

National DEFENSE

SPECIAL OPERATIONS OUTLOOK 2021



Introduction To Special Operations Outlook 2021

By Jim Smith, U.S. Special
Operations Command
Acquisition Executive



large businesses, commercial or defense members of the industrial base — and drawing upon broader perspectives and new ideas, is essential to competing against different and more capable adversaries. Like the command we support, the strength of SOF acquisition is partnered operations. But sometimes we fall short.

A SOF leader recently took the time to relate to me his

strong support for one of our programs and his equal dismissal of another program. The difference? In the former case, he appreciated the program manager's overt outreach to the operators while in the latter case, he felt the program manager had neglected to truly understand the operators' perspective. The SOF acquisition process functions at its best when we — the government, industry and academia — partner to support our SOF commanders by working together.

Continues on page 4

Table of Contents

4 Introduction to Special Operations Outlook 2021

By Jim Smith, U.S. Special Operations
Command Acquisition Executive

7 Special Operations Forces Bracing for Arctic Missions

By Jon Harper

9 SOFWERX Exploring New Arctic Tech for Commandos

By Jon Harper

10 Need for Speed: SOFWERX Zeros In on Rapid Acquisition

By Mandy Mayfield

12 SOCOM Keeps Pushing for New 'Armed Overwatch' Aircraft

By Yasmin Tadjdeh

14 Industry Supports Special Ops With Lethality Enhancements

By Scott Gourley

16 Shadow Warriors Pursuing Next-Gen Surveillance Tech

By Jon Harper

18 SOCOM Shows Interest in Hybrid, AI-Enabled Vehicles

By Yasmin Tadjdeh

20 Air Force Enhances Special Warfare Training

By Yasmin Tadjdeh

22 AFSOC Wants to Divest Some Missions

By Stew Magnuson

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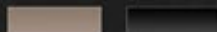


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Partnered Operations in SOF Acquisition

(Continued from page 2)

When Army Gen. Richard Clarke assumed the role of commander for U.S. Special Operations Command in 2019, he held a conference with all USSOCOM service component commanders, theater special operations commanders and senior enlisted leaders. Our leaders focused on drafting a clear, concise set of priorities that would apply across the breadth of the special operations enterprise.

The five priorities developed included advancing partnerships as well as competing and winning for the nation, preserving and growing readiness, innovating for future threats, and strengthening our force and families.

For members of the SOF acquisition government team, our job is to achieve these priorities in the acquisition space. As we work to advance partnerships, we not only think about how we

component commander panel, and we dedicate as much time to listening as we do to presenting as evidenced by the many one-on-one sessions offered with our program executive officers.

As partners in the acquisition space, the challenge we mutually face is one that we share with the operators we support. SOF are called on to conduct operations in the competition phase of international relations as well as enable the Joint Force in conflict. This wide breadth of responsibility requires our operators to be extremely agile and to think critically about how best to approach a problem strategically, operationally and tactically. There is no one-size-fits-all solution for SOF.

Likewise, we in the acquisition community must eschew the easy templated approach to acquisition. The techniques that have made SOF acquisition successful in the last 20 years supporting mainly counter-violent extremist organization (C-VEO)

operations are not the same techniques that will allow us to be successful for the next 20 years in strategic competition against peer competitors.

We often design acquisition strategies framed by the tradeoff between cost, schedule and performance. Against a C-VEO threat, schedule often trumped cost and performance. To support SOF in strategic competition, acquisition strategies will need to consider the trades between not only cost, schedule and performance, but also security. We need to secure and protect the technology, techniques and tactics that give our operators an advantage in competition and conflict. We need industry and academia to team with us on a more robust means of protecting information.

There will be no default priority among the four tradeoffs. Some-

times speed will be our strength but, other times, the need for greater security may require a more deliberate approach. In all cases, we will work with our partners to design the right strategy and communicate that across our partners transparently at the appropriate security level.

Not to sound too much like Dear Abby, but communication is the key to successful partnerships. To date, SOF has established many venues to communicate our requirements to industry and academia. We recently established Engage SOF (eSOF), an online tool for our industry and academic partners to submit proposals and receive feedback. Since its inception in September, we have received 140 submissions from 120 unique



can better team with foreign partners to share technologies and ensure interoperability among allies, but we also think about how we can better collaborate among the full breadth and depth of our industrial base and great academic institutions.

Events like this year's Special Operations Forces Industry Conference (SOFIC) are an opportunity to strengthen partnerships between SOF commanders, government acquisition professionals and industry and academic attendees to explore innovative solutions that will enable SOF operations in both the current and future operating environments. For this precise reason, we design the SOFIC schedule to hear from our commanders, to include Gen. Clarke's keynote address and the



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companies.

We have also maintained the Vulcan tech scout website for the Defense Department and interagency government partners. Currently more than 15,000 government users have access to over 8,000 scout cards on which they've performed more than 18,000 assessments. In the last year alone, 6,500 new government users joined, and industry and academic partners added 2,200 scout cards.

Our SOFWERX platform, in partnership with DefenseWerx, has led over 20 collaboration and assessment events since the beginning of the fiscal year and added 5,000 partners to the 45,000-plus members in their ecosystem.

Finally, and I know this doesn't make me "viral" by any stretch of the imagination, but over 2,700 partners are linked into the USSOCOM Acquisition Executive account on LinkedIn.

This year, we will simplify the number of different venues our partners navigate in order to partner with USSOCOM. We're establishing a new web-based entry portal to link the separate SOF venues together in the digital space. If before we could be accused of having too many "doorways" for entry to SOF acquisition, we'll now have one "foyer" — a web location where an industry or academic partner can enter, receive direction on how to proceed and have the opportunity to provide their information.

We'll also link together the back-end databases so that if you join the SOFWERX ecosystem, submit a Vulcan scout card, participate in a technical experimentation event, or propose a solution to us via eSOF, we'll know who you are and our program managers will have access to all of your interactions with a single query.

We need industry and academia's active participation and feedback. I encourage our partners to review USSOCOM's capability areas of interest and our science-and-technology hard problems listed on the USSOCOM website. How can you help us with our modernization focus areas: next-generation intelligence, reconnaissance and surveillance; next-generation mobility; precision fires and effects; data and networks; hyper enabling the operator; and biotechnologies? How can you help close the gaps in our science-and-technology priorities in areas such as special communications, tailorable lethality, electronic warfare, human performance optimization or data-enabled SOF?

I encourage you to use SOFIC or any of the tools mentioned earlier to engage with us. We want to open new paths of communications with partners who can help us achieve our commander's vision of USSOCOM transforming into an AI-enabled command by applying the best practices of the commercial base to the areas listed above.

The single most tangible artifact of our partnership with industry and academia is our contract strategy. Our government team has worked diligently over the past few years to build competency in each of the tools Congress and the Office of the Secretary of Defense have authorized for our use. We have found that Other Transaction Authority agreements (OTAs) allow us to partner with industry in a more tailored fashion to develop prototypes. Just three years ago, we conducted our first two OTAs; in 2019 we did seven; and last year we did 40. We're

executing nine OTAs already in fiscal year 2021.

OTAs are not the one-size-fits-all tool for SOF contracting strategies, but our rapidly growing cadre of agreement officers have now developed the confidence and acumen to engage in OTAs when we view that as the best means to support our commanders.

Likewise, we're early adopters of the Defense Commercial Solutions Opening (CSO) Pilot. This pilot allows us to partner to "acquire innovative commercial items, technologies, or services that directly meet program requirements."

We initiated our first two CSOs last year for two of our newest programs: Hyper-Enabled Operator (HEO) and Mission Command System/Common Operating Picture (MCS/COP). Interestingly, these two programs are also breaking trail on how best to partner with the operational units.

For our HEO science-and-technology effort, our team has partnered directly with 7th Special Forces Group by conducting frequent experiments to determine how best to provide cognitive overmatch to the individual SOF operator and small team at the remote, austere edge of the battlespace.

In the case of MCS/COP — a software intensive program that will follow the Defense Department's new software acquisition pathway — the program office is partnering with our Special Operations Command Central Command. We know that software development is highly iterative and requires direct and frequent feedback from end users to support an agile development process. The MCS/COP program is causing us to rethink partnering on every level.

As announced at last year's SOFIC, we created a new program executive office specifically chartered to develop expertise in software acquisition and to exercise the software acquisition pathway in a manner that will enable acquisition at a pace and direction that commercial software developers will be comfortable with. For both MCS/COP and HEO we've reached out to academic partners to bring in engineering and computer science expertise to support the government team. These programs will lead the way on how we — the government, industry and academic team — can more directly partner with the operators we support.

I'll fill in one of the blanks I mentioned in the beginning. The program the aforementioned "SOF leader" strongly supported is this HEO effort. Our partnering with industry, academia and the operators has provided strong confidence within the user community we support. As to the program he dismissed, we're getting that one fixed by applying lessons we've learned from the HEO effort and others.

Many of the terms I have discussed above were presented for the first time at last year's SOFIC. USSOCOM remains a fast-paced environment and there are sure to be new concepts presented this year. Likewise, much has progressed with our industry and academic partners and we want to hear from you.

