

**CENTER FOR SPACE
POLICY AND STRATEGY**

JULY 2018

***CLEARING THE INTELLECTUAL
UNDERBRUSH: PREPARING FOR
CONFLICT THAT EXTENDS INTO SPACE***

**MICHAEL P. GLEASON
THE AEROSPACE CORPORATION**

MICHAEL P. GLEASON

Dr. Michael P. Gleason is a national security senior project engineer in The Aerospace Corporation's Center for Space Policy and Strategy. Prior to joining Aerospace, he supported the Office of the Secretary of Defense Office of Net Assessment as a senior strategic space analyst. He served 29 years in the Air Force and is an accomplished national security space expert with experience in space policy, strategy, satellite operations, and international affairs. While in the Air Force, he served for five years at the Pentagon and two years at the Department of State. A graduate of the U.S. Air Force Academy, he holds a Ph.D. in political science from George Washington University.

ABOUT THE CENTER FOR SPACE POLICY AND STRATEGY

The Center for Space Policy and Strategy is dedicated to shaping the future by providing nonpartisan research and strategic analysis to decisionmakers. The Center is part of The Aerospace Corporation, a nonprofit organization that advises the government on complex space enterprise and systems engineering problems.

Contact us at www.aerospace.org/policy or policy@aero.org



Summary

In April 2018, the Chairman of the Joint Chiefs of Staff released the latest version of Joint Publication 3-14 Space Operations (JP 3-14) making many changes to the previous 2013 version. One of those revisions was the deletion of the space mission area taxonomy. Why does deletion of the space mission area taxonomy matter? This paper argues that saying goodbye to the space mission area taxonomy will contribute to normalizing space terminology and concepts for the joint warfighter and help prepare the joint force for conflict that extends into space.

Introduction

Joint Publication 3-14 Space Operations (JP 3-14) provides U.S. Department of Defense doctrine to plan, execute, and assess joint space operations. It plays a fundamental role in defining military space operations, establishing key concepts and terminology, and providing a framework for understanding space operation's component parts and activities, stakeholder roles and responsibilities, planning and assessment processes, and ultimately shapes the space capabilities required to execute the doctrine. The guidance in the publication is authoritative, takes precedence over U.S. Army, Navy, Air Force, and Marine publications, and only in exceptional circumstances should U.S. military commanders deviate from it.¹ JP 3-14 is written for the armed forces of the United States but it is widely read by allies, adversaries, and interested members of the public and academia. As such, it carries significant weight beyond the U.S. military. In April 2018, the Chairman of the Joint Chiefs of Staff released the latest version of JP 3-14 making many changes to the previous 2013 version. One of those revisions was the deletion of the military space mission area taxonomy.²

Why does deletion of the military space mission area taxonomy matter? First, the space mission area taxonomy has been used inconsistently across the national security space enterprise and the joint force. Second, the taxonomy, rooted in the 1980s, is outdated and inadequate in relation to current security space issues. Third, and most importantly, it is not aligned with concepts familiar to the joint force and may inhibit the integration and normalization of space within the Department of Defense. Deleting the taxonomy is a key step in making sure that space is not treated as a special domain, different from other warfighting domains. If accepted consistently across the Department of Defense, as required based on the authoritative nature of JP 3-14, and by other stakeholders in the national security space community, saying goodbye to the old space mission area taxonomy will be a net positive as its deletion will contribute to normalizing space terminology and concepts for the joint warfighter. However, a new taxonomy for the 21st century is still needed for the national security space community to enable fresh thinking about how to respond to threats to U.S. national security space capabilities.

The Military Space Mission Areas Taxonomy

Why do we have taxonomies? Taxonomies, or intellectual frameworks, typologies, paradigms, mental pictures, and so forth, are used to organize and categorize our thinking and help us to prioritize, compare, see relationships, make assumptions, draw analogies, rationalize, and ideally think more efficiently and make more informed judgements about assorted topics. Taxonomies also come with risks, however, such as leading practitioners and analysts to unconsciously discount information that does not fit into a particular category very well, overlook gaps in information, or to misperceive interrelationship among categories. In addition, competitors who do not use the same taxonomy are not constrained in their thinking in the same way and may develop unique insights that give them an advantage. For example, in recent years, China has developed a unique, up-to-date, intellectual framework for thinking about its military space mission areas, which accounts for the nexus between space, information warfare, and deterrence.

