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Assessing the Readiness of Contractor-Provided Space Operations Capabilities



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About This Report

There are a significant number of private contractors performing space operations functions and tasks for the Air Force. This report examines how the Air Force evaluates its ability to deliver space operations capabilities provided by contractors.

The research reported here was commissioned by Brigadier General David Mineau, Director, Current Operations, Headquarters Air Force, and conducted within the Strategy and Doctrine Program of RAND Project AIR FORCE as part of a fiscal year 2019 project, *Measuring Operational Readiness in the Space Community*.¹ That project also produced a separate report with a wider scope that is not available to the general public.

The views expressed in this report are solely those of the author and do not reflect the official policy or position of the U.S. Air Force, U.S. Space Force, U.S. Department of Defense, or senior leadership of the U.S. Government.

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¹ This work was completed before the establishment of the U.S. Space Force. The issue, approach, findings and recommendations remain relevant because the inherent structure and missions of the examined squadrons have not changed.

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Summary

Issue

There are a significant number of private contractors performing space operations functions and tasks for the Air Force. This report examines how the Air Force evaluates its ability to deliver space operations capabilities provided by contractors.

Approach

We reviewed contractor personnel tracking in Air Force databases. We solicited data from Air Force Installation Contracting Agency contacts at Air Force Space Command (AFSPC). At the request of AFSPC/A3 and the Fourteenth Air Force (14 AF), we examined two squadrons: the 2nd Space Operations Squadron and the 2nd Space Warning Squadron. For those units, we obtained Contractor Performance Assessment Reporting System (CPARS) reports, Quality Assurance (QA) reports, and Performance Work Statements (PWSs). We also solicited subject matter expert (SME) input from the relevant contract managers at Space and Missile Systems Center (SMC) and uniformed operational SMEs within each of the two units.

Conclusions

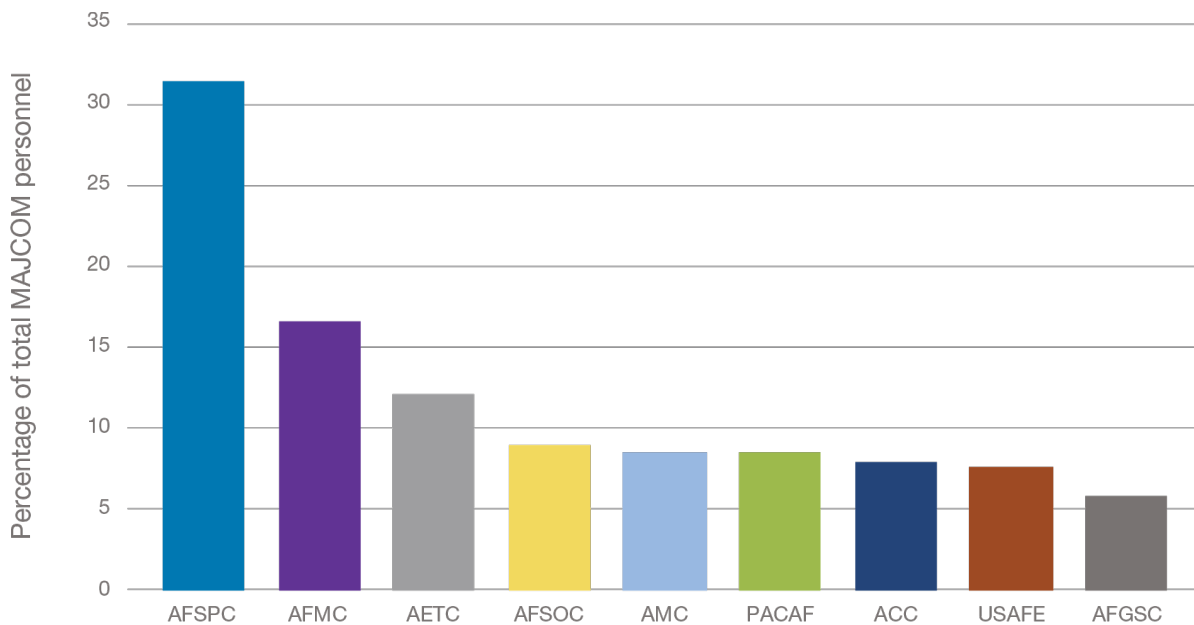
- Contractors substantially contribute to operational space missions.
- Contractors often have more systems and technical expertise than the uniformed and civilian personnel they support.
 - To use a flying analogy, the arrangement could be compared to needing contractors to coach takeoffs and landings and perform the most challenging tactics for an operational flying squadron. This contractor reliance places space in a unique situation among operational military missions.
- AFSPC has the largest proportion of contractors across all Air Force major commands (MAJCOMs); twice the fraction of the next MAJCOM, which is heavily involved in acquisition (Air Force Material Command); and essentially four times the fraction of all other MAJCOMs.
 - Contractors constitute 25 percent of the AFSPC-identified Space Cadre.
 - Contractors are also prevalent in every space operations group.
 - Contractors constitute 17 percent of personnel across all space operations groups.
- The Air Force lacks a definition of contractor readiness and lacks a process for tracking the readiness of capabilities provided by contractors.
- Contractors' performance is tracked by SMC using acquisition and contracting tools and compliance constructs.