I'd ask you to take advantage of the SOFIC forum. Ask us questions, present your ideas and challenge our assumptions in the acquisition space. I'm personally looking forward to it and, as always, thank you for your partnership in support of our SOF. **ND**

COLD FRONT

SPECIAL OPERATIONS FORCES BRACING FOR ARCTIC MISSIONS

BY JON HARPER

For the past two decades, U.S. Special Operations Forces have deployed to some of the most dangerous and inhospitable places on the planet to combat terrorist networks. With the Pentagon increasingly focused on great power competition, they may soon find themselves spending more time in a region that presents a unique set of challenges — the Arctic.

In 2019, the Defense Department released its latest Arctic Strategy, which noted the important role for special operators.

“DoD’s desired end-state for the Arctic is a secure and stable region in which U.S. national security interests are safeguarded, the U.S. homeland is defended, and nations work cooperatively to address shared challenges,” the document said. “The agile and expeditionary nature of SOF, combined with established

allied and partner relations and interoperability, provides DoD a ready capability to compete below the level of armed conflict in the Arctic region, and across the spectrum of SOF core activities.”

Special operators have played a central role in the post-9/11 wars conducting direct assault missions, the most famous being the 2011 raid that killed Osama bin Laden. But unless terrorist groups set up shop in the High North, SOF will play more of a supporting role in the Arctic using a wide range of skill sets, officials and analysts say.

U.S. Special Operations Forces include Army Green Berets, Navy SEALs, Marine Raiders, Special Tactics airmen and other elements.

“We do a lot of stuff, and frankly, the majority of what we are assigned in the SOF community are missions that are in support of the general purpose forces, who obviously in the Arctic will ... be the biggest chunk of the American activity there,” said Steve Bucci, a retired Special Forces officer and a defense analyst with the Heritage Foundation think tank. “Pretty much all of the missions we can do anywhere else, we can do in the Arctic; ... we’ll just do it in a lot colder environment with a lot more challenge to get it done.”

Missions could include special reconnaissance, calling in fires against enemy forces, and training with foreign partners.

They may also entail what the military calls “unconventional warfare,” a core capability of the Green Berets since their founding.

“If an adversary in the Arctic context, whether it be Russia or China, took over an area or was threatening an area that way, we could go and assist [allies] with unconventional warfare to help try and liberate” an area, Bucci said. “Or if they’re threatening it with some of their gray zone-type operations, we could put our guys in there to go in and do counterinsurgency or counter-unconventional warfare.”

While counterterrorism ops are unlikely, direct action missions aren’t off the table, he noted.

SOF might be told to “go in, blow up a radar site or some-



U.S. and Norwegian SOF conducting infiltration/exfiltration training with snowmobiles.

Army photo, iStock photo

thing like that that might be hindering our more conventional brothers and sisters” in the armed forces, Bucci said.

But there are unique challenges in a region where temperatures can drop to more than 50 degrees below zero.

“The Arctic environment is going to be pretty tough on special operations units,” Bucci said. Commandos will need to carry more equipment such as special cold weather survival gear, he noted. “And if you’re ... skiing or pulling Ahkios [sleds] and all that stuff, that’s really tough.”

Additionally, soldier equipment and platforms such as aircraft and ground vehicles might not function as well.

“Weapons first and foremost,” Bucci said. “The whole lubrication challenge changes. Lubricants that work at normal temperatures, when you get to really extremely cold ones, can actually cause malfunctions because they kind of gunk up ... and solidify.”

Having the right equipment, enough of it and maintaining it properly is critical, he added.

Communication can also be a problem, as high latitudes are not covered by satellites in geostationary orbit, and disruptions can be caused by icing on radio antennas or by heavy seas.

Beyond-line-of-sight comms can be challenging, noted Air Force Special Operations Command Commander Lt. Gen. James Slife.

“We just have to go back and relearn some lessons about different waveforms that we may have moved away from in the past, or exploring new waveforms and new frequency bands that allow us to communicate at long distance at those high latitudes,” Slife told reporters during a media roundtable.

Meanwhile, with the renewed focus on great power competition, AFSOC has “dusted off [mission sets] that we used to do as a matter of course and has fallen away since 9/11,” he said.

Special operators have a number of unique capabilities, he noted. For example, AFSOC combat controllers have the ability to establish and operate landing zones in difficult environments.

“We’re relearning how to operate ... in a way that allows us to rapidly rearm and refuel fighter-type aircraft from austere regions” so they can get back in the air and rejoin the fight, Slife said.

In January 2020 during the Emerald Warrior exercise in Alaska, Special Tactics airmen for the first time simulated seizing a forward area refueling point, also known as a FARP, and refueling fifth-generation aircraft in an extreme cold weather environment.

The effort involved aircrew with the 27th Special Operations Wing, a Special Tactics team and F-22 Raptors assigned to Pacific Air Forces’ 3rd Wing. An airfield was surveyed and secured while an AFSOC-operated C-130 aircraft refueled fighter jets parked on the ground, according to an AFSOC press release.

“Working with the newest and most advanced fighters in the Air Force provides [Special Tactics teams] the opportunity to maintain technological edge and develop the tactics, techniques and procedures needed in order to leverage their full capabilities ... [in] a challenging operational environment,” said a Special Tactics officer whose identity was not disclosed in the

release.

Meanwhile, Green Berets are retooling for Arctic ops.

In September, a 1st Special Forces Group airborne team participated in the Valor United 20 exercise in Alaska.

They honed their patrolling and survival skills “in some of the most unforgiving terrain in the United States,” according to an Army press release.

Key focus areas were Arctic, alpine and glacier movement, crevasse rescue, and long-range high frequency communications.

“In conflict with a peer adversary, U.S. forces may not come to rely on the same communication systems as in the Global War on Terror,” the release noted. “Both Special Operations Command-Pacific and the conventional force have identified the need for long-range radio communications skills to be able to transmit messages without interference from skilled, technically advanced opponents.”

During the exercise, Green Berets successfully transmitted high-frequency radio messages from remote camps in Alaska to Okinawa, Japan, more than 4,400 miles away.

They also practiced their special reconnaissance skills, built concealed surveillance sites and conducted long-range photography.

Select Green Beret teams “must be able to support themselves for lengthy operations in harsh Arctic or alpine environments without compromise by adversary forces,” the release noted. “As part of these operations, the detachment can be called to provide special reconnaissance for SOF or large conventional forces.”

The Army and its SOF component are taking another look at whether the current training paradigm at locations such as the Special Operations Advanced Mountaineering School in Fort Carson, Colorado, is sufficient. The school prepares Green Berets and other forces to survive and fight in harsh environments, and certifies them in advanced cold weather, high altitude and high-angle military mountaineering skills.

The Army in March released its new Arctic strategy, “Regaining Arctic Dominance,” which was developed with input from SOCOM.

“The ability to conduct effective and extended operations in the Arctic requires far more than just a set of specialized equipment,” the strategy said. “To develop a true all-weather/environment force capable of rapid deployment may require a modification in the role of the Combined Training Centers and Special Operations Forces Training Center in serving as culminating training events for Arctic-based formations.”

The service needs to advocate for greater access to the Arctic-focused schools of allies and partners for SOF as well as conventional forces, it added.

U.S. personnel are often deployed overseas to train foreign forces. But when it comes to the High North, training should work both ways, Bucci noted.

Special operators could “go to some of those countries that have a ton of experience working in that kind of environment — in fact, more than we do — and actually learn from them,” he said.

In March, U.S. Navy SEALs teamed up with Marines and Norwegian soldiers in an allied joint terminal attack controller training exercise near Setermoen, Norway. Forward deployed operators known as JTACs are tasked with directing combat aircraft for close-air support and other offensive missions.

During the joint exercise, they practiced calling in simulated airstrikes from U.S. Air Force B-1 Lancer bombers.

"The JTAC integration with foreign allied forces is important as it allows ... allied counterparts to learn how to operate together and make accurate calls for fire from supporting combat aircraft in the harsh Arctic climate," according to a Marine Corps press release.

In another example of partnerships in Northern Europe, U.S. Special Operations Command Europe and Swedish Special Operations Command have collaborated on a book called *ROC: Resistance Operating Concept*, published by Joint Special Operations University Press, which noted Russia's incursions into the Crimea region of Ukraine and its use of "gray zone" tactics.

Sweden and Russia are both Arctic nations, as are the United States, Canada, Denmark, Finland, Iceland and Norway. China considers itself a "near Arctic" power.

"European nations once again face threatening neighbors with potentially expansive intent," SOCEUR Commander Maj.

Gen. Kirk Smith wrote in the foreword to the publication. "Even those with strong alliances and friends do not necessarily have the power to prevent incursion."

The book takes a deep dive on methods of resistance — an aspect of unconventional warfare — that allied nations under threat can use to build resilience and fight back.

While technology is important, it's not a cure-all for the challenges that the United States faces in the Arctic, said Idaho University Professor Lilian "Doc" Alessa, a Defense Department advisor.

"The first SOF truth is that humans are more important than hardware," she said during a recent presentation.

Special operators have a unique ability to develop networks working with allies, the private sector and academia, as well as local populations and indigenous peoples, she said.