In contrast, the U.S. military space mission areas taxonomy has been in use since the 1980s. Since that time, U.S. space policy, strategy, and doctrine have evolved significantly to produce the recent 2018 “National Strategy for Space,” the “Space Enterprise Vision,” and the “Space Warfighting Construct,” all with the imperative to prepare for conflict that extends into space. Yet the original military space mission areas have remained, potentially subtly constraining the thinking of the national security space community.

The previous version of Joint Publication (JP) 3-14, “Space Operations,” published in 2013, listed five military space mission areas: space situational awareness, space force enhancement, space support, space control, and space force application.³ There was nothing inherently wrong with these labels or definitions—but they have not been consistently

applied among all stakeholders in the national security space enterprise.

For example, the 2010 “National Space Policy of the United States” states that the Secretary of Defense shall maintain the capabilities to execute the space support, force enhancement, space control, and force application missions.⁴ The 2013 JP 3-14 was consistent with this policy but added space situational awareness as a space mission area as noted above.

The 2012 Department of Defense Directive (DODD) 3100.10, “Space Policy,” lists the same mission areas as the 2013 JP 3-14, but does not describe them in the same terms.⁵ For example, DODD 3100.10 identifies “timely attribution of hostile and natural events” as a key function of space situational awareness, while the 2013 JP 3-14 did not mention attribution. Likewise, DODD 3100.10 notes the importance of resilience, whereas the 2013 JP 3-14 did not mention resilience.

In addition, a significant revision to DODD 3100.10 was released in late 2016. The revised document renames, redefines, and adds and subtracts mission areas to the taxonomy. It includes space situational awareness, adds “battle management command and control,” renames “space support” to “space service support,” renames “force enhancement” to “space support to operations,” deletes “space force application,” and expands the definition of “space control.” Of course, DOD policy serves a different purpose than doctrine, but here is another example of the military space mission areas taxonomy not being applied consistently.

Table 1: Military Space Mission Area Definitions

The 2013 Joint Publication (JP) 3-14, “Joint Space Doctrine,” defines five military space mission areas:

1. **Space situational awareness** involves characterizing, as completely as necessary, the space capabilities operating within the terrestrial environment and the space domain. It integrates space surveillance, environmental monitoring, knowledge of the status and readiness of U.S. and cooperative satellite systems, and analysis of the space domain. It also incorporates intelligence sources to provide insight into adversarial use of space capabilities and threats to U.S. space capabilities while helping to determine an adversary’s intent.
2. **Space force enhancement** increases joint force effectiveness by improving the combat potential of that force, enhancing operational awareness, and providing critical joint force support. Space force enhancement is composed of intelligence gathering, missile warning, environmental monitoring, satellite communications, and navigation.
3. **Space support** includes the essential capabilities, functions, activities, and tasks necessary to operate and sustain all elements of space forces throughout the range of military operations. Components include spacelift, satellite operations, and reconstitution of space forces.
4. **Space control** supports freedom of action in space for friendly forces and, when necessary, defeats adversarial efforts that interfere with or attack U.S. or allied space systems and negates adversarial space capabilities. It consists of offensive and defensive space control. Offensive measures prevent the hostile use of U.S. or third-party space capabilities and negate the capabilities used to interfere with or attack them. Defensive measures preserve the ability to exploit space capabilities via active and passive actions while protecting friendly space assets from attack, interference, or unintentional hazards.
5. **Space force application** directs combat operations in, through, and from space to influence a conflict by holding terrestrial targets at risk. It includes ballistic missile defense and force projection capabilities such as intercontinental ballistic missiles.

