

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 5-11-2023		2. REPORT TYPE FINAL		3. DATES COVERED (From - To) N/A	
4. TITLE AND SUBTITLE Accelerating Space Competency: How the Marine Corps' Aviation Experience Can Inform Space Domain Integration				5a. CONTRACT NUMBER N/A	
				5b. GRANT NUMBER N/A	
				5c. PROGRAM ELEMENT NUMBER N/A	
6. AUTHOR(S) Michael A. Arguello, Major, U.S. Marine Corps				5d. PROJECT NUMBER N/A	
				5e. TASK NUMBER N/A	
				5f. WORK UNIT NUMBER N/A	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Writing & Teaching Excellence Center Naval War College 686 Cushing Road Newport, RI 02841-1207				8. PERFORMING ORGANIZATION REPORT NUMBER N/A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A				10. SPONSOR/MONITOR'S ACRONYM(S) N/A	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) N/A	
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement A: Approved for public release; Distribution is unlimited.					
13. SUPPLEMENTARY NOTES A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the curriculum. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.					
14. ABSTRACT The U.S. Marine Corps' value proposition as a Navy and Joint Force enabler in contested areas is at risk because it lacks capability in space. The national defense industry widely recognizes space as a consequential warfighting domain that a near-peer adversary will, with certainty, take actions to degrade, disrupt, and deny. To fight within and into these space-contested environments, Marines must be organically skilled and capable of incorporating space into their operations at the speed of relevance. Unfortunately, most Marine space personnel serve in those roles temporarily, limiting institutional expertise and representation in the military space community. In addition to the problem of temporary employment, the insufficient number of Marine space personnel causes centralization at the Marine Expeditionary Force (3-star) level and at Marine Expeditionary Units, leaving all other forms of the Marine Air-Ground Task Force with minimal access to space-based assets, and virtually no integration of space considerations into their training and operations. By drawing on lessons from the Corps' slow embrace of aviation, this paper urges the prioritization and development of a sufficient and permanent Space Cadre that will be able to develop the deep relationship and competence in space needed to make good on the Corps' value proposition.					
15. SUBJECT TERMS (Key words) Space, Marine Corps, Contested, Marine Air-Ground Task Force (MAGTF), Expeditionary Advanced Base Operations (EABO), Littoral Operations in Contested Environments (LOCE), Aviation					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT N/A	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Director, Writing Center
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED			19b. TELEPHONE NUMBER (include area code) 401-841-6499

Accelerating Space Competency: How the Marine Corps' Aviation Experience Can Inform
Space Domain Integration

Date Submitted: 8 May 2023

Word Count: 3,572 words

DISTRIBUTION A. Approved for public release: distribution unlimited. The contents of this paper reflect the author's personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Strategic Setting

The U.S. Marine Corps' history with aviation offers a cautionary tale for the space domain—prioritize the development of permanent space personnel and let them demonstrate their usefulness to keep the Corps relevant. The U.S. Army bought its first plane in 1909, followed by the U.S. Navy in 1911.¹ The first prospective Marine aviators reported for training in 1912 and fought tirelessly for the next two decades to prove their worth while the Army and Navy embraced their aviators.² The first Marine aviator, Lieutenant Alfred A. Cunningham, aggressively sought to persuade skeptics, ultimately securing permanent aviation personnel for the Corps in 1920.³ In 1920, Cunningham wrote that aviators could demonstrate their worth to the Corps after establishing permanent personnel.⁴ Experiments and evolution followed as the Corps gradually embraced aviation. Marine formations grew more lethal through combined arms with aviation assets supporting ground schemes of maneuver. In hindsight, the Corps wasted time developing its aviation capabilities. The Corps faces a similar problem today: its lack of permanent space personnel inhibits the experimentation, practice, and a “seat at the table” needed to mature in the space domain. Space has been an essential enabler of military operations for decades, and that will become increasingly so in the future.