"They can vector in the right people at the right time with the right information and the right context to ... build the collaboration network" that is needed to improve situational awareness and cooperation in that region, she added.

"It requires working with communities in situ, viewing them as partners in the security and defense enterprise," Alessa said. "This is something that SOF was born and built to do and will be our key for ensuring that we adapt to the new world in the Arctic." **ND**

SOFWERX Exploring New Arctic Tech for Commandos

■ SOFWERX, a Tampa, Florida-based innovation hub, recently hosted a "Tech Tuesday" session in concert with U.S. Special Operations Command, which focused on current transformational technologies that could facilitate ops in Arctic climates. Selected organizations had the opportunity to virtually pitch their cutting-edge technology to interested government partners.

"Broadly, we looked at human performance," SOFWERX Director Leslie Babich said during a presentation in March. "Things that will keep you warm, things that will support your body structure and allow your energy [to be conserved]. ... You can do the mission a little bit longer, a little bit farther with the support of these technologies."

SOFWERX is also looking at communications equipment that would work well at high latitudes, as well as intelligence, surveillance and reconnaissance tools to improve situational awareness.

"ISR capabilities are going to be slightly different than what we're using now," Babich said without elaborating.

Other innovations on the wish list relate to energy and

power.

"A lot of operators are carrying around packs and packs of batteries, so any way we can take ... technologies and alleviate that load" is of interest, she said.

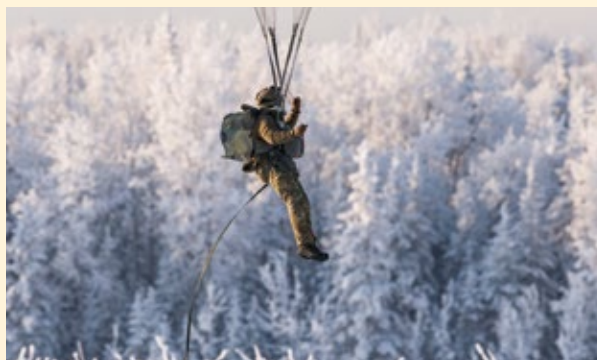
While Special Operations Command may need to acquire some additional specialized equipment for the Arctic, such as snowmobiles, it won't necessarily be building large stockpiles of expensive platforms for niche missions, noted Steve Bucci, a retired Special Forces officer and a defense analyst with the Heritage Foundation think tank.

Some items of interest, such as cold weather clothing, might be available in the civilian market. SOCOM can also piggyback off of the larger services that develop and purchase large quantities of equipment.

"We do it with weapons. We do it with clothing. We do it with vehicles," Bucci said. "You get more capability for your buck."

Special Operations Command and its industry partners can also modify or add capabilities to conventional forces' equipment to meet SOF needs, he noted.

- JON HARPER



A special warfare airman conducts airborne training in Alaska.

Need for Speed: SOFWERX Zeros In On Rapid Acquisition

BY MANDY MAYFIELD

An innovation hub linked with Special Operations Command is pivoting its efforts from discovering new technology to more rapidly putting capabilities into the hands of commandos.

The SOFWERX hub was stood up in 2017 under a partnership agreement with SOCOM to help solve challenging warfighter problems in collaboration with industry, academia and government stakeholders. Since its creation, the organization has set out to solve a number of issues and begun weekly virtual forums inviting creators to pitch their unique solutions.

SOFWERX Director Leslie Babich, who joined the Tampa, Florida-based center in late 2020, is realigning its efforts to focus on rapid procurement, not just tech discovery, said Brian Andrews, the organization's chief technology officer.

"We're going to really focus our efforts on the acquisition piece and how do we shorten that timeline from SOFWERX [developing] a proof of concept to getting it into the warfighters' hands," he said in an interview.

That includes everything from how the command can get the money to purchase a system as well as the sustainment, training, support, logistics and delivery aspects, he added.

Although SOFWERX is changing its priorities, it will still have efforts geared toward discovery, Andrews noted.

To walk lockstep with Special Operations Command, SOFWERX is closely aligned with the organization's program executive offices, Andrews noted.

"Those 11 PEOs ... are closely tied with SOFWERX and they work with us through what we call a collaborative project order," he explained.

The order allows the offices to give SOFWERX a broad, but complex, problem set that often does not have a single solution that can solve it. SOFWERX then takes those issues, puts together a team and facilitates discovery and ideation to fully define the problem and identify solutions, he said.

"That is kind of the magic of SOFWERX because we can put in a room an end user that has the problem; the acquisition folks that are going to plan out the money and the acquisition strategy; the academics; ... industry partners that might be able to provide a solution; and even the national labs or subject matter experts," Andrews said. "We sit there and kind of hash over what the art of the possible is."

The group also gets inquiries from components of SOCOM when they are facing a problem in a very specific area, Andrews said.

"We had a thing called warfighter nomination where they could go online and answer about five questions about their problem," he said. A team would then take the issues to the

command and ask if they should be worked on.

"Since then, it's become a little more formalized and now they give us research topics for our Tech Tuesday events," he said. "Then we go scout our ecosystem to try to see if there's someone out there to solve their problems."

The hub currently focuses on three different kinds of innovation: incremental, adjacent and transformational.

"Incremental" innovation focuses on making improvements to existing military technology. "Adjacent" innovation centers around taking technology from a different market and modifying it for the warfighter. "Transformational" innovation includes procuring game-changing capabilities.

To zero in on finding more transformational technologies, every week SOFWERX hosts "Tech Tuesday" events where industry and academia can join virtual forums to pitch their capabilities to SOCOM and other government partners.

"Tech Tuesday is our event where any group can submit — if they think they have a transformational technology — to us and then we align that with the component groups" for SOCOM, he said.

Meanwhile, SOFWERX has recently begun mulling over solutions to a perennial issue: maintenance.

Some of the maintenance procedures and tools the military uses are dated, Andrews noted. One example includes treating and maintaining the bottom of the hulls of Navy vessels.

"There's a lot of technology that's come out with ... biocides that are now environmentally friendly that will keep growth off the bottom of the ship," he said. The service has been using regular paint for decades, "so why not experiment with some of these newer biocide paints that keep the particles from growing on the bottom of the ship?" he asked.

Biocides are a chemical substance intended to destroy, deter and render harmless a damaging organism.

Although the hub is looking at how it can aid the maintenance of warfighting capabilities, it has also brought a number of new technologies to the military since its inception.

New technologies the organization has recently been working on include the Silent Tactical Energy Enhanced Dismount, or STEED. The platform is an all-terrain electrically powered cart that allows users to move equipment up hills, through waterlogged areas and even in subterranean environments, he said.

The idea came from Hendrick Motorsports, a North Carolina-based racecar company that pitched the capability to SOFWERX, which further developed it for Special Operations Command, Andrews said.

Another innovation SOFWERX recently procured is the goTenna. The hub discovered the capability online through a Kickstarter campaign. The individuals who created the product conceived of it after seeing the devastation caused by Hurricane Sandy in 2012 that left many individuals and organizations with degraded communication capabilities, Andrews said.

"They came up with this Kickstarter idea to make this tiny UHF radio that you could kind of pin on a backpack or wear in your pocket," he said. "It's about the size of a large stick of gum maybe, or a small makeup case."

The ultra high frequency radio can connect via Bluetooth

to a cell phone and allow radio communications over several miles, Andrews said.

The company now makes a military version that has encryption called the goTennaX.

"There is a whole team of guys carrying these that now have a low data rate communication device," he said.

Commandos operating on the side of a mountain in a remote area or in the middle of the desert far away from cell phone towers can use the system to communicate, all without the need of a satellite.

"It is an interesting success story of two entrepreneurs ... [creating] a commercial product, and then we brought them into the SOFWERX ecosystem and now they're selling military-type products to the end users," he said.

Andrew Hunter, director of the Defense-Industrial Initiatives Group at the Center for Strategic and International Studies, a Washington, D.C.-based think tank, said the internet literacy of innovation hubs such as SOFWERX is helping to bring more non-traditional players into the defense world.

Government acquisition is very process oriented, Hunter noted. Its procedure for procurement typically involves posting solicitations on government websites and assuming individuals and organizations who are interested in doing business with Uncle Sam will find them and submit a proposal.

"It is a little extreme to say that's all the government does because I think program offices will often reach out to people that they know might be interested and flag a solicitation for them or bring it to their attention," Hunter said. However, "that still kind of relies on people in the contracting office knowing who they think might be interested."

Therefore, the current process "heavily reinforces the fact that people who are in the [government contracting] business find out what's going on in the business, and people who aren't in the inner circle have a really hard time getting information or understanding it," he said.

This structure can create barriers for companies that don't have a history of working for the government, he noted.

Tech hubs such as SOFWERX, on the other hand, are often better at connecting with a wide range of innovators, he suggested.

"The advantage that a lot of these organizations that are innovation hubs have is they ... are more what I would characterize as digital natives," Hunter said.

"They were created in an era where all the modern tools of the internet existed and were accessible and they're not trying to adapt to modern life from archaic government systems that long predate modern life.

"They just have an advantage in outreach and in breaking through these barriers to industry and getting to a wider swath of people because they use things like Facebook, they use other avenues, more modern avenues of communication to reach out to industry and identify new sources," he added.

