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ENHANCED SPECIAL OPERATIONS COMMUNICATIONS IN AUSTERE ENVIRONMENTS

How 5G and multi-access edge computing are about to transform how special ops teams operate in austere zones.

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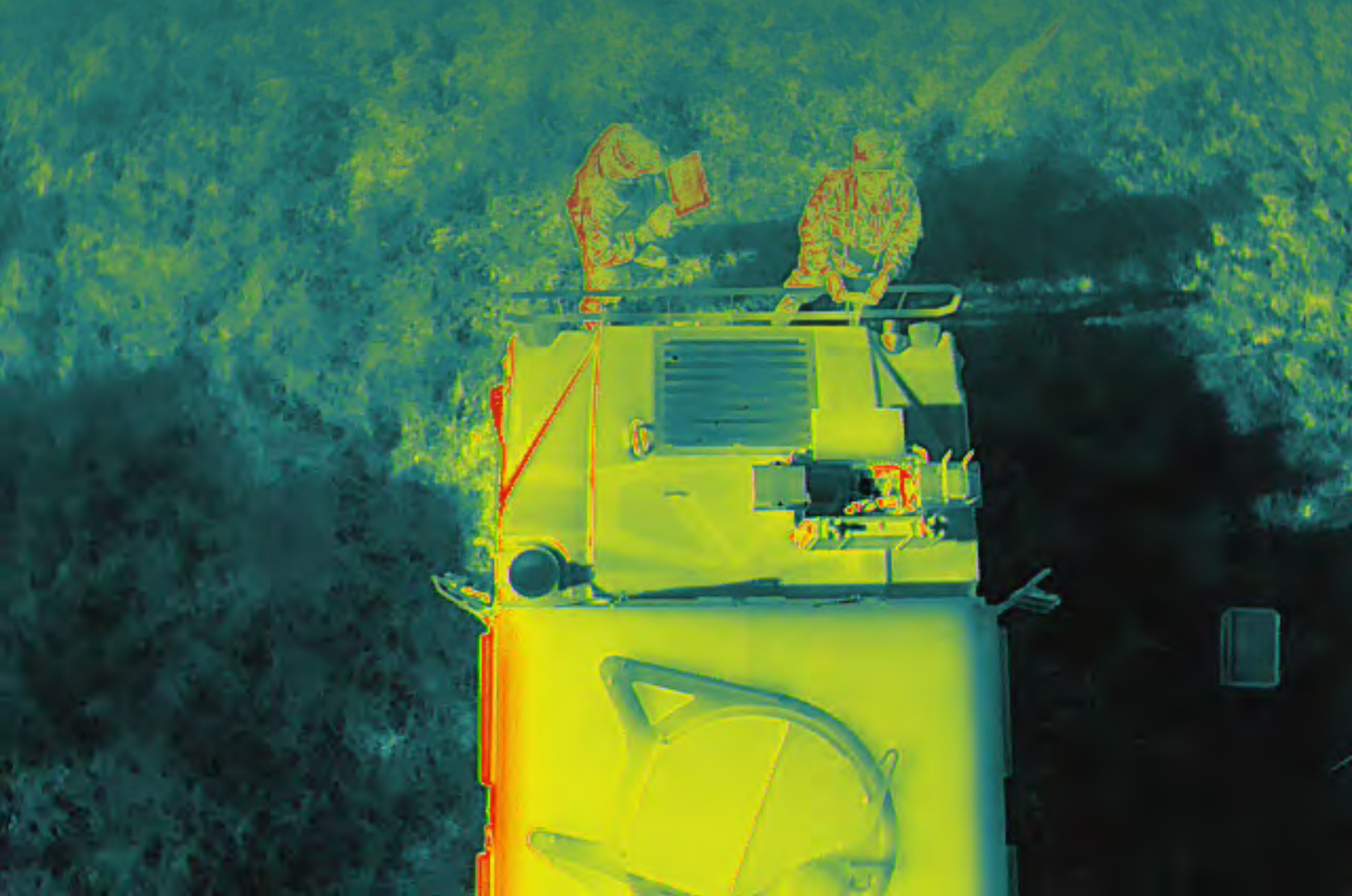

A U.S. Special Operations unit, flying by helicopter under cover of darkness, radios final coordination instructions to their regional command center at an undisclosed location. Their target is now just four miles out — and approaching quickly.