The Marine Corps' ability to operate effectively in contested areas against near-peer competitors is crucial for joint maritime campaigning and other joint operations. To achieve this, Marines need to have a thorough understanding of the space environment to leverage space assets in the employment of the Marine Air-Ground Task Force (MAGTF) and in support of

¹ Edward C. Johnson. *Marine Corps Aviation: The Early Years 1912-1940*. Edited by Graham A. Cosmas. Washington, DC: History and Museums Division, Headquarters, U.S. Marine Corps, 1977, 1.

² Edward C. Johnson. *Marine Corps Aviation*, 30.

³ Edward C. Johnson. *Marine Corps Aviation*, 27.

⁴ Alfred A. Cunningham. “Value of Aviation to the Marine Corps.” *Marine Corps Gazette* V, no. 3 (1920): 221-233, 221.

Expeditionary Advanced Base Operations (EABO), Littoral Operations in a Contested Environment (LOCE), and the like. In 2021, General David H. Berger issued his *Concept for Stand-In Forces*, providing a vision for the Corps as a Navy and Joint Force enabler capable of operating well within the range of the enemy.⁵ This concept also recognized the inevitability of adversary actions to degrade, disrupt, and deny space, cyber, and electromagnetic spectrum operations in contested areas.⁶ Therefore, the Corps must be organically skilled at incorporating space into their operations at the speed of relevance.

To successfully operate in contested areas, the Corps must establish a numerically sufficient and permanent cadre of personnel highly knowledgeable in space systems throughout the Fleet Marine Force (FMF) and at Marine Corps Forces Space Command (MARFORSPACE) to support combatant commands. This Space Cadre should also have the skills and knowledge to understand the space domain's impact on Marine, Navy, and joint operations. In the FMF, each Marine Expeditionary Force (MEF) needs enough space-smart Marines to support every task-organized MAGTF to ensure the command and control (C2), movement and maneuver (M2), and protection of any MAGTF operating in contested areas. Similarly, MARFORSPACE needs

enough of the right personnel, including seniority, to ensure readiness for U.S. Space Command (USSPACECOM) tasking and become a reliable and preferred service for the USSPACECOM Commander. Through demonstrated proficiency, tenacity, and reliability, the Corps would build a critical reputation for operating in the space domain, potentially leading to broader authorities and access to support MAGTFs and Marines conducting EABO, LOCE, and other high-risk operations.

⁵ David H. Berger, *A Concept for Stand-In Forces*, (Washington, DC: March 2021), 16.
⁶ David H. Berger, *A Concept for Stand-In Forces*, 16.

Developing Relationships and Competence

The realization that a professional aviation force required personnel with long experience was a turning point for the Marine Corps because it marked a shift towards a more specialized approach to military aviation—the same is needed for space. Like the current space Military Occupational Specialties (MOS), it used to be a policy for Marine aviators to first serve substantial time in non-aviation roles.⁷ Marine aviators were also required to return to their primary occupation after five years in aviation, similar to most modern-day Marine Space Cadre that must return to their primary non-space related trade.⁸ Fortunately, the Marine Corps eventually recognized the importance of investing in highly trained pilots and ground support personnel, which allowed the Corps to develop a more effective and efficient air power capability. As a result, Marine aviation grew steadily, and the Corps became a formidable force in the air. As the aviation force grew, so did opportunities to develop Marine Corps warfighting concepts such as the MAGTF. The Corps formed the MAGTF to effectively employ capabilities in every warfighting domain at the time (land, sea, and air), but now this means may fall short in the advent of newly critical domains such as space. Like aviation, the space profession in the Marine Corps can advance under the right conditions. The Marine Corps' history with aviation illustrates the importance of investing in specialized personnel. The Corps should take the same approach for the Space Cadre, given their current focus on multiple areas with limited personnel.

The Space Cadre's focus on multiple areas with limited personnel impedes its ability to support the FMF. Each MEF command element (CE) has a Space Operations Officer (MOS 8866) responsible for coordinating with various departments at a large MEF headquarters. The complexities of the job require more than just one officer. According to the Marine Corps MOS

⁷ Alfred A. Cunningham. "Value of Aviation to the Marine Corps," 232.

⁸ Edward C. Johnson. *Marine Corps Aviation*, 30.

