

Implementing CJADC2 Tech **AT THE**

DEFENSE DEPARTMENT

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From the editor's desk



Ross Gianfortune, Managing Editor

Connecting Everything, Across All Domains

Connectivity is critical for the military of the future and the present. To keep pace with the speed of war, the Defense Department has brought forward the Combined Joint All-Domain Command and Control (CJADC2) concept, adding on “Combined” to JADC2. The new term further emphasizes the collaborative roles that allies and coalition forces have in connecting assets across all warfighting domains and throughout the electromagnetic spectrum.

The military services are implementing these connectivity

capabilities. Some of the biggest shortfalls to conducting operations, according to Marine Forces Special Operations Command (MARSOC) specialists, are the complexities of having multiple systems and applications that don't talk to one another. The Air Force is trying to keep connectedness simple. Officials say that implementing the Air Force's contribution to the CJADC2 framework will need to focus on service's most integral needs.

With emerging technology at the forefront, the military is looking to connect everyone and everything on the battlefield. ✨

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Defense tech leaders describe wanting to remove 'one-trick pony' systems.

BY ANASTASIA OBIS

DOD's JADC2 Concept is Now CJADC2

Military leaders want to emphasize the 'combined' nature of the joint strategy.

BY JORDAN MCDONALD

There's a somewhat new, but familiar, acronym with a foothold in the defense community. CJADC2, or Combined Joint All-Domain Command and Control, was out in full force at the annual AUSA conference in Washington, D.C. in October.

Introduced earlier this year, the term is somewhat of an update to JADC2 — the military's concept to put actionable data in the hands of the warfighter and improve decision-making.

Putting the 'Combined' in JADC2

According to a Defense Department strategy document, CJADC2 will “empower our joint force commanders with the capabilities needed to command the joint force across all warfighting domains and throughout the electromagnetic spectrum to deter and, if necessary, defeat any adversary at any time and in any place around the globe.”

The “combined” term emphasizes the role allies and coalition forces bring into the strategy to bring all military action and coordination under one umbrella.

Defense officials see a united collective network key to enabling



commanders to be able to make quicker decisions on the battlefield and coordinate those decisions across domains of land, air and sea. The network will also enable better coordination with the nation's coalition and ally partners.

The name rebrand does not change anything about the strategy itself, but



rather puts the notion of a collective effort at the forefront.

“Zero trust, data centricity, mission partner environments, interoperability and defensibility. Those are all foundational concepts of CJADC2 to execute globally integrated operations around the world,” said Col. Anne-Marie Wiersgalla, communications director at SouthCom, at AUSA.

“You have to build synergy, not just joint cooperation after joint cooperation,” Army Futures Command Commanding Gen. John Murray said back in 2020. “It has to be joint synergy across all warfighting domains. And, I would add, it has to be done with our closest allies and partners. ... We won’t do it without other nations along with us as well.” 🌟

To Modernize Command and Control, Air Force Wants to Keep Things Simple

“Complexity...is going to kill us,” Brig. Gen. Luke Cropsey said. “The more complex your environment is, the simpler the rules of engagement need to be.”

BY ANASTASIA OBIS



To manage the complex architecture of delivering a system that connects a wide range of assets and advancing on developing the battle networks of the future, an Air Force official said the service needs to start simple instead of trying to “boil the ocean.”