Another aspect that stands out particularly in the Special Operations Forces community is that leaders are very "aggressive" about facilitating outreach to companies they are interested in working with, Hunter said.

"As you might imagine with special operators, they don't sit back and wait for people to find them — they actively go out



A SOFWERX technician mills a metal plate.

looking for products that could be useful and they will start up a relationship," he said.

It's atypical for a government team to reach out to industry members that haven't contacted them, Hunter said.

Moving forward, SOFWERX hopes to connect with the other services' innovation hubs, national labs and other organizations by building unique capabilities to streamline the procurement of transformational technologies without accidentally duplicating efforts.

"There are a lot of people working on a problem that got solved in a lab two years ago — they just don't know who to ask, and that is a problem," Andrews said. "I don't know if it's necessarily a SOFWERX problem to solve, but we'd love to be a part of [trying] ... to figure out how all these innovation centers communicate." **ND**

SOCOM Keeps Pushing For New 'Armed Overwatch' Aircraft

BY YASMIN TADJDEH

Despite hurdles, Air Force Special Operations Command is still gung-ho about purchasing a replacement for its U-28A Draco manned intelligence, surveillance and reconnaissance platform that will also be able to offer air support to commandos on the ground in austere regions.

The system — known as Armed Overwatch — is envisioned as a commercially available, multi-role airplane that will contribute to Special Operations Command's counterterrorism mission at lower cost than high-end platforms, said SOCOM Commander Gen. Richard Clarke.

"This program will provide cost-effective, multipurpose aircraft to support operations in remote, austere areas for the foreseeable future," he said in his prepared testimony for a March hearing before the Senate Armed Services Committee.

In many remote areas, ISR assets are currently "stretched thin and come at high cost," he noted.

However, the Armed Overwatch initiative recently hit some roadblocks after lawmakers in the 2021 National Defense Authorization Act barred the command from beginning procurement this fiscal year as originally planned.

Congressional defense committees also asked SOCOM to conduct additional analysis to evaluate whether other material solutions or existing aircraft might meet the program's requirements, said Navy Cmdr. Tim Hawkins, a command spokesperson.

The command awarded a contract to RAND Corp. in November for the analysis, he said in a statement to *National Defense*. That study was slated to be completed at the end of March.

"We are wrapping up some of the back and forth between SOCOM and the defense oversight committees on the Hill," said Lt. Gen. James "Jim" Slife, commander of Air Force Special Operations Command.

Once the study is finished, the command plans to demonstrate an Armed Overwatch capability with industry in the coming months, he said during a media roundtable at the Air Force Association's Aerospace Warfare Symposium in February.

"We're on track easily to execute and complete our industry demonstrations before the end of this fiscal year," he said. "We're in really, really healthy shape on that right now."

Congress appropriated money in the fiscal year 2021 budget for Special Operations Command to continue research-and-development work on the program including the demo before AFSOC goes to a procurement decision, Slife said. Because of this, "I don't anticipate that we would get into aircraft procure-

ment until FY '22 at the earliest," he noted during a Mitchell Institute for Aerospace Studies event.

The command expects four to seven industry partners to participate in the demonstration which will showcase a spectrum of capabilities and ideas for how AFSOC can accomplish the Armed Overwatch mission, he said.

The command is interested in the same "general class of airplanes" as Sierra Nevada and Embraer's A-29 Super Tucano, Textron/Beechcraft's AT-6 Wolverine and Textron's AirLand Scorpion, Slife said.

"We have looked at everything from the existing Air Force platforms, both the ISR [and] close-air support platforms, to off-the-shelf industry platforms to non-developmental platforms industry has been working on [with] their own funding for the last several years," he said.

Slife said he would be open to including unmanned aircraft, such as the General Atomics-built MQ-9 Reaper, in the demonstration, though he noted that remotely piloted aircraft would likely face significant challenges.

"The only thing that's unmanned about the RPA business is the cockpit," Slife said. "There is a tremendous manpower that goes behind that. And when you look at where we intend to operate these platforms and so forth ... it needs to be a light footprint. It needs to be able to operate in remote areas in small ... disaggregated formations. And the MQ-9 is a challenging airplane from an infrastructure perspective."

The command is interested in any platform that can give commandos an Armed Overwatch capability, he said.

"I am not wedded to a manned platform," Slife said. "I'm not opposed to manned. I'm not opposed to unmanned. I'm just looking to get the mission done."

However, in a statement, Special Operations Command threw cold water on the idea that an unmanned platform could be used for the Armed Overwatch mission.

"The Armed Overwatch acquisition program aims to provide Special Operations Forces with deployable, affordable and sus-

tainable manned aircraft systems capable of executing close-air support, precision strike and armed intelligence, surveillance and reconnaissance requirements in austere and permissive environments for use in operations against violent extremist organizations," Hawkins said.

However, he noted that as part of the RAND study, the command is considering unmanned platforms that could offer commandos a "mix of capabilities" and be complementary to the Armed Overwatch mission.

Moving forward, Slife noted that support for the program varies across the defense committees on Capitol Hill. "Some are more supportive than others, but I think Congress is being prudent about this," he said. "Ultimately, I believe that SOCOM will be able to demonstrate to the Congress that this is a viable program and it's required for the future operating environment."

Slife said he is "cautiously optimistic" that the command



U-28

will be able to procure the platforms which could be useful in regions such as Africa, where threats to relatively slow-moving aircraft aren't as high as in other parts of the world where adversaries have advanced air defense systems.

The command is staying firm on its planned acquisition of 75 platforms, he said.

"That's where I think the sweet spot is, both in terms of being able to sustain the training base to be able to have a sustainable force generation model, and to be able to support the number of ground teams that we anticipate being out in these very small disaggregated environments where we anticipate the Armed Overwatch platform operating," he said.

A critic of the effort, Richard Aboulafia, vice president of the Teal Group, a Fairfax, Virginia-based defense and aerospace market analysis firm, said the aircraft that SOCOM is considering for the program would be too vulnerable.

"Survivability is just not great at all," he said. "There's a reason that no First World countries operate planes in this class."

Slife pushed back on that notion.

"As envisioned, it is survivable enough to operate in the environment that we anticipate it operating in," he said. "Clearly, we're not trying to build an Armed Overwatch platform that would be in a contested First World ... kind of environment. I mean, if we wanted to do that, the Armed Overwatch platform would be the F-35."

Aboulafia believes a better solution for the mission would be a combination of systems such as a next-generation drone known as the MQ-X, attack helicopters and a light-attack aircraft such as the A-10 Warthog that could be obtained from the other services, he said.

"SOCOM has never been shy about operating used equipment or other people's equipment," he noted.

Aboulafia was also critical of the number of aircraft the command wants to procure.

"I'm still not really sure how you could use 75 in the context of the broader SOCOM force structure," he said. "Most of SOCOM's fleet are smaller and frankly, more exotic, from the Wolfhound to the MH-47 to the MH-60 to the CV-22."

The fact that Congress asked the command to conduct further studies of potential alternatives suggests that the program will be "tremendously contested," he added.

Mark Cancian, senior adviser at the Center for Strategic and International Studies' International Security Program, noted that when the late Sen. John McCain, R-Ariz., was in charge of the Senate Armed Services Committee, there was much more support for light-attack aircraft.

"Congress has shifted ... to putting the brakes on what the department is doing," he said.

Based on congressional language, there is definite opposition to the effort, he noted.

"Looking at all of that, it's very discouraging," Cancian said. "Plus, this is a very different kind of program. ... The United States hasn't had a program like this ... since the Vietnam War,

when they had the A-1s doing exactly this mission — a propeller-driven aircraft designed to drop bombs on insurgents as a low-cost alternative to high-performance aircraft that had been designed for other kinds of missions."

Moving forward, AFSOC will need to garner backing on Capitol Hill to ensure that the program does not end up on the chopping block, Cancian said.

"Lining up congressional support is important and making the pitch to Congress ... has been their big stumbling block," he said of SOCOM. "They got it into the DoD budget" request, he noted. "They convinced DoD that there was a use here, and I think that the Air Force was relatively OK [with it] because of the argument that they didn't want to chew up F-35 lifetime on these kinds of missions."

John Venable, senior research fellow for defense policy at the Heritage Foundation's Center for National Defense, said SOCOM should be able to convince lawmakers that there is a need for the platform.

"You don't have to look very far to find the need. We lost several special ops folks ... [a few] years ago in Africa, because there was no air support," he said, referring to an ambush in 2017 near the village of Tongo Tongo, Niger, that left four American and four local soldiers dead after taking enemy fire from ISIS affiliated militants.

Armed Overwatch "is a direct linkage to that," Venable said. "The need is absolutely there."

Venable believes that a manned platform is the right choice for AFSOC.

"If you look at what ... a Reaper costs in order to keep top

cover over a small contingent of folks — and you have that capability 24 hours a day — you're going to need three or four drones," he said. "You're going to need at least two cycles of air crew that are on watch all the time."

The drones will also require runways that are pristine and debris free, whereas some light-attack aircraft can fly out of more rugged airfields, Venable noted.