Manual, the purpose of 8866 is to represent the "Marine Corps' interest in national security

space matters, to include participating in the development of space plans, policy, doctrine, and requirements." The strategic focus aligns with the 8866's education received at the Naval

Postgraduate School. Still, it does not prepare them for operational or tactical level employment, mainly when the 8866 is the sole space officer at the MEF CE. The MEF 8866 resides within the operations department and coordinates across a diverse interdepartmental staff, including the

intelligence department, communications department, and planning cells.¹⁰ With so much to do, the 8866s should be able to leverage Space Staff Operations Officers (MOS 0540) to serve as

space integration advisors, particularly at the tactical levels, but there are too few. To affect Naval and Joint Maritime Campaigning, the Corps needs enough space-smart Marines to support

any Marine unit operating in contested areas (or training to do so) to close kill chains (and webs) and ensure C2, M2, and protection such as through detection mitigation and shaping

opportunities to manipulate an adversary's understanding of the operational environment.¹¹ The Corps space personnel structure is insufficient to develop relationships and

competence at the MEF level and practically unavailable at any lower echelon, such as a Marine division, let alone a regiment or battalion. According to the Marine Corps' Space MOS

Specialist, the newly established Maritime Space Officer (MOS 1706) is more appropriately trained to support the FMF.¹² The MOS Manual states that 1706s "are responsible for the

deliberate, detailed planning and employment of space capabilities and effects, as well as the

⁹ Kevin M. Iiams, "NAVMC 1200.IH: Military Occupational Specialties Manual." (Marine Corps Order, Washington, DC: Department of the Navy, 2022), 371.

¹⁰ Joseph Horvath, Erika Teichert, and James Connoly, "The Marine Space Support Team Concept." Marine Corps Gazette 103, no. 1 (2019): 67-71, 69.

¹¹ Timothy Polyard, Adam Fountain, Andrew Foltermann, and Edwin Latrell, "Fighting From the Ultimate High Ground." *Marine Corps Gazette* 105, no. 9 (2021): 82-87, 84.

¹² Liam P. O'Lone, Space Military Occupational Specialist for the Deputy Commandant of the Marine Corps, Information. Headquarters Marine Corps. Telephone interview by the author. Newport, RI, May 5, 2023.

coordination and integration of a unit's space efforts into its overall scheme of maneuver.”¹³ The MOS is new, with only 5 Marines currently trained, but it will be fully grown to 69 Marines by 2027.¹⁴ This is a step in the right direction but is still insufficient because it is not enough to get capability reliably below the division (2-star) level. According to the most recent “Authorized Strength Report” showing the fully built 1706 MOS in 2027, 69 Maritime Space Officers translates to 52 serving in a space-related role, accounting for a regular rotation of assignments outside their primary occupation, which is standard for Marine Corps Officers to ensure balanced professional development.¹⁵ Of the 52 billets, only 17 are earmarked to support the FMF, putting a 1706 at each MEF CE, MEU, and division headquarters.¹⁶ The First Marine Division, for example, has three regiments (each containing four battalions) and six specialized battalions; one 1706 sitting in the division headquarters is not enough.¹⁷ This disadvantages the Marine Corps, as space-based capabilities are critical for C2, M2, force protection in modern warfare. By developing its space support capabilities, the Corps can be prepared for extreme circumstances that may require some units to operate, for a time, independently in space-degraded environments.

The Marine Corps is missing opportunities to develop relationships and competence because newly minted space professionals gain access to contacts and tools essential to leveraging the space domain. A study from the Naval Postgraduate School found that valuable resources and capabilities in space are frequently underutilized because of delays in the classification process and a lack of awareness of their existence.¹⁸ It should not surprise any

¹³ Kevin M. Hams. “NAVMC 1200.1H: Military Occupational Specialties Manual,” 104.

¹⁴ Liam P. O’Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

¹⁵ Authorized Strength Report (Officer). Quantico, VA: United States Marine Corps, 2023.

¹⁶ Authorized Strength Report (Officer).

¹⁷ United States Marine Corps. 1st Marine Division. Accessed May 6, 2023.
<https://www.1stmardiv.marines.mil/>.