- The operational military hierarchy is unaware of the readiness status of the capabilities that contractors contribute to space operations.²
- Contract management falls outside the operations’ chain of command.
- Responsibility for tracking contractor numbers falls outside both operations and contracting chains of command.
 - Tracking contractor counts is at the discretion of the MAJCOM and, at AFSPC, falls to local manpower functions of force support squadrons.

Recommendations

- Develop specific operational reporting criteria for contractor readiness.
- Incorporate contractor readiness information into operational reporting and personnel/resource accounting.
- Improve personnel reporting by considering manpower needed to support the Space Mission Force and an integrated personnel picture by including component and contractor contributions.
- Examine more units across AFSPC and the Air Force to test these findings more broadly.

Figure S.1. Contractor Percentage of Total Personnel, by Major Command



NOTES: ACC = Air Combat Command; AETC = Air Education and Training Command; AFGSC = Air Force Global Strike Command; AFMC = Air Force Materiel Command; AFSOC = Air Force Global Strike Command; AMC = Air Mobility Command; PACAF = Pacific Air Forces; USAFE = U.S. Air Forces in Europe.

² This phrasing is somewhat outside the common Air Force usage of *readiness*. Here, we are referring to whether the Air Force can rely on contractors to provide the capabilities it expects them to deliver. We do not use *readiness* of the contractors because many contracts are performance based and thus the traditional personnel metrics applied to contractor personnel may not be relevant.

Acknowledgments

We would like to thank the following individuals for their support of this report: Major General John Shaw and Brigadier General Deanna Burt at Air Force Space Command, and Col Robert Widmann and Natasha DiPietro of the Air Force Installation Contracting Agency. Additionally, we appreciate the thoughtful reviews and constructive feedback of an earlier version of this report provided by our RAND colleagues Brad DeBlois, Amado Cordova, and Bruce McClintock.

Abbreviations

2 SOPS	2nd Space Operations Squadron
2 SWS	2nd Space Warning Squadron
14 AF	Fourteenth Air Force
ACC	Air Combat Command
AETC	Air Education and Training Command
AFMC	Air Force Materiel Command
AFSPC	Air Force Space Command
CDO	contested, denied, or operationally limited
CPARS	Contractor Performance Assessment Reporting System
DoD	U.S. Department of Defense
DRRS	Defense Readiness Reporting system
FAR	Federal Acquisition Regulation
GAO	U.S. Government Accountability Office
GEARSS II	GPS Engineering, Analysis, and Remote Site Sustainment II
GPS	Global Positioning System
HAF	Headquarters Air Force
MAJCOM	major command
MOU	memorandum of understanding
MPES	Military Personnel Execution System
PAF	RAND Project AIR FORCE
QA	quality assurance
SBIRS	Space-Based Infrared Surveillance
SCTF	Space Cadre Task Force
SMC	Space and Missile Systems Center
SME	subject matter expert
SOPS	Space Operations Squadron
SWS	Space Warning Squadron
UTC	unit type code

1. Introduction

The purpose of this report is to address issues related to understanding the readiness of Space Force capabilities that are largely provided by contract personnel.

Previously, the space domain was treated as a sanctuary, free from the potential for enemy attacks and a need to defend U.S. satellites and ground infrastructure. Military space operations, and the reliance on contractors for important elements of that mission, developed under this expectation of a benign space environment: There was little emphasis on warfighting or tracking readiness to do so. Now, during any future conflict, the U.S. military and the Air Force expect a contested, denied, or operationally limited (CDO) space environment. To effectively operate in the CDO environment, it is important that all contributors to space operations (military, civilian, and contractors) are trained and ready to face these challenges. Operational military units accomplish such training and track mission readiness to face these threats. Air Force leaders at all levels use this reporting to understand the preparedness of forces and their likelihood of success against various threats. However, no equivalent readiness information exists for contractors and the missions they perform to support space operations.