Additionally, the areas in which SOCOM plans to use the aircraft will not be high threat environments where they will face surface-to-air missiles that are radar guided, he said. It's possible they could encounter shoulder-launched SAMs but there are countermeasures that light-attack aircraft could deploy, he added.

"You don't want to put aircraft and aircrew at risk unnecessarily, but when you have Americans [on the ground] that are doing their job and they are in harm's way, you're going to put everything you need" in the air to protect them, Venable said. "That's what airmen do and that's what we need to have the ability to do."

Lawmakers must act quickly to give AFSOC the capability it is asking for, he said.

"The SOF community does not need another study," Venable said. "They need to go out and grab these airplanes and start fielding them now to give their folks top cover. That needs to be urgent." **ND**



A-29 Super Tucano

Industry Supports Special Ops With Lethality Enhancements

BY SCOTT GOURLEY

From small arms modifications and related sighting systems to mounts for crew served weapons, industry is presenting U.S. Special Operations Forces with a broad range of potential lethality enhancements. The technology includes potential handgun “personalization” upgrades, variable power tactical optics, long-range sniper weapons, new Gatling gun designs and remotely operated lightweight weapon stations.

One element of SOCOM’s small arms inventory involves handguns, where in addition to new component programs like suppressors or new ammunition, industry is providing options for warfighters to “personalize” their existing weapon.

An example of this can be seen in the emerging Sig Sauer M18-X conversion kit, which exploits the modular design of the M17/M18 9mm handgun carried by some SOF elements.

“The ‘X’ conversion is kind of a horizon project for defense,” explained Jason St. John, director of government products in Sig Sauer’s Defense Strategies Group. “It will capitalize for the end user on the modularity of the M17/M18 and P320 platforms with an entire suite of grip modifications, caliber conversions and other accessories to allow the professional end user to personalize the pistol themselves.”

From a program perspective, St. John said the M18-X kit is “not something actively being pursued at the moment.” However, noting that many of the individual kit elements are appearing in a number of emerging handgun requirements, he added: “This would be an excellent way for the end user to capitalize on the modular aspects of this platform.”

More formalized program efforts can be found in the company’s TANGO6T variable power riflescope, a 1-6X variable-magnification scope that enables the user to engage both close-quarter targets and targets at extended ranges.

In November, TANGO6T was selected by the Defense Department for the Direct View Optic (DVO) in response to a solicitation to enhance squad performance with a variable powered riflescope. That award followed its earlier selection for the Squad Designated Marksman Rifle (SDMR) and the Squad-Variable Powered Scope (S-VPS).

“TANGO6T has a 1-6 power direct view optic in the second focal plane,” St. John said. “That’s compared to a traditional optic one might find fielded on military weapon platforms, which could be 1X powered red dot or some fixed 1-and-6 or 1-and-4 optics. The variable power on the TANGO6T provides the operator with the opportunity for increases in target engagement.”

Asked about specific benefits for the SOF user, St. John deferred, pointing instead to recent selection on both DVO and SDMR programs.

“It’s not just specific to SOF,” he said. “If you look across the entire tactical spectrum, a variable power 1-6X optic with an enabled BDC [bullet drop compensation] reticle increases individual efficiencies, not only from a target identification or target engagement standpoint, but also from increases in individual hit percentage derived from the optic itself.”

He declined to discuss specific delivery quantities but acknowledged that the company is “currently active and fulfilling the requirements of the program.”

SOCOM elements are also receiving two different sniper rifles under contracts with Barrett Firearms Manufacturing.

According to Joel Miller, director of global military sales at Barrett, deliveries were recently concluded on an unidentified quantity of the company’s Multi-Role Adaptive Design (MRAD) rifle in caliber “300 PRC” [.300 Precision Rifle Cartridge] for a Defense Department customer, while early 2021 witnessed the start of deliveries for the MK22 MOD0 Advanced Sniper Rifle. The MK22 allows conversion between three different calibers: .338 Norma Magnum, .300 Norma Magnum and 7.62mm.

“We received the first delivery orders for the MK22s for USSOCOM,” he said. “We made those first deliveries in January and we are continuing to make those at this time.”

In addition to application as Special Operations Command’s Advanced Sniper Rifle, Miller added that the company is in negotiations with the Army to have the MK22 system serve as the service’s Precision Sniper Rifle.

The ongoing fielding of MK22 sniper rifles serves to emphasize SOF’s growing embrace of the .338 Norma Magnum cartridge. In fact, the last few years have also witnessed interest by both SOCOM and the Marine Corps in a medium machine gun in that caliber.

In a more recent example of industry anticipating possible SOF interest in a new lethality capability, the 2020 SHOT Show held in Las Vegas featured the display by Dillon Aero of an “experimental” prototype for a .338 Norma Magnum Gatling Gun that was credited with the ability to fire 2,500 rounds per minute.

Apparent validation of the anticipated user interest occurred in March of this year, when SOCOM’s technology application contracting office released a sources sought announcement in an attempt to identify “potential vendors who have the necessary capabilities to provide prototype, demonstration, production, management and sustainment capabilities for a multi-barreled automatic gun weapon chambered in .338 Norma.

“The multi-barreled weapon shall be capable of being integrated onto a rotary wing aircraft, capable of being either mechanically fired or electrically driven (Direct Current), and serviced by an external magazine. The solutions offered must have a Technology Readiness Level of 6 or higher to be considered for this effort,” it added.

The 2020 display of the .338 Norma prototype was coordinated with True Velocity, a manufacturer of polymer cased ammunition that has been on SOCOM’s wish list for several years.

Nammo is another company working multiple efforts with Defense Department agencies to provide a lightweight polymer capability to multiple customers including SOCOM, the Army and Marine Corps.

Asked for an industry perspective on the benefits of polymer-cased ammunition, a company representative said: "The lighter weight has a far-reaching impact for the mobility and operational use of aircraft, boats and ground mobility vehicles — allowing commanders greater operational flexibility with increased performance of platforms and weapons systems. Using metal ammunition transfers heat that causes wear and tear, whereas polymer ammunition operates at cooler temperatures and without substantial heat transfer, resulting in extending the service life of a weapons system."

At the higher end of lethality capabilities, Kongsberg Defense continues to support special operations requirements through modifications and variants of its M153 series Common Remotely Operated Weapon Station (CROWS).

SOCOM has been a long-time customers for CROWS, said Scott Burk, vice president of land systems at Kongsberg Defense. "We have been providing them weapon systems support, training and overseas support for a number of years."

Burk characterized the SOF community as one of the principal customers for the new CROWS Technology Refresh capability.

"The Tech Refresh system was originally envisioned to be an obsolescence cure for legacy CROWS. However, in addition to taking care of all the obsolescence issues, a lot of users were interested in capability increases. Some of those capability increases were SOF specific and came directly from USSOCOM," he said. "Tech Refresh cures all the obsolescence issues but also provides the user with more computing horsepower, better sensor capabilities, better tracking capabilities, and a much more modern weapon station."

One feature of the new design is interoperable communications between multiple weapon stations.

"We like to refer to that as cooperative or collaborative engagement," Burk said. "Looking at a simple scenario, it allows you to use one weapon station to basically cue multiple weapon stations to engage the target. And that was definitely something that was of a principal interest from USSOCOM, since it provides significant bang for the buck."

The cooperative engagement capability has been extended beyond the tech refresh effort to a system that Burk says the company is specifically building for SOCOM.

"We refer to it as Lite III. It is a third-generation Lite system that is significantly lighter and smaller than CROWS," he said. "It's even man-portable. Completely loaded with all LRUs [line replaceable units], and weapon and ammo, depending upon your ammo loadout, you're talking about a weapon system that is less than 200 pounds. But ... it still supports a lot of the same caliber capabilities that come along with CROWS."

The design was originally envisioned to address the expanding .338 Norma Magnum ammunition requirements coming out of SOCOM.

"But I'm going to pat ourselves on the back here," he said.



.338 Norma Gatling gun

"Our engineers did such a good job in designing the system that we started going through testing and discovered that the system performed very well for .50 caliber as well."

Significantly, the design is also optimized to be provisionally supported from both legacy CROWS and CROWS tech refresh efforts.

"For lightweight robotics, small ground combat vehicles and transport vehicles, this is right up USSOCOM's alley," he said. "It's just a great weapon system design."

Although the Lite III system is not adopted by SOF elements, Burk said that it has been displayed on Special Operations Command's Ground Mobility Vehicle and would be used in "a couple of demonstrations in the not-too-distant future."

"There is one very interesting part about Tech Refresh ... specific to USSOCOM," he noted. "There is one component within USSOCOM, coming out of the Army side of the house, which is very interested in backwards compatibility of the weapon system. So they have made a determination, and the system is designed for this, that they would like to upgrade their existing systems by component and LRU attrition versus a full block swap."

"That was what took so long for Tech Refresh to be finalized and qualified: the backwards compatibility with standard M153," he added. "The result is that it gives customers two options: they can do a full block swap or as they attrit components, or LRUs, they can swap them out. Now we have one USSOCOM customer where we are starting the delivery of Tech Refresh capabilities, but we're doing it by attrition versus block upgrade."

Asked about any other weapon station activities that might be of interest to the SOF community, Burk pointed to CROWS integration with the Spike anti-tank guided missile.