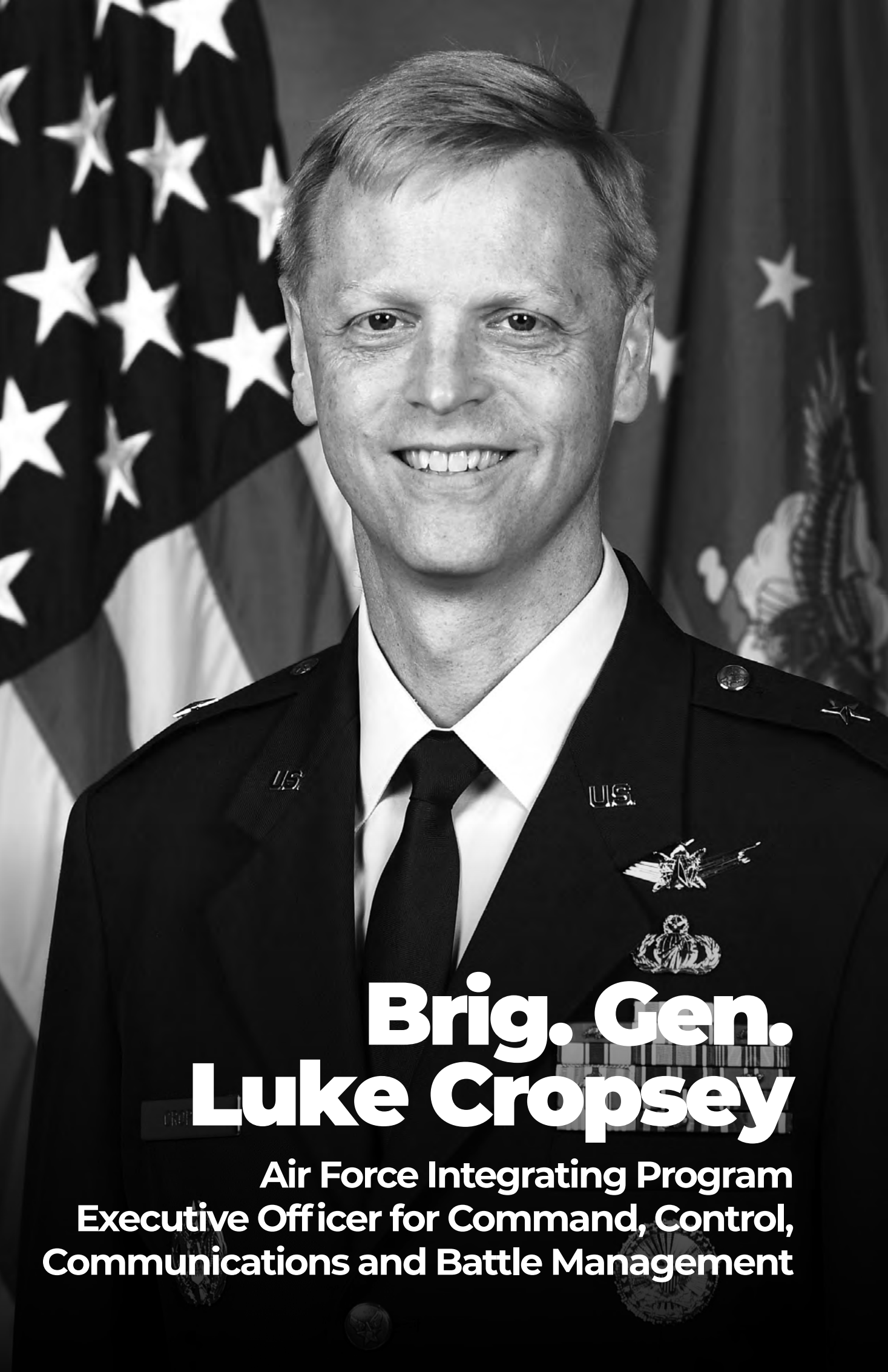
Brig. Gen. Luke Cropsey, the Air Force’s integrating program executive officer for command, control, communications and battle management (C3BM), said that the core challenge the service is facing is the complexity of designing a system in which sensors and shooters are connected and data is available to successfully execute the mission.

“The number one problem that we’re trying to figure out how we keep our heads wrapped around when it comes to the C3BM job content is really, at the end of the day, this problem with complexity,” Cropsey said at the Life

Cycle Industry Days conference in Dayton, Ohio, in August 2023.

“How do we, as an enterprise, and when I say the enterprise, I’m literally talking about everything from the requirements side of this business, what we do on the acquisition piece to this, how we budget. ... How do we keep our heads wrapped around all of the moving pieces that we have to be able to effectively manage and control for? Complexity in this space ... it’s going to kill us if we don’t figure out how we’re going to deal with it. And we have to deal with it effectively,” Cropsey added.

Cropsey is responsible for executing the Advanced Battle Management System (ABMS), the Air Force’s contribution to the Defense Department’s joint all-domain command and control initiative (Defense Department’s CJADC2 initiative). He said that it is imperative to go to the basic rules of engagement in order for his office to build the architecture that addresses integrated kill chains



Brig. Gen. Luke Cropsey

**Air Force Integrating Program
Executive Officer for Command, Control,
Communications and Battle Management**

and focus on command and control (C2) only, or the office will “collapse under its own weight.”