The 2018 National Defense Strategy emphasized rebuilding readiness considering the threats posed by Russia and China.² Both countries have significant capabilities to contest, deny, and operationally limit U.S. military space capabilities.³ Considering these threats, Headquarters Air Force (HAF), Director of Current Operations, asked RAND Project AIR FORCE (PAF) to determine how the Air Force space community can better measure its operational readiness. This report, which focuses on contractors, is one part of that larger project that examined space operational readiness more broadly.⁴

Previous PAF readiness efforts found that Air Force readiness ratings are sensitive to the number of people available to perform a unit's mission.⁵ It is not only the total number of people available that affects readiness scores, but also the specific scoring rules that determine personnel readiness ratings by considering subsets of unit personnel, who are often grouped by job specialty or experience level. With the increased focus on improving readiness in 2018 and 2019,

² U.S. Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, Washington, D.C., 2018.

³ Defense Intelligence Agency, *Challenges to Security in Space*, Washington, D.C., 2019.

⁴ The fiscal year 2019 project is titled *Measuring Operational Readiness in the Space Community*. The project also produced a separate report with a wider scope that is not available to the general public.

⁵ The report documenting this previous research is not available to the general public.

the Air Force also recognized the importance of personnel and focused much of the service's readiness improvement efforts on its people.⁶

During this same period, Air Force senior space leaders increasingly emphasized warfighting aspects of space operations and the desire to improve the Air Force's ability to continue functioning in space even when adversaries seek to contest, deny, or operationally limit the United States' operational capabilities.⁷ The confluence of increased adversary and U.S. capabilities in space, combined with a warfighting focus and a desire for more focused, effective, and efficient space operations, reignited discussion of a separate military space service.

As the idea of a separate space force gained momentum, multiple efforts explored options for how a new Space Force might be organized, considering which capabilities, units, bases, and personnel might transition to the new service. One of these efforts was a personnel study of how many and what type of personnel would be needed to effectively train for, and operate in, a CDO environment. That study, summarized in the *Space Cadre Personnel Review Report*, approached the question by selecting the key personnel specialties needed for space acquisition and operations.⁸ The existing Air Force population of these specialties was then used as the base to which additional personnel would be added who would be required to effectively train and operate in CDO environments. That report found that a surprisingly large proportion of contractors provide the core of a military space capability.

Given the U.S. Department of Defense's (DoD's) emphasis on readiness, the dependence of readiness on personnel availability, and the large proportion of contractors contributing to space mission areas, an obvious question arose: "How do these contractors contribute to operational space capability, and does the Air Force understand the current readiness of the contractors that contribute to space missions?"

The Air Force does not have metrics, criteria, or a process for measuring the readiness of capabilities provided by contractors, so Air Force Space Command (AFSPC)/A3 and HAF/A30 asked PAF to examine issues of contractor contributions and readiness tracking. AFSPC/A3 in turn tasked the Fourteenth Air Force (14 AF) to select two units for a pilot examination of these contractor issues. 14 AF chose the 2nd Space Operations Squadron (SOPS), the active duty squadron operating the Global Positioning System (GPS) constellation, and 2nd Space Warning Squadron (SWS), one of the two active duty units operating Space-Based Infrared Surveillance (SBIRS) satellites.

⁶ Heather Wilson, *Department of the Air Force Presentation to the Subcommittee on Readiness and Management Support, United States Senate: Current Readiness of the U.S. Air Force*, testimony presented before the U.S. Senate Armed Services Committee, Subcommittee on Readiness and Management Support, Washington, D.C., October 28, 2018.

⁷ John E. Hyten, *Space Mission Force: Developing Space Warfighters for Tomorrow*, white paper, Colorado Springs, Colo., June 29, 2016.

⁸ U.S. Air Force, *Space Cadre Personnel Review Report: Developing Our Space Cadre for a Warfighting Domain*, August 15, 2018.

In the next chapter, we explore how many contractors support space missions, including some background on and history of support-contractor data collection. Our contractor numbers analysis is based on an examination of Air Force historic personnel data and information from an Air Force–conducted effort to determine which personnel would make up a “space cadre.” In Chapter 3, we examine the applicability of current contractor performance measurements for tracking readiness, based on a focused literature review and a review of government requirements for agencies to oversee and report on the performance of their contractors. In the final chapter, we present our conclusions and recommendations. Contractors are critical to providing needed capabilities to the Air Force, especially in AFSPC. However, the Air Force lacks processes and data to understand how many contractors it relies on and the readiness of these contractors to continue supporting the mission, especially considering potential adversary actions.