The company recently conducted a demonstration in Slovenia, which is one of the contractor's foreign military sales customers for the CROWS Tech Refresh system. Spike has been chosen as an anti-tank guided missile by about 20 countries, he noted.

"We just did an integration and demonstration," Burk said. "The system that we did that on is a Kongsberg demo unit, but very close to CROWS. So that's something where we believe that, once [SOCOM] clears the current priority hurdles, they would be very interested in." **ND**

Shadow Warriors Pursuing Next-Gen Surveillance Tech

BY JON HARPER

U.S. Special Operations Command and the Intelligence Advanced Research Projects Activity are pursuing new technologies to identify and track threats.

Commandos rely on these types of capabilities when attacking terrorist groups and performing other critical missions.

"Intel drives ops," SOCOM Commander Gen. Richard Clarke said at a recent Senate Armed Services Committee hearing. "In order for us to compete more effectively in the future, we have to modernize both our precision strike and ISR ... so that [special operators] can quickly see and sense the battlefield that they may have to be fighting in."

Encrypted communications and electronic warfare capabilities are also critical to protect the force, he noted.

SOCOM's program executive office for special reconnaissance is responsible for pursuing these types of technologies.

The office's mission "is to lead the rapid and focused acquisition of state-of-the-art sensors and associated command-and-control, emplacement, recovery and specialized communication systems across all domains to enable total situational awareness for Special Operations Forces," PEO David Breede said in an email to *National Defense*.

Its technology portfolio encompasses technical collection and communication to include hostile forces tagging, tracking and locating; blue force tracking; tactical video systems for reconnaissance, surveillance and target acquisition; and remote advise-and-assist kits.

It also includes integrated air-, maritime- and ground-based sensor systems; signals intelligence processing, exploitation and dissemination; sensitive site exploitation with biometrics, forensics and intelligence analysis capabilities; and leveraging of national space-based technologies.

"We're really looking at operations in a near-peer and non-permissive environment," Breede said at last year's virtual Special Operations Forces Industry Conference managed by the National Defense Industrial Association on behalf of SOCOM.

Breede's top three priorities for technology development are advanced unattended ground sensors, flexible tactical radio frequency systems and collaborative autonomous platforms, he noted in his email.

"While reducing size, weight and power requirements of unattended ground sensors will always be a focus area, the key to modernization will be increasing onboard processing power, integrating alternative communication pathways, and improving interoperability with disparate sensor networks," he said.

Such technology can help commandos gather critical intelligence without having to put "boots on the ground" in dangerous areas and remote locations. They can also facilitate the

advising of foreign partners without SOF being "shoulder to shoulder" with them on the front lines, Breede has said.

To bolster communications, small tactical RF systems should become more flexible through not only software-defined radios, but also with frequency agile antennas and modularity across platforms and domains, he noted. SOCOM uses radios to transmit imagery as well as voice and text communications.

PEO Special Reconnaissance is also looking beyond today's remotely-operated intelligence-gathering systems and is eyeing collaborative autonomous platforms.

"Autonomy is crucial to the ability to operate in contested environments where traditional communication and navigation solutions may be challenged," Breede said. "Collaborative autonomy enables unmanned platforms to operate based on a shared understanding of the environment without active operator control in those contested environments."

Special Operations Command has high hopes that artificial intelligence and machine learning capabilities will help reduce manpower requirements for deploying robotic platforms.

"Today you've got an operator that's teamed up one-on-one with an unmanned aerial system, and it completely takes him out of the fight as he's maneuvering that" asset, said James Smith, SOCOM's acquisition executive.

"We are getting better ISR from ... the unattended ground sensors, the unmanned aerial systems," he added. "The problem is each one of those sensors takes an operator off the line. So how do we use artificial intelligence and machine learning to get those sensors to interoperate autonomously and provide feedback to a single operator to enable that force to maneuver on the objective?"

Autonomous drones or ground robots equipped with AI could be used to clear areas such as buildings or tunnels and free up SOF maneuver forces to be much more effective and efficient on the battlefield as they pursue their mission objectives, he noted.

Special Operations Command also wants to build upon the machine learning capabilities that were demonstrated by Project Maven, which utilized the technology to sort through a deluge of video footage collected by drones in war zones such as Afghanistan and identify items of interest, Clarke noted. The technology helped separate the wheat from the chaff and greatly facilitated intelligence processing, exploitation and dissemination.

"We can now pull in ... terabytes worth of data," he said during a panel discussion hosted by the Hudson Institute. "A human cannot sort through and sift through this in sufficient detail, nor quickly enough to get to the pertinent information. So I think that's an important part of what ... Project Maven has bought into this with object detection, so that humans can do only those things that humans have to do and try to get the machines to do all those other things."

Being able to speed up SOCOM's targeting cycle without requiring hundreds of analysts to examine intelligence is critical, he added.

Meanwhile, the Intelligence Advanced Research Projects Activity, also known as IARPA, has a new program to develop

next-generation surveillance capabilities for the national security community.

The organization, which falls under the Office of the Director of National Intelligence, invests in high-risk, high-reward research efforts that seek to overcome some of the most difficult technical challenges facing U.S. spy agencies.

The Biometric Recognition and Identification at Altitude and Range, or BRIAR, program aims to cultivate new software algorithm-based systems capable of performing “whole body” biometric identification from drones and other platforms.

“Many intelligence community and Department of Defense agencies require the ability to identify or recognize individuals under challenging scenarios, such as at long-range, ... through atmospheric turbulence, or from elevated and/or aerial sensor platforms,” according to an IARPA description of the program. “Expanding the range of conditions in which accurate and reliable biometric-based identification could be performed would greatly improve the number of addressable missions, types of platforms and sensors from which biometrics can be reliably used, and quality of outcomes and decisions.”

Mission applications of the technology could include counterterrorism, force protection, defending critical infrastructure and border security, noted program manager Lars Ericson.

However, the quality of imagery gathered by drones and other elevated surveillance platforms is often hindered by a number of factors that make it more difficult to accomplish biometric recognition, he said during a presentation to industry.

Atmospheric turbulence is a major problem that the agency hopes to overcome through the BRIAR program. “That introduces blur and distortion and intensity fluctuations due to dynamic changes in air molecules in ... that optical path between the target and the sensor,” Ericson explained.

Leveraging “probe video” footage also presents hurdles, he noted.

“In this case, you have different problems that are present in the imagery,” he said. “You have a very brief view of the subject of interest. It’s a severe look angle. There’s a high pitch angle there, and of course there’s motion and resolution challenges as well. And this would prove difficult to do accurate and reliable matching.”

While facial recognition — including long-range and “unconstrained” facial recognition — is a key capability of interest, the intelligence community needs “whole body” biometrics, he noted.

“There is a reliance on face recognition now,” Ericson said. “That’s not surprising. Face recognition has made significant advances over the last several years, but there was a benefit or a desire to be able to leverage additional biometric signatures or information in a given scene that can augment or inform or fuse with face [recognition] to improve your reliability and accuracy of those” matches.

That could include detecting and analyzing body shape,

movement, measurements, or other aspects of a human form for the purposes of recognition, identification, or verification.

For example, drones could watch a group of individuals walk across an area and try to pick out persons of interest using a variety of metrics.

“Motion, gait, perhaps body shape or anthropometric information — if you could leverage that or extract that ... that has promise to be able to improve the ability to do biometric matching.”

A capability known as person re-identification, or ReID, is also on the wish list. That includes systems that can identify the color and shape of an individual’s clothing, as well as their gender, age, hair style and items they might be carrying such as backpacks.

“ReID is a problem where you’re trying to identify other sightings of a person with different camera networks. Where else have you seen this person?” Ericson explained. “This work is a pretty hot topic in computer vision. There’s a lot of activity here and it’s primarily driven by the use cases around smart city and public safety” technology.

To be successful, BRIAR must advance multi-modal fused biometric signatures such as whole body identification, build on unconstrained facial recognition capabilities, and collect large amounts of relevant data, Ericson said.

Desired program “deliverables” include: image matching at long range (100 to 1,000 meters); matching at severe pitch views (20 to 50 degrees); atmospheric turbulence mitigation; multi-image templates from video; body and face localization in moving

video; cross-view whole body matching both indoors and outdoors; robustness against incomplete or occluded views; and multi-modal fusion, according to Ericson’s slides.

Solutions must be agnostic to sensor platforms and optics; adapt to edge processing and real-time streaming; accurate across diverse demographics and body shapes; invariant to pose, illumination, expression and clothing changes; and adapt or transfer solutions to be used in different platform-specific environments.

“The [technology] evaluation is going to be conducted on the aggregated evaluation sets that have images of subjects across a wide range of sensors and platforms,” Ericson said. “That’s how we’re going to fundamentally evaluate the statistical performance of these algorithms. And so they need to be agnostic or at least robust to the kinds of sensor platforms and optics” that will be used during testing.

The four-year program is expected to kick off in the third or fourth quarter of fiscal year 2021. IARPA hopes to transfer the technology to other government agencies after the project is completed. Its customers include the CIA and other intelligence agencies, the U.S. military and the Department of Homeland Security.