¹⁸ Naval Postgraduate School. *Naval Research Program 2019 Annual Report*. Monterey, CA: July 2020, 197.

professional that every industry has unique processes, languages, and tools. Further, usually only professionals from within said industry can fully 'speak the language,' be aware of resources, and be able to leverage those resources timely. A permanent and sufficient Space Cadre provides a foundational growth environment. The Corps' Space Cadre could tap into the U.S. military,

space organizational infrastructure at scale and the speed of relevance. When done consistently, the Corps could gain valuable insights into the latest developments and emerging technologies in

the space domain. In addition, these contacts could help the Marine Corps establish new

partnerships and collaborations with other military branches, government agencies, and

potentially private-sector companies involved in space operations. Ultimately, leveraging the

expertise and resources of new space professionals could help the Marine Corps stay at the

forefront of space-based capabilities and maintain its competitive edge in modern warfare.

The Corps Needs a Sufficient and Permanent Space Cadre

When aviation was new, the Marine Corps struggled to establish capability from the air

because it lacked a sufficient Aviation Cadre—they needed "a seat at the table." In October

1913, Cunningham represented Marine Corps aviation interests on a board appointed by the

Secretary of the Navy to develop plans for a "Naval Aeronautic Service."¹⁹ The panel concluded

without recommending organizing Marine aviation forces. By the end of 1916, the Marine Corps

finally established a dedicated aviation component named the "Marine Corps Aviation

Company."²⁰ When World War I began, the Marine Commandant obtained approval to expand

Marine Air units.²¹ By the end of the war in 1918, Marine aviation had proliferated with its own

¹⁹ Edward C. Johnson *Marine Corps Aviation*, 5.

²⁰ Edward C. Johnson *Marine Corps Aviation*, 10.

²¹ Edward C. Johnson *Marine Corps Aviation*, 11.

training programs and bases only to fight for existence after the war.²² Cunningham was a spirited advocate for Marine aviation. More than that, he was essentially the director of Aviation for the Marine Corps.²³ As talented as Lieutenant Cunningham was, having a junior officer as the senior aviator for the Marine Corps slowed the Corps' progress to mature its aviation component due to being overshadowed by senior representatives from other military branches. To properly organize, train, and equip in the face of emerging technologies, organizations must assign appropriate leadership to that cause, leaders with seniority and authority backed by equipment and manpower resources. In the early 1900s, the Marine Corps had dedicated Marine aviation personnel, although arguably not enough. Similarly, today's Marine Corps has some permanent personnel but insufficient to ensure growth, maximum employment, and overall representation in the space domain.

To ensure a "seat at the table," the Corps needs to make space a permanent career field for officers *and* enlisted Marines to develop senior leaders capable of leading and representing the Corps in the space domain. In September 2009, the Marine Corps published its first "Space Policy," directing the development and maintenance of the Marine Corps Space Cadre.²⁴ Today, the Space Cadre consists of three MOSs, with no plans to include enlisted Marines.²⁵ The Maritime Space Officer is the only space-related primary MOS (PMOS).²⁶ The PMOS identifies a Marine's primary skills and knowledge, meaning they should expect to serve most of their career in that PMOS.²⁷ Although technically a permanent career field, the 1706 MOS only becomes available at the rank of captain, and there are only five 1706s in the entire Marine

²² Edward C. Johnson *Marine Corps Aviation*, 25.

²³ Edward C. Johnson *Marine Corps Aviation*, 11.

²⁴ James F. Amos "MCO 5400.53: Marine Corps Space Policy." (Marine Corps Order, Washington, DC: Department of the Navy, 2009), 3.

²⁵ Liam P. O'Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

²⁶ Kevin M. Hams. "NAVMC 1200.1H: Military Occupational Specialties Manual," 104.

²⁷ Kevin M. Hams. "NAVMC 1200.1H: Military Occupational Specialties Manual," xii.