Furthermore, the 2012 Air Force Doctrine Annex 3-14, “Space Operations,” identifies three overarching space mission areas: global space mission operations, space support, and space control.⁶ Annex 3-14 explains that the force enhancement mission area is renamed “global space mission operations” because some Air Force space capabilities—such as environmental monitoring, satellite communications, and missile tracking—are global operations, and U.S. national interests in these capabilities extend beyond military operations. The space force application mission area has been moved to Annex 3-70, “Strategic Attack,” and Annex 3-72, “Nuclear Operations.” Interestingly, Annex 3-14 removes space situational

awareness as a mission area but emphasizes that it supports the other three mission areas.⁷

The Navy also has its perspectives on the military space mission areas. The 2017 Secretary of the Navy Instruction 5400.39D, “Department of the Navy Space Policy,” is consistent with the 2013 JP 3-14, referring to space situational awareness, space support, space force enhancement, and space force application.⁸ However, 5400.39D also says the Navy will “continually reassess the Department’s approach and investments in assuring the availability of mission-essential space support to naval forces.” The term “space support” in this context refers to “space force enhancement” per the

Table 2: Military Space Mission Area Variations

Policy / Mission Areas	2010 National Space Policy	2012 DODD 3100.10 Space Policy	2012 Air Force Doctrine Annex 3-14 Space Operations	2013 JP 3-14 Joint Space Doctrine	2014 Army FM 3-14 Army Space Operations (not public)	2016 DODD 3100.10 Space Policy (revised)	2017 SECNAVIN ST 5400.39D: Navy Space Policy
Space Situational Awareness		✓	Listed as support area	✓		✓	✓
Force Enhancement	✓	✓	Known as "Global Space Mission Operations"	Known as "Space Force Enhancement"	Known as "Space Support"	Known as "Space Support to Operations"	Known as "Space Support"
Space Support	✓	✓	✓	Deleted 2018		Known as "Space Service Support"	✓
Space Control	✓	✓	✓			✓	✓
Space Force Application	✓	✓	Listed in other annexes	✓		Removed	✓
Battle Mgmt. Command and Control						✓	

2013 JP 3-14—and as noted above, “space support” in the 2013 JP 3-14 refers to such activities as spacelift and satellite operations. Indeed, this highlights the fact that within the military space professional community stovepipe, the term “space support” means one thing, while to the rest of military, it implies “space support to the warfighter.” And, as pointed out above, Air Force Space Command refers to space force enhancement

(a.k.a. space support to the warfighter) as “global space mission operations.”

Finally, the Army, like the Navy, uses the term “space support” to describe what the 2013 JP 3-14 referred to as space force enhancement. In fact, Army Space Support Teams and Space Support Elements are the focal points for providing space-based intelligence, communications, navigation,

and missile warning products in theater—which come under the force enhancement mission area, not the space support mission area.

In sum, the taxonomy has not been consistently used among key stakeholders in the national security space enterprise, which may, in fact, impede critical efforts to clearly integrate and normalize space within DOD and the Joint Force.

The taxonomy has presented other weaknesses as well. Devised in the 1980s, the taxonomy may be ill-suited to facilitate thinking about such emerging activities as rendezvous and proximity operations (RPOs), on-orbit servicing, and commercially hosted payloads. For example, RPO activities might be categorized as “space support” or “SSA” (space situational awareness) or perhaps a “space control” mission. And they may even have a “space deterrence” mission. On-orbit servicing could fit in the taxonomy as “space support” or perhaps “space control.” Likewise, commercially hosted military payloads might be placed in the force enhancement bin but might also belong in the SSA or space control category, depending on the hosted payload’s mission. Likewise, many allied and partner capabilities are primarily civil, dual-use satellites with the information they provide being shared by civil and military users. Is the military space mission area taxonomy useful in these cases, or inhibiting fresh thinking in these, and other emerging areas?

The taxonomy may also inadvertently constrain thinking about the relationship among space and deterrence, and the nexus of space with cyber, missile defense, and information and network-centric warfare. For example, should “space deterrence” mean deterring attacks on space capabilities, or mean using space to enable deterrence in all domains, or mean something else altogether? Or, if space-based missile defenses become a reality in the future, should that space mission be thought of as force enhancement, space control, space force application, or something else?