Historically, about 70 percent of IARPA’s completed research successfully transitions to government partners, according to the agency. **ND**



SOCOM Shows Interest in Hybrid, AI-Enabled Vehicles

BY YASMIN TADJDEH

Special Operations Command is experimenting with emerging technologies as it works to bolster its ground vehicle fleet with new capabilities.

The command's family of vehicles — which features 3,000 platforms — includes the Ground Mobility Vehicle 1.1, light tactical all-terrain vehicles, non-standard commercial vehicles and mine-resistant ambush protected platforms, said Navy Cmdr. Tim Hawkins, a SOCOM spokesman.

Special Operations Command is currently investing its research, development, testing and evaluation dollars for vehicles in lightweight armor, hybrid-electric systems, advanced situational awareness and autonomy/semi-autonomy, Hawkins said in an email to *National Defense*. It is seeking technology that maximizes mobility, payload and protection.

Last year, the organization and its industry partner finished production of the Ground Mobility Vehicle 1.1, a highly mobile platform that supports both lethal and non-lethal special ops missions.

The vehicle — which is manufactured by General Dynamics Ordnance and Tactical Systems — is “becoming a mainstay of our capabilities throughout the force,” said Col. Joel Babbitt, program executive officer for SOF Warrior, which oversees the command's vehicle portfolio.

The system offers SOCOM increased mobility including internal CH-47 Chinook transportability, he noted during the 2020 Virtual Special Operations Forces Industry Conference hosted by the National Defense Industrial Association.

Key capability areas of interest for the GMV include lightweight armor material, improved payloads, storage capacity, vehicle weight reduction, terrain-specific tire alternatives as well as command, control, communications, computers, intelligence,

surveillance, and reconnaissance integration cost reductions, according to Babbitt's slides.

Additionally, the command is currently building two GMV 1.1 hybrid prototypes to explore the usefulness of hybrid-electric technology, Hawkins said.

“We expect to conduct performance testing and gather SOF operator feedback this summer,” he said. “The results will help inform future decisions on whether to invest in outfitting the existing GMV 1.1 fleet with the technology.”

A spokesperson for General Dynamics said the company is not involved in the hybrid-electric prototype effort.

The command also plans to purchase hybrid-electric prototypes of its light tactical all-terrain vehicle in the coming fiscal year, Hawkins added. “The LTATV prototypes will be evaluated by the program office and SOF operators to help inform any future requirements and possible procurement of the technology,” he said.

The LTATV is a Special Operations Command-modified, commercial-off-the-shelf lightweight platform that can be internally transported via V-22s, H-53s and H-47s, according to Babbitt's slides. There are two variants including a two-seat and a four-seat platform. The vehicle is intended to perform a variety of missions including reconnaissance and medical evacuation.

Last year the General Services Administration awarded a multi-year contract in support of the command for the lifecycle replacement of its LTATV fleet to Polaris with a value of up to \$109 million.

Polaris offered SOCOM its MRZR Alpha platform, a lightweight vehicle with off-road capabilities that was purpose-built for the command.

Mark Schmidt, manager of defense programs at Polaris Government and Defense, said the company would be providing SOCOM with a hybrid-electric variant of the LTATV in year three of the program.

“We're really excited to test and field a vehicle like this with Special Operations Forces as it will open up even more operational use cases with a high level of export power and even quieter operational modes,” he said in an email.

The company leveraged work from its commercial product lines as it developed the new vehicle, said Shane Novotny, director of engineering at Polaris Government and Defense.

“The MRZR Alpha is engineered and designed to meet specifications and requirements that greatly expanded on the durability, payload and performance of the current LTATV, the MRZR Diesel,” he said.

The platform has a durable chassis, powerful drivetrain and modular vehicle design, he noted. It features an expanded exportable power system and can carry more payload.

“We've also increased the size of the cargo area by 60 percent and added greater functionality through the incorporation of a flatbed design that includes cargo tie-down rails for added adaptability,” he said. “For example, with the tailgate installed and flat, two litters can be secured without any modifications to the second row or its seating capacity.”

The vehicle is powered by an 8-speed automotive transmission and a 4-stroke, 118 horsepower turbo-diesel engine,



Ground Mobility Vehicle 1.1

Defense Dept. photo

according to the company. That provides 200 foot-pounds of torque. Additionally, the four-seat version includes 2,000 pounds of payload, run-flat tires and can reach top speeds over 60 miles per hour.

Earlier this year the company wrapped up the critical design review phase of the program, Schmidt said.

“Our rigorous testing and extensive off-road mission profile field evaluation miles ... [have] proven the MRZR Alpha’s performance and durability at extreme heat, in the cold chamber and when operating on desert sand dunes or rocky terrain at elevation,” he said.

Production of the platform will be followed by government durability and user testing, as well as air transportation certifications, he said.

Because the effort is an indefinite-delivery/indefinite-quantity contract, the number of vehicles is not specified. However, Schmidt said the company could produce 1,500 MRZR Alphas per year on its current production line.

Nick Francis, director of Polaris Defense, said the contract was structured in a way that did not limit the vendor from expanding on the vehicle’s capabilities, which allowed the company to exceed requirements in some areas.

“This was a great approach, because it doesn’t put a limit on a very qualified industry base,” he said.

Previous MRZR’s have been outfitted with a variety of payloads including counter-drone systems, direct-fire weapons, ISR systems and autonomy packages. Schmidt noted that with the Alpha’s increased payload capacity, exportable power and physical space, it is easier to incorporate a variety of payloads.

In year two of the program, testing and delivery will focus on an Arctic mobility package, Schmidt said.

This “includes a full cab enclosure and tracks,” he said. “This will greatly expand the terrain and environments the MRZR Alpha can operate [in], to include snow and ice.”

Planning is also ongoing to outfit the LTATV with autonomous capabilities, Hawkins said. The command is considering purchasing a few autonomous platforms in the coming fiscal year.

“We will then test the prototypes and conduct user evaluations to help determine the usefulness of the technology, which will also help inform any possible future requirements for integrating autonomy into any portion of our fleet,” he said.

Other artificial intelligence efforts include a data-logger system that collects vehicle operational parameters to help advise maintenance efforts, Hawkins said.

“Machine learning is used in this logger to help project managers and logisticians determine when a vehicle will reach the end of its economical usefulness,” he said. “This a key factor when making informed decisions on whether vehicles should be replaced or receive lifecycle extensions.”

Meanwhile, one new vehicle Special Operations Command has indicated it may be interested in pursuing is the Joint Armored Ground Mobility System, or JAGMS.

Currently, no formal acquisition process is planned, Hawkins noted. However, last year the command conducted a market analysis of the industrial base for vendors that could produce such a platform. That report is under review, he said.

In a request for information released last year, Special Operations Command said it was seeking industry input about an armored ground tactical vehicle that could transport nine to 11 passengers as well as be internally transported in a C-130 aircraft.

“The government is primarily focused on understanding the marketplace for commercial and non-developmental items and/or commercial items easily modified,” the solicitation said.

Mark Cancian, senior adviser at the Center for Strategic and International Studies’ International Security Program, said many of SOCOM’s vehicle programs are well suited for counterter-



MRZR Alpha

rorism and counterinsurgency operations, which the command has become known for in the past two decades. However, with the Pentagon emphasizing great power competition with advanced adversaries such as Russia and China, those types of platforms are not as ideal.

The other services are moving “toward armored vehicles because of the higher level of threat,” he said. “SOCOM would have to at least balance its vehicle inventory with some sort of armored vehicle that could operate in a higher threat environment.”

A heavily armored vehicle such as JAGMS could be particularly useful in great power competition, Cancian said.

Meanwhile, Special Operations Command is maintaining its fleet of mine resistant, ambush-protected vehicles, which consist primarily of SOF-modified MRAP all-terrain vehicles and RG-33-A1 platforms.

MRAPs gained fame during the wars in Iraq and Afghanistan after being rushed into the field to protect troops from roadside bombs.

“We are actively resetting those at this point in time and managing the obsolescence of them,” Babbitt said.

Areas of interest for the command include active reset operations, obsolescence management and sustainment cost reductions, according to his slides.

One of the largest vehicle programs for the military writ large has been the Army and Marine Corps’ acquisition of Oshkosh

Defense’s joint light tactical vehicle. Special Operations Command does not plan to purchase purpose-built JLTVs, Hawkins said, but is currently collaborating with the JLTV Joint Program Office and its user community “to determine the potential configuration and cost of a future JLTV ‘SOF-kit.’”

Babbitt noted that the JLTV will be brought into the SOF fold via the services.

“This is a service-provided solution from the Army, Navy, Air Force, Marines to their components within USSOCOM,” he said. “It’s a great capability and will certainly be a mainstay of our capabilities into the future.”

A potential future acquisition opportunity is a lifecycle replacement for the non-standard commercial vehicle fleet in the coming years, Hawkins said.

SOCOM uses the platform — which resembles regular trucks found on highways all over the United States — when they want to blend in with local populations overseas, Babbitt said.

“If you want to look like just another jingle truck, this is what you’re driving, except ours are armored, ... much better maintained and can go a lot of places that some of the local vehicles may or may not be able to,” he said.

