director, TCI (part of SPX CommTech)*

**We are already seeing an increase in the** development of modern Communications Intelligence (COMINT) to keep up with the proliferation of UAS on both sides of the conflict. The physical threat has become three-dimensional and now demands persistent land-based teams to spend as much time looking at unmanned activity on the ground, as well as on the water, and in the sky.

The advent of 5G networks and 5G-enabled UAS means the utility of commercial systems will only continue to broaden. They're designed to operate in congested and contested environments where there is high interference and high volumes of usage across frequencies. This will increase the pressure and feed into the cycle of addressing the current threat and countering it before it swiftly evolves into the next iteration.

As a result, there's an unprecedented need for Counter-UAS (CUAS) solutions to enable defence teams to "find, fix, and finish" malicious devices in a strategic and cost-effective way.

One answer is Radio Frequency (RF) technology. RF presents the optimum platform to tackle UAS threats and adapt to what comes next. But why is this the case? How has it been deployed to date, and how will it continue to support military teams in the future?

## Data analysis for effective Counter-UAS RF defeat

The ongoing news of malicious drone deployments and open access to UAS offensive plans over the internet has increased the urgency for effective defeat systems. Solutions that cause minimal collateral damage make it possible to preserve components for post-defeat research and forensics. This is where RF advances are not only proving to be crucial in combating UAS, but also in understanding command and control in the evolving UAS landscape.

The value of RF solutions also lies in their extensive possibilities for rapid technical exploitation of the target. RF detection can be extremely useful in characterising and rapidly identifying signals of hostile UAS. Recording the RF profile of hostile UAS allows military teams to build a 'threat library' of data that can help automate future searches and identification of unidentified systems. This analysis is crucial in determining

the different levels of threat a specific UAS poses, and the response options to counter it.

As UAS have become more complex, their method of operation has become more diverse. In order to effectively defeat UAS, Counter-UAS systems should also include complementary detection sensors beyond RF. These include acoustic sensors, which identify the noise or sound of propulsion systems, or electro-optical systems that monitor movement within an environment. Together they form a comprehensive Counter-UAS system that doesn't solely rely on RF detection.

Access to real-time granular information is helping drive network-centric warfare to become data-centric, which is fuelling the need for critical COMINT across the battlefield. Teams with the most precise information from multiple sources will likely win and, to do so successfully, the information exchange must be instantaneous so that the best tactical and deployment decisions can be made.

## Meeting unexpected consequences and challenges

As experiences on the battlefield continue to evolve, unintended consequences and the dynamic challenges of UAS are being uncovered.

For instance, in modern peer-on-peer conflicts, operating in the RF space and emitting a signal to counter a UAS poses a real risk of revealing a team's location, meaning it is likely to become a target itself and put lives at risk. Furthermore, most of today's UAS rely on navigation systems like GPS, which can also be subject to disruption and expose navigation vulnerabilities. This in turn pushes the need for high levels of encryption that protect sensitive data.

While RF radars are specialised at identifying movement, it's often been a challenge to correctly identify an approaching threat – leading to a constant need to re-calibrate the systems to help capture drones that are travelling at increased or decreased speeds. While we continue to learn and adapt, technology has progressed to balance active RF radar and passive RF sensors for accurate UAS detection, identification, location, and tracking.

Another key challenge lies in how defence organisations appropriately prioritize and respond to a threat. Low-cost commercial UAS often are deployed in volume, whilst high-tech and high-cost UAS are used more selectively. Both can have a significant impact on the battlefield and the decision to use costly hard-kill solutions can create a dilemma. With a range of

*Battlespace team. Photo courtesy iStock*

scenarios in an increasingly complex environment, defence users are working hard to develop concepts of operations (CONOPS) and implement a multi-layered approach of weapons systems against equally multi-layered target sets.

In this context, despite its high initial expense, conducting an early investment in soft-kill solutions means these can be redeployed over time to help accurately identify the threat and determine the right level of response. The high rate of re-use and precision makes RF a key ally for teams on the ground. The surge in commercial UAS is leading to a greater influence on the future procurement of battlefield communications and applications to manage future tactical situations.

## New technological trends driving COMINT

Modern battlefield communications are becoming data-centric with new technologies and capabilities to support the development and execution of multi-domain operations – allowing the modern military to be more flexible in adapting and responding to threats across all domains in a coordinated

*Military teams using the SPX CommTech BLACKTALON Counter-UAS solution, developed by TCI and ECS. Photo courtesy SPX CommTech*

manner. Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) is at the core of this, and COMINT and UAS detection and defeat have an important role to play in the defence of that capability.