The old taxonomy is not very useful in these contexts.

Perhaps more troubling, the taxonomy has not become familiar to joint warfighters and does not integrate well with joint warfighting concepts and terminology. Like underbrush in a forest, the taxonomy may constrain the healthy growth of new thinking. No wonder the April 2018 version of JP 3-14 deletes the space mission area taxonomy entirely. The usefulness of the taxonomy has reached its limit.

But what replaces the old taxonomy in the 2018 JP 3-14? Although not stated explicitly in the new JP 3-14, it is reasonable to assume that “joint functions” are a step toward replacing the old, unique to the military space community, mission areas taxonomy. The 2018 JP 3-14 aligns space capabilities with “the seven joint functions” in accordance with Joint Publication 3-0, “Joint Operations.” This alignment will help normalize space doctrine and help make space operations less exceptional within U.S. joint forces. Joint functions are “related capabilities and activities grouped together to help Joint Force Commanders (JFCs) integrate, synchronize, and direct joint operations.”⁹ The seven joint functions are command and control, intelligence, fires, movement and maneuver, protection, sustainment, and information.

It is beyond the scope of this paper to delve deeply into these functions, except to say it is a step in the right direction—as long as joint stakeholders understand the meaning of these functions, use this terminology consistently, and if the joint functions framework helps the joint force think more efficiently and more innovatively about current threats to U.S. space activities, and warfare that extends to space.

As a point of comparison, the Chinese military space strategy also includes a taxonomy. The taxonomy consists of three types of missions for

Table 3: The Seven Joint Functions and Space

The 2018 Joint Publication (JP) 3-14 provides a sampling of specific space capabilities and operations for which a shared understanding among the joint force is essential for fostering and enhancing unified action. Excerpts include:

1. **Command and Control.** A large percentage of the intelligence required to make decisions for employment of forces is obtained from space-based intelligence collection assets. SSA assists command and control by characterizing the space environment, including the ground link segment. SSA provides insight into an adversary's employment of space systems.
2. **Intelligence.** Space-based assets complement non-space-based intelligence sources by providing decisionmakers with timely, accurate data for information that can create a decisive advantage across all phases of conflict.
3. **Fires.** Includes space control operations that create a desired effect on enemy space systems in multiple domains.
4. **Movement and Maneuver.** Includes the deployment, repositioning, or re-orientation of on-orbit assets and terrestrial space forces.
5. **Protection.** Includes all measures in space operations taken to ensure friendly space systems perform as designed by overcoming attempts to deny or manipulate them.
6. **Sustainment.** Space operations sustainment is achieved through spacelift, satellite operations, space force reconstitution, and maintenance of a force of space operations personnel.
7. **Information.** Space supports the flow of information and decisionmaking.

the People Liberation's Army (PLA) space forces: space information support, space deterrence, and space attack and defense operations.¹⁰ China's space information support mission is comparable to the U.S. force enhancement mission area (a.k.a., global space mission operations, space support to operations, or space support to the warfighter, as described above); however, China places the space information support mission firmly within the broader context of networks and information warfare, which the U.S. taxonomy does not. The PLA taxonomy also facilitates thinking on how space deterrence supports conventional and nuclear

deterrence and how space capabilities may independently deter an adversary.

Also, China's space attack and defense operations mission type is roughly equivalent to the U.S. space control mission area but notably includes the sub-mission area of "space-based attack against ground and air targets." This indicates the PLA has room for thinking about weapons that can strike other domains, while based in space. In contrast, the somewhat equivalent "space force application" mission area has been eliminated in the 2018 JP 3-14, as well as in Air Force Space Command's Annex