Capabilities of interest for the current fleet include lightweight armor materials, lightweight vehicle components, C4ISR cost reductions and suspension technology, according to Babbitt’s slides. **ND**

Air Force Enhances Special Warfare Training

BY YASMIN TADJDEH

Special operators are known for tackling some of the military’s toughest and most grueling missions. With that often comes both physical and mental stresses that can wear commandos down over time.

To better prepare elite personnel for challenging environments, the Air Force is improving how it trains them through the use of innovative technology and techniques.

“Human performance experts and technologies are being used after the Air Force identified that Special Warfare candidates and operators were facing injuries and challenges that could be mitigated with upfront training,” Chief Master Sgt. Joshua Smith, Special Warfare human performance program manager, said in a statement. “Our goal is to provide our students with an agile training pipeline that provides tools and knowledge that helps prevent injuries during training and throughout their careers.”

The Air Force established the Special Warfare human performance support group in 2018 under the Special Warfare Training Wing at Joint Base San Antonio-Lackland, Texas.

“Our airmen are our greatest asset, and ensuring their health is essential to their success and the readiness of our Air Force,”

Smith said. “It is our priority to invest in our student’s mental and physical well-being during training and beyond.”

Lt. Col. Shawnee Williams, an aerospace operational physiologist and commander of the human performance squadron, said the organization examines how to optimize the performance, lethality, readiness and sustainability of what the Air Force calls its “special warfare human weapon system.”

“The human performance squadron combines research, technology integration, strength and conditioning, performance, nutrition, physical and occupational therapy and psychology,” she said during a call with reporters in November.

Just as the Air Force maintains its aircraft in a comprehensive way, it also needs to take care of its special operators, she noted.

“We hadn’t had up until now a really thorough programmatic review of how we look at the human weapon system, and teaching the students a comprehensive overview of performance, the proper way to fuel their body, how to healthily mentally cope with technique, and perform better and really be elite,” she said. “It’s not just about getting by, it’s about how you take it to that next step and train people for these fundamentally different environments that they’re going to have in the operational community and ensure that they know how to

cope with it.”

To do so, the squadron uses a number of different technologies to track the health and performance of trainees in real time and make appropriate adjustments, Williams said.

Officials examine fatigue and various physiological inputs from heart rate to core body temperatures, she said. They also look for asymmetries in musculoskeletal performance to determine if that could result in a trainee having a proclivity toward a certain injury; or if they are already hurt, what their recovery timeline might look like.

These devices help officials ascertain the nature of a particular injury, how they can best help the trainee recuperate, and what are the success rates of recovering from those types of injuries, she noted.

The Air Force’s Special Warfare Preparatory Course and the Assessment and Selection Course both utilize human performance technology. During the A&S course, trainees are equipped with wearable devices that track their health and help instructors make adjustments to training objectives.

“The goal is to push candidates to their limit, not to break them,” noted Maj. Lindzi Torres, Special Warfare human performance squadron operations officer. “By monitoring the performance status and health of each candidate, instructors can better tailor and plan training objectives in a way that test candidates’ abilities while mitigating injuries or delays in training.”

The devices also allow instructors in follow-on courses to access a trainee’s profile and view their historical data which includes injuries, training setbacks as well as health and performance information and trends, according to the service.

The squadron utilizes specialized bands that can track fatigue and also monitor sleep patterns, Torres said. It also has devices that can conduct hydration, sweat and metabolic testing.

“There are some new technologies that can actually measure energy expenditure in the field,” she said. “We have quite an array of technology.”

Each Special Warfare trainee is physiologically different and using body monitoring devices can help instructors tailor training to their specific needs, Williams said.

Over the next six to 12 months, the squadron will be working on changing the dashboards that display users’ data, Williams said.

“Sometimes you get programs that go into a unit and people are asked to kind of pick it up,” she said. “We don’t want that. We have the experts within our squadron to supplement that, manage it and harness that information so that it’s meaningful, because you can get a ton of data all day long and if you don’t have a way to interpret it and apply it, it doesn’t get you anywhere.”

The squadron is also working to increase the number of human performance technicians at some of its locations, she said.



Special Warfare trainees listen to instructions at Joint Base San Antonio-Lackland, Texas.

Torres noted that while wearable devices can provide a user with a plethora of health metrics, it is sometimes useful for individual wearers to not see that data on a day-to-day basis.

For example, trainers may ask users to fill out a wellness survey which will ask how the student feels and how they perceive their performance, nutrition or hydration.

“We [then] compare the objective technological data against the student’s data to see if there are any discrepancies,” she explained. “We were tending to find that the students thought that they were going to underperform because the device said they were going to underperform.”

Torres noted that the service is taking a “holistic” approach to the needs of trainees. For example, the Air Force established a special dining facility specifically for them.

Additionally, the squadron is working with other entities in the Defense Department as well as sports teams on its model, she said.

“We’ve seen a lot of successes and feedback,” she added.

The squadron is also thinking about how it can use technology to have trainees better leverage what they have learned already.

“We’re looking at ... how do we put in strength and conditioning workouts and what system do we use that allows those conditioning workouts to build upon themselves from the 18 to 24 months pipeline,” Torres said.

“It’s not just siloed events where they’re getting this instruction,” she added. “What happens at [Joint Base San Antonio-Lackland] then builds on each of the courses that they go to ... along the pipeline.”

Torres said the squadron is looking at technology such as a 360-degree “capture system” that tracks the physiological movement of trainees to predict where injuries may occur.

Officials are looking to industry for new, cutting edge systems that it can demonstrate within its trainee population, she said.

The Air Force is also refining its eight-week Special Warfare Preparatory Course which is required for airmen interested in joining the Special Warfare community. The course is complet-

ed following graduation of basic training.

"In the past, candidates arrived unprepared both mentally and physically for the rigors of the Special Warfare pipeline, which drove historical levels of high attrition," Chief Master Sgt. Todd Popovic, Special Warfare training wing command chief, said in a statement. "However, this course provides a firm foundation to educate and prepare each airman for what's ahead and has proven to decrease attrition in the follow-on courses."

Master Sgt. Michael Blout, superintendent of the course, said the Air Force is conducting better and more well-rounded training, which provides the service "with more capable operators straight out of the training pipeline," he said.

So far, the program is paying dividends and officials have seen an improvement in the health of its student body, he said.

"On a day-to-day basis, our airmen are better equipped, better trained both physically and mentally than they ever have been in the past," he said.

However, Blout noted that the effectiveness of the changes in the training process will best be measured in the long run.

"For us to effectively say that ... we have changed the game, I think it will be a little bit too early, a little bit presumptuous of us to say that" now, he said. However, "we're absolutely on the right track."

Blout — who has been in charge of the course since March 2020 — said it is constantly changing.

"In the world of sports medicine, nutrition, physicality, mental resilience — all of these are ever evolving and ... [we're] on the cutting edge of the forefront of trying to pioneer new TTP — tactics, techniques, and procedures — for how to train these young airmen, these weapons systems," he said.

The organization is "mapping" the successful and unsuccessful traits of its candidates, examining what works and doesn't work, and considering the right attributes a successful candidate should have, he noted.

The service is thinking about "what does a successful Special Warfare airman look like in the civilian realm, which will help us do targeted recruitment of individuals that we know are going to be closer to fitting the model of what fits into the Special Warfare or the SOF mold," he said. **ND**

AFSOC Wants to Divest Some Missions

■ A shifting security environment is forcing Air Force Special Operations Command to rethink its missions and relationships, its commander said recently.

"It's clear that we are at an inflection point as significant for us as Sept. 11, 2001 was. It's not marked by a singular event, but it is clearly marked by a shifting security environment," said AFSOC Commander Lt. Gen. Jim Slife.

The AFSOC of the future must be different than the one of today, he said.

"If you accept that proposition, and if you accept the proposition that we will have flat or declining resourcing with which to work, the only conclusion that one can come to is that we have to stop doing some stuff."

Some of the missions the command has undertaken over the last 20 years when Special Operations Forces were

heavily involved in the global war on terrorism will have to be reduced, or be taken on by other services, he said during a talk at the Center for Strategic and International Studies.

AFSOC flies the specially converted AC-130 gunships, CV-22 Ospreys and MC-130 fixed-wing aircraft used for exfiltration and infiltration, several models of small and medium-sized unmanned aerial vehicles, and about a dozen other specialized aircraft.

The 2018 National Defense Strategy emphasizes great power competition, and although counterterrorism missions will not completely go away, they are not the focus they once were, the document said.

"We have to divest to invest. We're not going to be able to transform ourselves if we don't stop doing some of the things that perhaps have been very dear to us for the last 20 years," Slife said. "They may not necessarily be relevant to the future." He described these missions as "commodity activities" requiring capabilities that are not necessarily unique to AFSOC.

"We're not the only people that do these things, but we've taken them on because maybe it was easier to do it for ourselves," Slife said.

Part of the command's shift will be a closer relationship with the Air Force, he said.

"What I can uniquely provide to SOF is the connective tissue to my parent service. And so I've been focusing pretty hard on looking for those opportunities to draw that connective tissue back a little more closely together between my service and the United States Air Force," he said.

— STEW MAGNUSON



Air Force photo