Artificial Intelligence (AI) will become omnipresent in all military capabilities whether it be in communications, intelligence, surveillance, target acquisition and reconnaissance (ISTAR), COMINT, or in weapon systems. Going forward we expect it will be much easier to approve the use of AI in a soft-kill Counter-UAS than it would be to include AI and remove the human element from a hard kill weapon system.

Additionally, satellite communications will continue to be more accessible through standards such as MUOS (Multiple User Objective System), a beyond-line-of-sight system that is much harder to detect, and much more resistant to interference. Most importantly, this system will have much higher capacity and availability to users on the ground than traditional satellite communications. We're also seeing mesh radios increase the robustness of information delivery as they're less prone to interruption in communications.

We also expect to see a move away from the heavy reliance upon satellite navigation systems which provide position, navigation, and timing information. Should the satellites not be available to provide position, navigation, and timing platform-based solutions such as inertial navigation, atomic clocks and oscillators will become increasingly more available and crucial on the battlefield.

Finally, although not a direct capability on the ground, we anticipate an increase in the ability of governments to adjust acquisition models to rapidly procure equipment at the speed of relevance. Any delay in the acquisition and deployment of a solution could render the system out of date when it reaches military teams on the battlefield. In this context, we are seeing NATO countries working towards avoiding vendor lock-in. This ultimately places users in the driving seat for the rapid optimization of their capabilities through modifications over the air – for instance, reprogramming systems to include new waveforms and crypto.

## Information will always be the key to effective Counter-UAS

Whether it's for commercial or military purposes, the timely flow and delivery of information is crucial. Whilst most technological adaptations come from present-day necessity, we are seeing a longer-term thinking of data distribution on network-centric communications. This also applies to optical communications, which are very hard to intercept but also extremely complex to use.

As "threat libraries" grow, they will lead to more and more data for AI and machine learning (ML) purposes to quickly identify new threats. With the growth in three-dimensional detection across air, sea, and land combined with 3D radars using RF technology, we can expect to see teams starting to merge information from various sensors to make more informed decisions – either fully automatically or semi-automatically.

Ultimately, striking a balance between accessibility and the right solution to use will determine whether there will be more disruptive technology on the horizon that reaches the battlefield and changes the landscape of UAS and Counter-UAS solutions. In the long term, we anticipate continued cross-pollination between commercial communications and military communications, which will continue to drive easy access to technology from a perspective of availability and use.

Like many companies, at SPX CommTech we're constantly looking at the market dynamics to understand where we invest in R&D and want to enable more software-defined functionality and performance which will allow teams to optimize their capability for a specific use when it is needed, as well as the flexibility and agility to rapidly re-roll or optimize equipment for other missions.

The aim is to be one step ahead of the world's next challenge and continue to inch closer to a smarter and more secure future for all. **GMC**

*Military teams using the SPX CommTech BLACKTALON Counter-UAS solution, developed by TCI and ECS. Photo courtesy SPX CommTech*

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James Kubik, Co-Founder and CEO, Somewear

Alan Besquin, Co-Founder and CTO, Somewear

GMC Q&A

# Connecting the innermost frontier

The world of connected wearables is still new to us, especially as civilian consumers, although the technology will almost certainly be ubiquitous in just a few decades time. Today, mission-critical operators are field-testing these emerging technologies in the most extreme conditions to prove their mettle and make them reliable enough for us all to rely upon. We spoke to James Kubik, Co-Founder and CEO and Alan Besquin, Co-Founder and CTO of Somewear Labs to discuss their latest experiments, and what they mean for the wearables sector.

*Laurence Russell, Associate Editor, Global Military Communications*

**Question: With the current still-maturing nature of the wearables and biometrics markets, many consider such applications a "nice-to-have" solution rather than a necessity. Of course, mission-critical applications have different requirements. Why do defence procurers need to invest in operator biometrics today?**

**James Kubik:** The most valuable asset on the battlefield is the operator, and our goal as technologists is to provide solutions that better ensure the operator's fitness to perform and provide actionable intelligence in real-time. Integrating easily digestible information from biometrics readings both increases the survivability of operators and provides leaders with information on the health and safety of their teams that would otherwise be subjective or non-existent.

**Question: It's Somewear Labs' goal to develop comms solutions with a more resilient PACE plan including autonomous failover capabilities. Could you explain what that entails and how you're pursuing it?**

**James Kubik /Alan Besquin:** We believe technology should be an enabler that fades into the background so operators can focus on what they do best.