“Another doc by the name of John Gall ... made this very famous statement ... where he said, ‘look, every complex system that works is invariably a result of a simple system that worked. And a complex system that you try to design from scratch is never going to work,’” Cropsey said.

“How do we make a simple system that’ll work? And then once we have a simple system that will work, how do we build the complexity around that to the point where we can start layering that together and actually get to the end-to-end capability that we need to have?” he added.

Cropsey said that the first analysis of what the initial architecture of integrated killed chains was delivered to Air Force Secretary Frank Kendall in a June quarterly update and that the details will be delivered to “anybody with the right security clearance” this fall.

“I’m working right now with the Navy and the Army to see if we can collectively do something together on that front so that we are not ... splitting you [industry] all up in different ways and in different places,” said Cropsey.

Given this complex environment, Cropsey said his office is following four basic rules to design an architecture required to implement the DOD’s CJADC2 concept. The first rule is understanding the operational outcome that needs to be achieved and the C3BM team works closely with the ABMS cross-functional team in charge of defining the operational problem space.

“The first principle that we have on the C3BM front is that we have to have alignment around the operational outcome that we want to achieve. If we don’t have operational alignment on that problem, then we are not going to get to the point where any of the rest of this is going to matter because there’s just too many cooks in the kitchen when it comes to how everybody sees the problem and all the different prospective ways that you can potentially solve it,” Cropsey said. (ctd.)



The second principle for Cropsey's office is that they "do all of C2" and "don't do any more than C2."

"You have to have an end-to-end perspective across the entire C2 problem, you can't cut it short. But if you allow all of that solution to creep further out into the rest of the enterprise, you're going to collapse under your own weight," said Cropsey.

The third rule is prioritizing architecture over a specific product, while the fourth principle is being able to continuously deploy capability over time.

"One of our basic tenets here is that a simple, incremental and iterative approach is the one that's gonna win this one. Big bang acquisitions have proven to fail, historically, time and time again in this space," said Cropsey.

"When we sit down with the ABMS CFT team, and I'm talking to the battle managers on that team, there is a very visceral real mission requirement when it comes to their ability to make enough magic happen on the floor of an AOC are out there in the CRC to make sure that our guys and gals were coming home from that engagement," he added. "The amount of magic they have to do right now in their heads is ridiculous. And they're just looking for some help with regards to how they manage that, how they actually affect those decisions in a way that doesn't require them to do it all in their head." ✨

“The first principle that we have on the C3BM front is that we have to have alignment around the operational outcome that we want to achieve.”

— Brig. Gen. Luke Cropsey, Air Force Integrating Program Executive Officer for Command, Control, Communications and Battle Management

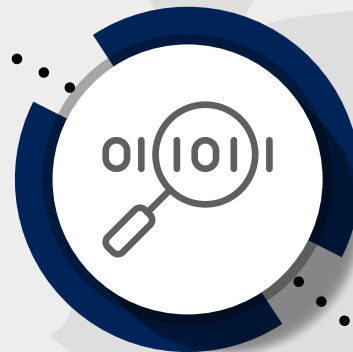
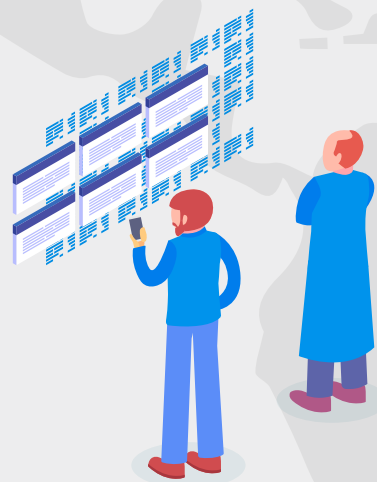
CJADC2 Lines of Effort

In order to fully realize the concept, the Defense Department’s strategy established five lines of effort toward implementation. Each links multiple tasks and mission toward the CJADC2 framework using the logic of purpose-cause and “effect-to focus” efforts toward establishing operational and strategic conditions.