Corps.²⁸ The highest-ranking Marine with a 1706 MOS history is a lieutenant colonel.²⁹ The

other two space specialties are additional MOSS (AMOS) and comprise 98.8 percent of the

Corps' Space Cadre. An AMOS is awarded to Marines that obtain skills outside their PMOS.³⁰

Only two colonels and five lieutenant colonels have an 8866 MOS.³¹ To effectively leverage

space assets, conduct space-based operations, and integrate with other U.S. space-related

organizations and people, the Corps needs a "seat at the table." To have such a seat, the Corps

(and any organization) needs enough senior leaders with deep experience in the space domain.

The Corps does not have deep expertise because there is zero opportunity for enlisted Marines

and no permanent career opportunities for officers aside from a limited number of 1706s. To

address this challenge, the Corps must invest in a more robust permanent career field for space.

However, the Space Cadre must be sufficiently staffed even with a permanent field.

The Corps needs a Space Cadre large enough to support the entire FMF, where each MEF

has dozens of MAGTFs either exercising, operating, or preparing for one of the two. The whole

space cadre amounts to 271 Marine officers, of which only 33 serve in a space-related billet.³²

There are 28 Space Operations Officers (8866) and 238 Space Operations Staff Officers

(0540).³³ The limited staffing of the Space Cadre is further exacerbated because with 28 Space

Operations Officers, even fewer are serving in that role, and temporarily at that because 8866 is

²⁸ Liam P. O'Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

²⁹ All Marine colonels PMOSs change to 80xx series MOSs, but their PMOS as a lieutenant colonel reverts to an

AMOS; Liam P. O'Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

³⁰ Kevin M. Hams. "NAVMC 1200.1H: Military Occupational Specialties Manual," x.

³¹ "Roster of Marine Corps Personnel Holding the Primary, Additional, or Billet Military Occupational Specialties

of 8866, 0540, or 1706." Obtained from Manpower & Reserve Affairs Commander's Personal Analysis, accessed

April 15, 2023.

³² "Roster of Marine Corps Personnel Holding the Primary, Additional, or Billet Military Occupational Specialties

of 8866, 0540, or 1706."

³³ "Roster of Marine Corps Personnel Holding the Primary, Additional, or Billet Military Occupational Specialties

of 8866, 0540, or 1706."

not a PMOS.³⁴ Similarly, of the 239 Space Operations Staff Officers, only 26 are operating in that role (again, temporarily) between MARFORSPACE and the FMF.³⁵ This lack of staffing limits the Corps' space integration capabilities and jeopardizes its ability to maintain its edge against near-peer competitors in contested areas. With such a small Cadre, resources are spread thin.

Minimal manpower resources result in minimal capability. At the operational level, each MEF has billets for one 8866 at the CE, and one assigned to each Marine Expeditionary Unit (MEU).³⁶ One 8866 may be sufficient for a MEU but certainly not for an entire MEF. Having one 8866 designated for the rest of the MEF severely limits each MEF's subordinate Marine Aircraft Wing, Division, or Marine Logistics Group from fully leveraging space. In theory, 8866s should be able to apply leverage through 0540s, but 0540 assignments are inconsistent. As stated earlier, 239 Space Operations Staff Officers are in the Space Cadre, but only 26 currently serve in space-related roles. Space Marines experience a significant workload burden. Every time a space professional completes their rotation, the Corps replaces them with someone who may have no prior experience in the role, further exacerbating the workload and decreasing the team's effectiveness. Establishing the 1706 PMOS is helpful, but as stated earlier, there are no plans to build the MOS large enough to provide expertise below the MEF CE, MEU, or division headquarters. The limited staffing of the Space Cadre and the inconsistent assignments of 0540s severely limit the Corps' ability to operate in the space domain. There are simply not enough 'space Marines' to support MARFORSPACE and the entire FMF.

³⁴ There are only 24 Billet Identification Codes (BIC) for the 8866 MOS, so in addition to needing more 8866s, the Corps needs to expand the number of BICs to assign the 8866s; Liam P. O'Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

³⁵ "Roster of Marine Corps Personnel Holding the Primary, Additional, or Billet Military Occupational Specialties of 8866, 0540, or 1706."