But in a familiar yet strikingly new scenario, the special ops team — and commanders at both the mobile command unit and headquarters — are also viewing high-resolution images and telemetry data of their objective in real-time as the helicopter nears its target.

The surveillance images are being relayed from a separate, uncrewed aircraft flying high above the helicopter, equipped with a new, 18-pound 4G/5G Mobile Ad-hoc Network (MANET) payload and satellite communications pod. The equipment allows those images and intelligence to be securely transmitted to the helicopter and a highly secure, government-accredited cloud to archive the data and perform post-mission analysis and debriefs.

As the helicopter reaches its destination and inserts the team, the special ops team members also notice a new level of networked communications and intelligence sharing capability. The MANET platform aboard the drone flying overhead has established a private 5G cellular network bubble roughly seven kilometers wide around their target area.

That cellular bubble enables the transmission of real-time surveillance and body cam video images, voice communications, and sensor data from every person on the team, including body orientation, impact and CASEVAC detection, biometric data and other tracking data. Had there been vehicles or other assets on the ground, the technology could also have monitored and remotely controlled those, despite being in a contested radio frequency (RF) connectivity zone.

Minutes later, after accomplishing their primary mission, the special ops team came to appreciate another significant benefit of a private 4G/5G communications platform flying overhead: its ability to rapidly upload and securely transmit gigabytes ofsensitive data to team leaders back at the regional command and control center. The data transfer via satellite connection wasn't previously possible at 4G speeds; now, it effectively eliminates the need of manually transporting hard drives after mission completion and gives command leaders much faster access to what could prove to be highly critical data for better decision-making.

And there's another benefit: The new generation of 5G gear — and the modern connected applications they enable at the warfighter's edge — are lighter, more powerful and more reliable than bulkier legacy radio gear usually needed on such missions.

As a result, each team member can move faster, aided with more in-the-moment intelligence. That added speed and agility can be crucial to ensuring mission effectiveness — and, most importantly, everyone's safety.

Accelerating situational awareness

As the above scenario describes, training for — and executing — routine military operations in austere or RF-denied environments can pose tremendous technical challenges. The same can be said for first responders and specialized teams when storms or disasters wipe out communications.

Modern, real-time situational awareness requires integrating vast amounts of data from personnel, vehicles, drones and support systems. But it also

involves setting up a wide range of underlying radio, satellite, GPS-navigation and communications support systems to deliver that information securely.

The communications challenges faced by Special Forces and other elite military forces are more complicated than most missions, given the uniqueness of their assignments, how fast they must move with lethality, and the unpredictability of the circumstances they encounter.

Consequently, the ability to fully integrate voice, video, surveillance, sensor and GPS data on the move, using multi-access edge computing (MEC) and private 5G network connectivity, has never been more essential or promising, says Troy Mitchell, a former U.S. Marine Corps intelligence officer with special ops experience.

"The clock is against you," says Mitchell, now a client partner for government at Verizon. These missions involve tremendous risks and uncertainties. Every second counts, involving the reliable integration of:

- **Voice communications** between individual team members, their insertion platforms and regional command centers.
- **Video and drone surveillance cameras** capable of capturing and relaying steady streams of low-light imagery to operators on the ground and decision-makers at forward command centers and headquarters.
- **GPS and navigation data** that are precise and secure.
- **IoT and sensor data,** monitoring the movement and well-being of hyper-enabled warriors and assets supporting the mission.
- **Command and control platforms** at Network Operations Centers (NOC) can integrate incoming data, analyze critical information and direct operators, weapon platforms and communications systems remotely.

"The faster special ops teams can observe, orient, decide and act (OODA Loop), the faster they can stay ahead of their adversary," said Mitchell.

"But the stakes keep getting higher as the amount of technology in the field — and the need for ad hoc mesh communications and orchestration — have grown." You have drones overhead. As hyper-enabled warriors, everyone is wearing devices for interconnected team communications.

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> *Client Partner, Government, Verizon*

You're also connected to regional nodes. And it all needs to function over, and adapt to, whatever radio spectrum is available in austere environments without being penetrated by adversarial capabilities," said Mitchell.