STEP 02

Establish the Human Enterprise

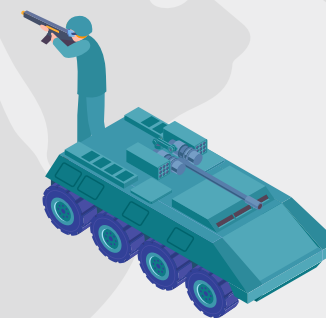
Because of the potential points of failure, the Joint Force places a specific focus on human performance while using innovative tools like AI within CJADC2.



STEP 03

Establish the Technical Enterprise

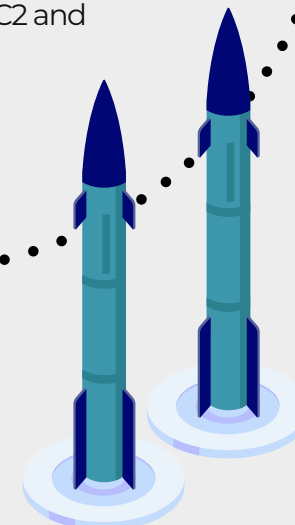
This LOE addresses the transport infrastructure of the CJADC2 ecosystem and provides the essential minimum necessary features, including communications system resiliency and diversity, multi-level security and elimination of single points of failure.



STEP 04

Integrate NC2/NC3 with CJADC2

Where necessary, the CJADC2 approach will collaborate and Integrate with Nuclear C2 and Communications.



STEP 05

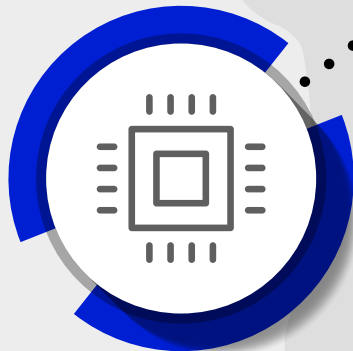
Modernize Mission Partner Information Sharing

Using a continuous framework, the CJADC2 approach must attempt to establish and maintain a common understanding of the operational environment through shared situational awareness with partners.

STEP 01

Establish the Data Enterprise

The Joint Force and its partners must be able to discover and access any data from all warfighting domains and at all levels of warfare to accelerate decision-making.





Data at Mission Speed for CJADC2

The Defense Department's effort to effectively operate in multi-domain operations requires concerted solutions around technology and cybersecurity.

What are the challenges the Defense Department faces in realizing modern multi-domain operations?

Silver & Sanchez The key goal of CJADC2 is to leverage data across the battlespace quickly and effectively. This is no small undertaking. One of the biggest challenges is keeping pace with the volume and complexity of data in modern warfare and to defeat adversaries decisively.

There are also technology challenges around data interoperability between the armed forces, other nations and partners. The data also exists in different formats, and effective data management and integration — with rising data sources from sensors, systems and platforms — is paramount.

Of course, there are always cyber challenges when you open up the data, along with the need for



Michael Sanchez ▶
Army Solutions Executive at
Software AG Government
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“We look forward to seeing the benefits of CJADC2 come to life, where the right information is being delivered to the right person at the right time to make the best decision at the speed of relevance.”

zero-trust architectures for various weapons systems.

There are also many non-technical challenges, which include change management, cost and budget, as well as the need for workforce training. In addition, there will be a need to make weapon systems more open, and there's no one existing system for all command and control. Bringing network communications to the tactical edge will also be challenging.

 **What are some of the recent advancements you've seen helping in this journey?**

Silver & Sanchez From a use case perspective, there are plenty of opportunities for CJADC2 success, which are improved situational awareness, rapid decision-making, and advancing logistics and supply chain efforts.

Data integration is also a key opportunity for CJADC2 success. Through data integration, it is possible to connect and harmonize data from various sources, regardless of format or location. The data collected from land, sea, air, space and cyber domains can be efficiently integrated, ensuring military leaders have a unified and up-to-date picture of the battlefield.

 **What do you look forward to over the next year?**

Silver & Sanchez We look forward to seeing the benefits of CJADC2 come to life, where the right information is being delivered to the right person at the right time to make the best decision at the speed of relevance.

This will address the department's challenges around improved situational awareness, interoperability and decision-making across all branches of the military and domains.

As a current, active provider of solutions for data integration, Internet of Things (IoT), streaming analytics and process mining, our organization is poised to make a significant impact on CJADC2 initiatives.