Table 4: China’s Military Space Taxonomy

1. Space Information Support
2. Space Deterrence
3. Space Attack and Defense

3-14 and DODD 3100.10—which begs the question of where the intellectual room exists within the DOD space enterprise and among DOD space professionals for contemplating this potential military space activity. Does the absence of the previous intellectual sandbox to play with such ideas represent any risk? Recall from above that taxonomies come with risks, including subtly influencing those using a taxonomy to discount information that does not fit into their taxonomy well, overlooking gaps in information, or misperceiving interrelationships when presented with data that does not fit. That said, the joint function of “fires” is not domain specific. “Fires” are provided from land to air (surface-to-air missiles), from sea to land, from land to sea, and from air to land and sea, and so forth. Likewise, the joint function “protection” is not domain specific, nor are the other joint functions. So perhaps the new “joint functions” framework in the 2018 JP 3-14 will open room for more thinking in this area among space professionals.

However, DOD space professionals and joint forces also need a framework appropriate for grappling with additional complex, emerging, space issues. For example, will the joint functions framework facilitate thinking about such issues as debris and protecting the sustainability of the space domain, the role of the joint force in following cislunar developments, preventing mishaps and misperceptions from causing conflict in space, and

deterrence? Perhaps. But if not, a framework for thinking about these issues will be needed.

Conclusion

Given the broad scope of issues senior decisionmakers must think about—for example, the reorganization of the national security space enterprise, billion-dollar space architecture decisions, and warfighting—focusing on normalizing concepts and terminology may seem like an insignificant task. But the old space mission areas taxonomy is not useful in the imperative to normalize space terminology and concepts for the joint warfighter. Furthermore, its inconsistent application across the national security space enterprise, and its obsolescence in relation to current security space issues, clearly indicate it is time for the military space mission areas taxonomy to go. Eliminating the old taxonomy facilitates the integration and normalization of space within the joint force, and opens the intellectual room to develop new ideas, see new relationships, make new assumptions, and to think innovatively about space as a warfighting domain.

Nevertheless, while the taxonomy’s deletion and the alignment with the seven joint functions is necessary, these actions may not be sufficient for national security space community strategists, analysts, and thought leaders to organize their thoughts more sagaciously about conflict extending into space. In order to preclude defaulting to the outdated taxonomy when organizing their thoughts about conflict extending into space, and in light of the new 2018 “National Strategy for Space,” the national security space community still needs a more comprehensive, up-to-date framework, aligned with joint concepts, to enable creative thinking and to stimulate new ideas. That task is an area for further research, analysis, and discussion which hopefully this paper quickly stimulates.

References

- ¹ Joint Publication (JP) 3-14, “Space Operations,” April 10, 2018, page i.
http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf.
- ² Ibid, page iii.
- ³ Joint Publication (JP) 3-14, “Space Operations,” May 29, 2013,
http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf.
- ⁴ 2010 National Space Policy of the United States, June 28, 2010,
http://obamawhitehouse.archives.gov/sites/default/files/national_space_policy_6-28-10.pdf.
- ⁵ DOD Directive (DODD) 3100.10 (Oct. 18, 2012);
http://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/310010_dodd_2012.pdf.
- ⁶ U.S. Air Force Doctrine Annex 3-14, Space Operations, June 19, 2012,
<https://jdeis.js.mil/jdeis/index.jsp?pindex=27&pubId=545>.
- ⁷ See:
http://www.doctrine.af.mil/Portals/61/documents/Annex_3-14/3-14-D21-SPACE-OPS-MSN-Areas.pdf?ver=2017-09-19-154553-410 for the full AF Doctrine Annex 3-14 descriptions of the space mission areas.
- ⁸ Secretary of the Navy Instruction 5400.39D: Department of the Navy Space Policy, December 17, 2015,
<https://doni.documentservices.dla.mil/Directives/05000%20General%20Management%20Security%20and%20Safety%20Services/05-400%20Organization%20and%20Functional%20Support%20Services/5400.39D.pdf>.
- ⁹ 2018, JP 3-14, page iii.
- ¹⁰ Pollpeter, K., and J. Ray, “The Conceptual Evolution of China’s Military Space Operations and Strategy,” *China’s Evolving Military Strategy*, ed. Joe McReynolds, Jamestown Foundation, 2016, 261–262.