"Creating a private 4G/5G cellular bubble inserts a critical level of communications reliability in an otherwise uncertain situation. At the same time, when you've completed the raid or operation, you have a large amount of data on hard drives — what some operators call 'bricks' — that people want to expedite the decision-making process quickly… and support national security requirements. Having private 5G networks and edge computing capabilities, especially cross-domain to the classified level, the ability to access and make quick, tactical decisions about that data is a tremendous value to out-cycling adversaries' OODA loop processes," he said.

Inserting 5G networks in austere environments

Private 5G / MEC networks can provide a combination of customizable cell infrastructure, optional local storage and compute capability. They also utilize available radio spectrum and communications transport channels more effectively and efficiently for fast, secure and reliable connectivity. MEC adds the ability to process and share large volumes of data locally, where and when needed, and upload critical data via satellite to a secure cloud environment more seamlessly.

As importantly, 5G can give special ops teams the ability to create customized logical networks and partitions or network slices. This allows special operations units to establish secure, end-to-end network connections tailored to environmental spectrum and security requirements, including the potential transport of secret and classified data. Because 5G/MEC makes it possible to establish distinct, secure communication channels, it promises to give military leaders a superior platform for communicating and collaborating with allied partners and multi-national humanitarian organizations for global operations, training purposes or emergency response.

That can be equally valuable for agencies like FEMA and first responders globally, providing relief where power and communications systems have gone down and may take days or weeks to re-establish.

Erecting virtual bridges to the cloud

The ability to deploy a 5G network with mobile edge computing presents military and special operations commanders with another potential significant benefit: the ability to transmit data back and forth to remote cloud computing locations securely via terrestrial and satellite connectivity,

"5G combined with low orbital satellite connectivity makes it possible to erect secure virtual bridges from the edge to the cloud, giving decision makers a superior common operating picture that can literally save lives."

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Managing Partner, 5G Public Sector, Verizon

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according to Bryan Schromsky, managing partner, 5G Public Sector at Verizon.

"Transmitting high volumes of intelligence data bi-directionally between the 5G network and secure cloud platforms is critical to mission success for the special operations community," said Schromsky. "5G combined with low orbital satellite connectivity makes it possible to erect secure virtual bridges from the edge to the cloud, giving decision makers a superior common operating picture that can literally save lives."

In many situations, the lack of connectivity in austere environments — let alone the lack of high-speed throughput — can limit the ability to transmit data during an operation. With 3G, users historically expected network speeds up to 7.2 Mbps; with 4G or LTE, network speeds might reach 150 Mbps. That still makes it impractical to merge today's latest video surveillance and field intelligence with more extensive data pools or apply AI/ML tools to provide predictive analysis.

But with 5G network speeds of up to 1Gbps in certain circumstances, the ability to rely on secure cloud computing, not just edge computing — and deliver the Combined Joint All-Domain Command and Control (CJADC2) capabilities envisioned by Pentagon officials — is finally becoming a reality.

"With 5G, it's now feasible to inject cloud computing and AI capabilities into the decision-making process on the battlefield and give commanders a competitive advantage," said Schromsky.

The connected command of the future

Like earlier generations of wireless, radio and signal capabilities, 5G/MEC requires various telecommunications equipment, protocols and expertise.

Consequently, the Defense Department conducts a variety of 5G/MEC pilot programs, including a "5G Challenge" together with the National Telecommunications and Information Administration (NTIA) and other industry demonstrations to understand better what it will take to deploy 5G/MEC successfully.

The U.S. Army, for instance, is exploring how to modernize connectivity across their military bases with the adoption of 5G/MEC to develop

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> *Chief, U.S. Army’s Radio Frequency Communications Division*

“smart bases” that can wirelessly connect thousands of on-base IoT devices — including autonomous vehicles and drones — within the DOD’s network infrastructure.

Instead of carrying hard drives loaded with data across a runway, 5G, in theory, would give base personnel the ability to stream data instead, according to Dr. James Tucker Swindell II, chief of the U.S. Army’s Radio Frequency Communications Division, in a recent FedScoop panel.

That capability is coming fast and promises to dramatically alter how Special Operations teams and the military handle their data and, in turn, think about various operations, from logistics and troop deployments to how teams can improve the chances of mission success with soldiers safely returning home.

Find out more about how Verizon’s 5G and multi-access edge computing are poised to transform how military forces operate in austere zones.

This report was produced by Scoop News Group for FedScoop and sponsored by Verizon.

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