³⁶ Liam P. O'Lone. Telephone interview by the author. Newport, RI. May 5, 2023.

The Corps needs a Space Cadre large enough to fully staff MARFORSPACE with senior

leaders to ensure a "seat at the table" with other service components at USSPACECOM. In 2020, the Marine Corps activated MARFORSPACE as a subordinate to USSPACECOM.³⁷ It was

created from existing space expertise within Marine Corps Forces, Strategic Command. It is led by a 2-star Marine general officer who heads Marine Corps Forces Cyber Command

(MARFORCYBER) and Marine Corps Information Command.³⁸ Currently, the remaining Space Cadre is thinly spread across MARFORSPACE, USSPACECOM, and various non-operational FMF.³⁹ Even with the activation of MARFORSPACE, the organization has only 49 Marines,

with a meager 27 space professionals, 1 of whom are highly transient reservists.⁴⁰ By 2027 with the space MOSS fully built, there will be 35 active duty space personnel between the 1706, 8866, and 1786 (replacing the 0540 MOS) MOSS to cover MARFORSPACE and USSPACECOM.⁴¹

This is a step in the right direction, but it is difficult to imagine that this is enough manpower to have an appreciable "seat at the table." Compared to the 1,351 Marines at MARFORCYBER, the insufficient staffing of Space Cadre at MARFORSPACE and USSPACECOM calls into question the Corps' ability to integrate superior space capabilities crucial to maintaining military

advantage in contested areas.⁴² Per the 2020 Defense Space Strategy, "the integration of superior

³⁷ "Marine Corps Forces Space Command." U.S. Space Command. Last modified December 12, 2022. Accessed April 14, 2023. <https://www.spacecom.mil/MEDIA/IMAGERY/igphoto/2002535364/>.

³⁸ Irene Loewenson "New Marine information command aims to sync up data operations." Marine Corps Times. Last modified January 31, 2023. Accessed April 14, 2023. <https://www.marinecorpsimes.com/news/your-marine-corps/2023/01/31/new-marine-information-command-aims-to-sync-up-data-operations/>.

³⁹ "Roster of Marine Corps Personnel Holding the Primary, Additional, or Billet Military Occupational Specialties of 8866, 0540, or 1706." Roster of Marine Corps Personnel Assigned to Marine Corps Space Command." Obtained Manpower & Reserve Affairs Commander's Personal Analysis, accessed April 15, 2023.

⁴⁰ "Roster of Marine Corps Personnel Assigned to Marine Corps Forces Space Command." Obtained Manpower & Reserve Affairs Commander's Personal Analysis, accessed April 15, 2023.

⁴¹ Authorized Strength Report (Officer).

⁴² "Roster of Marine Corps Personnel Assigned to Marine Corps Forces Cyber Command." Obtained Manpower & Reserve Affairs Commander's Personal Analysis, accessed April 15, 2023.

space capabilities into and throughout the Joint Force...is essential for securing our military advantage against threats in space.”⁴³ The current and planned number of space-educated Marines cannot be enough to integrate superior space capabilities.

Conclusion

The Marine Corps must establish a credible and permanent Space Cadre to fulfill its value proposition as a Navy and Joint Force enabler in contested areas. The Corps can learn from its slow embrace of aviation relative to its sister services and prioritize the development of the Space Cadre, both officer and enlisted, throughout the FMF and MARFORSPACE. A permanent Space Cadre sets the conditions to develop deep experience, relationships, and competence. With the right amount and mix of space-smart Marines in the FMF, MAGTF commanders and unit leaders involved in EABO, LOCE, and the like will become more attuned to the space environment in training, and more capable in real-world operations. At MARFORSPACE, the Corps’ cadre could develop the depth and reputation needed to evolve into the service of choice for USSPACECOM tasking. The Corps must accelerate its space competency; as it does, it will become more capable and lethal in unpredictable ways. The activity in space is accelerating, and the Marine Corps must keep up with the advancements and establish a strong space presence to support naval and joint maritime campaigning.

⁴³ U. S. Department of Defense. *Defense Space Strategy Summary*. June, 2020, pp 1-10, 7.

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