Photo courtesy Somewear Labs

From the beginning, we've designed and built our system to be as simple to operate as possible. To achieve simplicity for the user, we've had to build a complex system behind the scenes. One example is Smart Routing, our capability that evaluates the communication pathways to which a user might have access and then autonomously routes data through the most efficient channel. This way, the operator doesn't have to expend cognitive energy on determining what network to use - the system takes that cognitive load off their shoulders.

**Question: You supported the Special Warfare Training Wing of the US Air Force in partnership with Guardian Premier Solutions to enhance operator safety in dynamic environments. With the common assumption that troops can relay chronic issues via radio, what more does always-on satellite biometrics offer?**

**James Kubik:** We are big believers in adopting a functional PACE plan. Radios play a key role in that and often occupy the primary slot for voice comms. However, when it comes to providing a reliable, resilient foundation for situational awareness, we believe a more robust solution is required.

Somewear's satcom solution establishes that reliable foundation, sidestepping the failure modes that common radio systems experience including range limitations, performance in mountainous terrain, and network congestion. The US Air Force and Guardian Premier Solutions experienced these challenges first hand and are the perfect case study to highlight how the resilient, satellite-enabled platform Somewear provides ensured that they could monitor their people across all operating environments.

Following the exercise, Pat Burgess, Director Future Ops - Team GPS at Guardian Premier Solutions remarked, "We knew where somebody was, but we didn't know how they were doing. The majority of the time, the operators at risk were out of radio range, which meant medical intervention would only take place once we realized an operator's position had been stationary for 10 minutes or more."

**Question: You're also invested in supporting the precision of HALO jumps using real-time location data transmission. Why have such operations gone unsupported in that capacity before now?**

**James Kubik:** Military free fall operations are as dynamic as they come. From the pre-mission planning to the aircraft operations to the jump itself, there are so many moving pieces and so much risk being managed across the team.

Most technology that these teams have had access to is either highly capable but cumbersome to set up and operate, or simple commercial technologies that lack the capability needed for this mission set. Somewear provides an easy-to-use platform that also has a robust feature set for managing individuals, multiple teams, and assets across land, air, and sea.

Kurt Kusterbeck, a Paraloft Operations Specialist who participated in our work told us, "Within seconds of jumpers exiting the aircraft and deploying their canopy, the safety crew is using Somewear to track if the jumper or whole jump team is going to make it to the desired point of impact under canopy."

**Question: 2D Recon is using Somewear technology to track jumpers in order to understand mission risks in greater detail. How will experiments like theirs contribute to better HALO operations?**

**James Kubik:** 2D Recon is an incredible example of how subject matter experts can dramatically improve operations with the right enabling tools. Before using Somewear, it could take them hours to find jumpers who landed off target. Now, they use Somewear to identify whether a jumper is off course while they are still in the air and deploy support vehicles to the projected landing location.

**Question: The collection, communication, and analysis of all this previously unseen data creates a processing burden for leaders. Do you believe the true power of biometrics will be unlocked by algorithms that draw their own conclusions from this information and execute timely responses autonomously? What are the types of responses and conclusions that could be drawn autonomously?**

**James Kubik / Alan Besquin:** In my eyes, the best commanders seek out the relevant information that they need to make the best operational decisions. What we're doing by integrating biometrics data is giving them a new lens through which to evaluate the health and safety of their operators.

Looking into the not-too-distant future, commanders will be able to leverage AI to help parse large data sets to seek out the insights they need to make better decisions. Technology will help paint a clearer picture from more (and better) data and reduce the time it takes a commander to act on credible information.

**Question: What are your expectations for the evolution of mission-critical biometrics in the years ahead? What are we on the cusp of, and what's further beyond the horizon?**

**James Kubik / Alan Besquin:** We see the adoption and implementation of this technology driving improvements in operator safety, operator performance, and post-service treatment - in that order.

The initial use cases have been centred around improving operator safety and we have already seen numerous examples of how this technology can empower operators to avoid or prevent conditions like heat stroke. Second, we see teams utilizing this technology to optimize their performance by understanding what conditions lead to maximum output. Lastly, we anticipate the proliferation of human performance and health data within these specialized environments will enable researchers and medical professionals to better understand the source of common post-service health issues. Our hope is this could lead to early detection and allow individuals to begin remediation early. **GMC**


*Photo courtesy Somewear Labs*

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