Our data integration solutions provide enhanced interoperability where



different communication protocols and data formats. Navy ERP is where we do this today. We also can support real-time data sharing, and our solutions are scalable to accommodate growth in data volume and the number of connected systems.

In addition, our IoT solutions provide the means to easily integrate with sensors and devices across multiple domains and platforms, enabling the collection of real-time data on troop movements, environmental conditions, equipment status and more. We are doing this for the Army. These sensors can be embedded in various assets, such as vehicles, drones, wearable devices and equipment, to provide a comprehensive view of the battlefield.

With our streaming analytics solutions, military organizations can process and analyze data on the fly and extract valuable information from the continuous stream of incoming data and act as needed. We are doing this for ADVANA. This aids in real-time analysis and provides predictive analytics, as well as alerting and decision support.

Finally, our process-mining solutions enable military organizations to gain deep insights into their processes, identify bottlenecks and make data-driven decisions to streamline operations. We are doing this across DOD for the Army, Navy and Air Force. 🌟



Integrate Anything, Anywhere, Any way you want

Software AG Government Solutions: Data at Mission Speed for JADC2

At the forefront of modern warfare, the Combined Joint All-Domain Command and Control (CJADC2) initiative is revolutionizing how military forces operate. It's about enhancing coordination, elevating interoperability, and securing information advantage at the speed of relevance.

UNIFYING POWER:
Data Integration

SITUATIONAL AWARENESS REVOLUTION:
IoT Integration

REAL-TIME INSIGHTS:
Streaming Analytics

OPERATIONAL EFFICIENCY:
Process Intelligence

Marines Special Ops Want Industry Help to Create Systems that Talk to Each Other

Defense tech leaders describe wanting to remove ‘one-trick pony’ systems.

BY ANASTASIA OBIS

Marine Forces Special Operations Command (MARSOC) officials want a better way to manage web-based applications with aggregated data amid an evolving security landscape where having multiple systems and applications that don't talk to each other can present security risks.

The complexities of having multiple systems and applications that don't talk to one another and the technologies that are “one-trick ponies” are some of the biggest shortfalls to conducting successful operations, according to Marine Forces Special Operations Command (MARSOC) specialists.

Three MARSOC specialists, whose names cannot be used due to the nature of their job, spoke about their most pressing tech needs needed to carry out its mission — providing highly trained and specialized forces to execute complex and sensitive operations worldwide in austere environments.