2. Contractors in Space Operations: How Many? Supporting Which Missions?

It is surprisingly challenging to determine the number of contractors supporting AFSPC. Not only is determining how many difficult, but also understanding what these contractors do, and how well, presents a challenge for the Air Force. This section examines the number and prevalence of contractors across the Air Force and specifically within AFSPC. It also addresses some background and history of contractor personnel tracking.

We Have Only a Partial Grasp on How Many Contractors There Are . . .

To understand the quality of contractor information, it is useful to understand some of the history and purpose behind DoD contractor data collection. During the 1980s, there was a push from the Reagan administration to downsize and outsource when possible. The argument was that capabilities outsourced to the private sector would ultimately save the government money and spur private innovation. However, in practice, the advantages were not clear, and there was debate surrounding the actual savings, if any. Thus, the Air Force began closely tracking its numbers of support contractors. This process was detailed in personnel regulations and implemented in the Military Personnel Execution System (MPES) database. Progressively, interest in DoD contractors generally ebbed until the wars in Iraq and Afghanistan. These wars sparked renewed attention on contractor oversight during the mid-2000s. Large numbers of contractors, engaged in active combat and sometimes outnumbering military troops, were in theater. Concern about contractor accountability and costs reinvigorated congressional oversight.⁹ Processes were put in place for the services and DoD to annually report the number of support contractors to Congress.¹⁰

The Air Force has documented its process in a series of Air Force Instructions (AFIs). AFI 38-201 required base manpower flights to annually record the number of contractors in MPES,

⁹ For more background on DoD outsourcing, see Nancy Young Moore, Molly Dunigan, Frank Camm, Samantha Cherney, Clifford A. Grammich, Judith D. Mele, Evan D. Peet, and Anita Szafran, *A Review of Alternative Methods to Inventory Contracted Services in the Department of Defense*, Santa Monica, Calif.: RAND Corporation, RR-1704-OSD, 2017.

¹⁰ The U.S. Government Accountability Office (GAO) has examined and reported extensively on this issue. The most recent GAO report is *DoD Contracted Services: Long-Standing Issues Remain About Using Inventory for Management Decisions*, Washington, D.C., GAO-18-330, March 2018. Additionally, GAO has identified DoD contract management as a high-risk area since 1992 and reports on DoD contract management annually; see U.S. Government Accountability Office, *High-Risk Series: Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas*, Washington, D.C., GAO-19-157SP, March 2019, p. 227.

which fed into the broader DoD reporting.¹¹ AFI 38-101, released in August 2019, superseded AFI 38-201 and removed the requirement to determine contractor numbers, but left the option for individual major commands (MAJCOMs) to continue tracking contractor numbers in MPES.¹²

Examination of MPES data shows that all MAJCOMs consistently reported contractor numbers between 2013 and 2019. AFSPC kept the requirement for local manpower flights to continue reporting and offered three methods to determine the number of contractors supporting the local base. The three methods detailed in the AFSPC guidance are (1) gathering input from Air Force contracting officers or their representatives, (2) estimating by applying existing manpower standards detailed in Air Force Manual (AFMAN) 38-208 (the Air Force's former guidebook for manpower assessments), and (3) estimating based on the total contract value or level of effort.¹³ AFSPC's policy to continue contractor reporting appears to be executed, as evidenced by regularly updated data in MPES. The AFSPC policy and regularly updated information support the currency and completeness of the AFSPC MPES data.

As mentioned in the introduction, the Space Cadre Task Force's (SCTF's) *Space Cadre Personnel Review Report* showed that, of the core group of 12,000 people, about 2,900 were contractors.¹⁴ That report defined the core group as all personnel who were classified as one of a set of space-related specialties.¹⁵ The report's contractor data were derived from the MPES. PAF replicated the *Space Cadre Personnel Review Report* contractor numbers using the MPES for the specific AFSCs that were designated as "space cadre." Knowing that our data aligned with the SCTF analysis, we mined the MPES contractor data further, with confidence that the results would be consistent with previous AFSPC efforts.

For context, we first examined the distribution of the more than 60,000 contractors across the Air Force MAJCOMs.¹⁶ Perhaps not surprisingly, given its large technical and acquisition focus, the largest number of contractors reside in Air Force Materiel Command (AFMC). AFSPC

¹¹ AFI 38-201, *Determining Manpower Requirements*, Washington, D.C.: Department of the Air Force, December 30, 2003, Chapter 6.