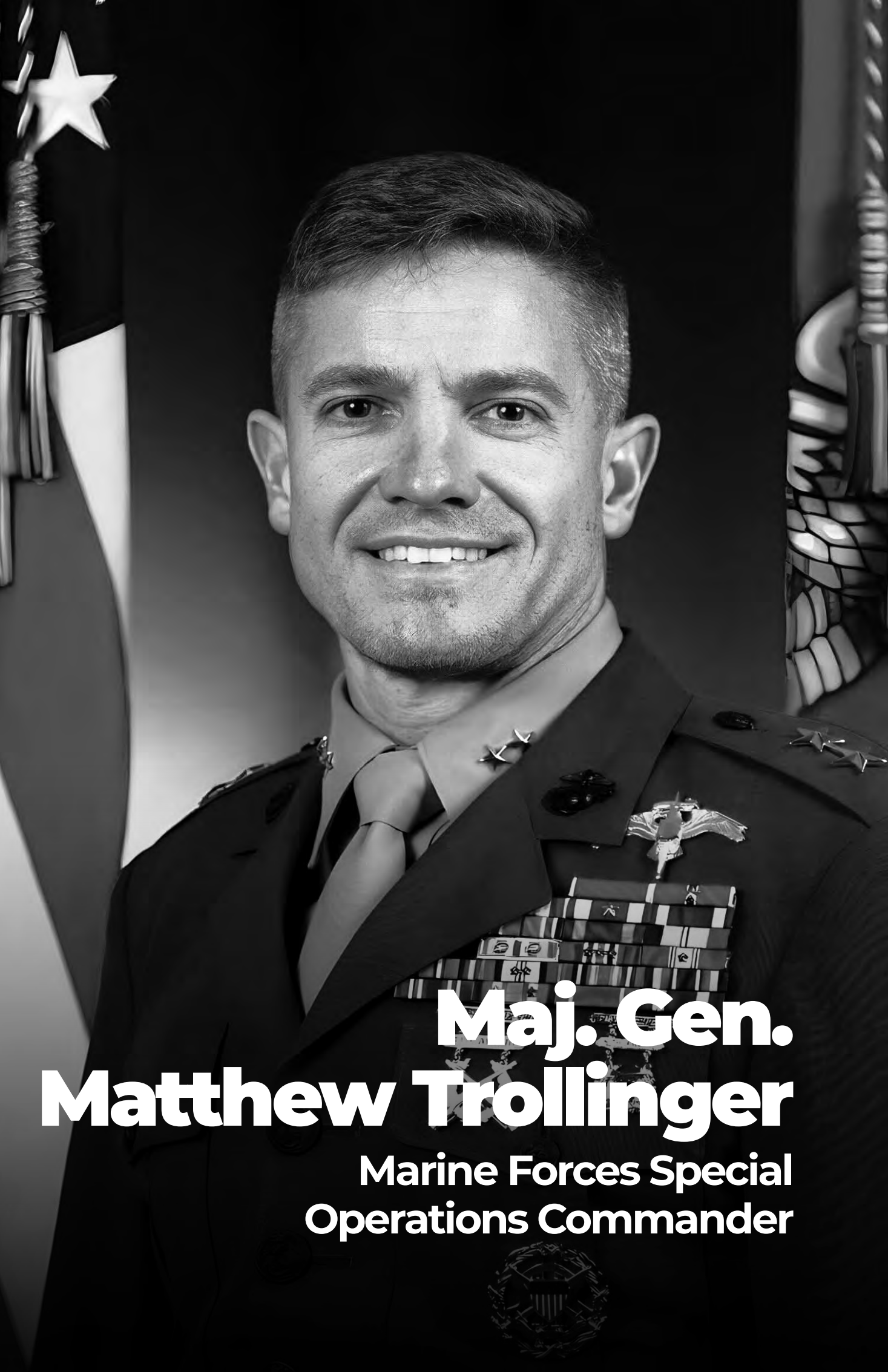


“We talk about these different types of applications that don't talk to one another, and I feel like we can solve this with industry by ... creating some sort of desktop software applications, web-based applications that have that data aggregation as well as other features,” a special operations capability specialist said at a conference in May 2023.

Since its inception in 2006, MARSOC has been conducting a wide array of missions, including unconventional warfare and special reconnaissance. MARSOC consists of a little over 3,000 personnel, with hundreds of Marines

deployed on a daily basis.

As a special operations force, MARSOC relies on leveraging technological advancements to conduct its missions successfully and stay ahead of adversaries. Still, the specialists said that while they are looking forward to incorporating emerging technologies into their operations, what they really struggle with is



**Maj. Gen.
Matthew Trollinger**
Marine Forces Special
Operations Commander

carrying around pieces of technology that do one thing only. This prevents them from being more efficient and moving at the speed of mission.

“One of our biggest complaints is just how much gear we have. Obviously what we do as communicators, we have from servers to nodes to radios. ... There’s so many pieces of gear that we could be in charge of at any time,” said a special operations specialist.

The service, he said, describes a one-trick pony as one where a piece of gear does one thing only.

“If you had something like that, where all these programs could talk, where they didn’t have to jump from screen to screen to screen or device to device. In some cases, that’s a literal laptop where this laptop only works with this piece of gear. ... It’s extremely inconvenient as a communicator where I have to be on the fly or move to the team’s needs,” the specialist added.

MARSOC Commander Maj. Gen. Matthew Trollinger emphasized the importance of finding solutions to data integration challenges, fusing multiple systems and collapsing various pieces of gear into one as his specialists conduct missions in highly complex operating environments.

“Anything that we can leverage to mitigate or lessen the burden on the individual again because I’m all about making sure that people have what they need or we can relieve them of something that they don’t need to have hanging over them or weighing them down,” he said. “How can we best leverage technology for the individual to get after what it is?” ❁

“Anything that we can leverage to mitigate or lessen the burden on the individual [is our goal]...How can we best leverage technology for the individual to get after what it is?”

**— Maj. Gen. Matthew Trollinger, Marine Forces
Special Operations Commander**