¹² AFI 38-101, *Manpower and Organizations*, Washington, D.C.: Department of the Air Force, August 29, 2019.

¹³ Air Force Manual 38-208 has been superseded by Air Force Manual 38-102, *Manpower and Organization Standard Work Processes and Procedures*, Washington, D.C.: Department of the Air Force, September 4, 2019. This regulation and its predecessor outlined the processes and steps for performing official manpower studies.

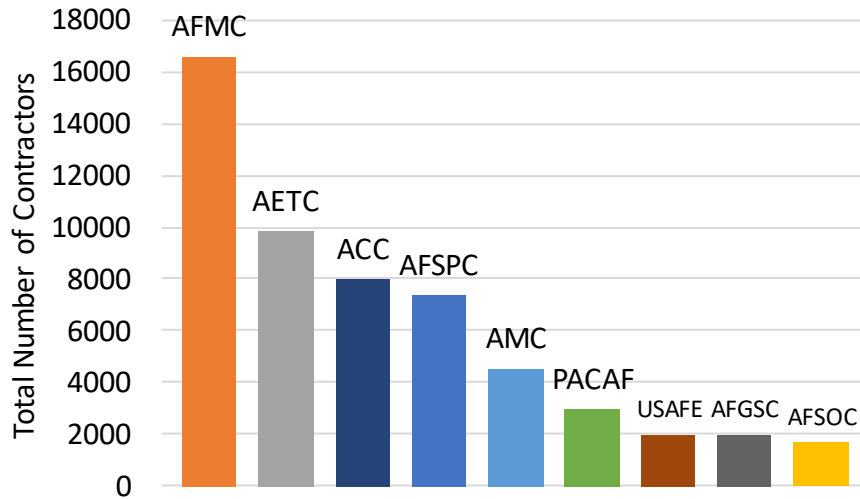
¹⁴ U.S. Air Force, 2018, p. 22.

¹⁵ The SCTF defined the "space cadre" as any personnel in AFSPC who were classified as one of a set of Air Force Specialty Codes (AFSCs). Most of the space cadre were in the career fields of developmental engineering, space operations, and space systems operations and acquisition. Specifically, the SCTF included the following three-digit AFSCs: 13S, 14N, 15W, 17D, 17D, 1B4, 1C6, 1NX, 1W0, 2M0, 3D0, 3D1, 61A, 61C, 61D, 62E, 63A, 9S1, 63S, 60C, 63G, 1DC, 91W, and 91C.

¹⁶ Here we refer to any contractor that appeared in the MPES data set. As noted at the end of the chapter, there are not presently consistent definitions and processes across the Air Force to allow for a precise count.

ranked fourth in total number of contractors in MPES (see Figure 2.1).¹⁷ However, when contractors are viewed as a percentage of total personnel (officer, enlisted, civilian, and contractor), AFSPC ranks first by a significant margin, having twice the fraction of the next MAJCOM that is heavily involved in acquisition (AFMC) and essentially four times the fraction of all other MAJCOMs (see Figure 2.2).

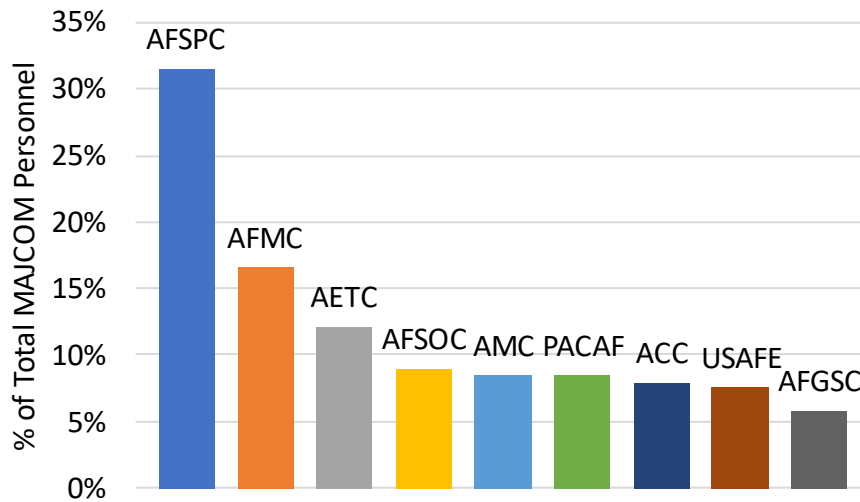
Figure 2.1. Total Number of Contractors, by Major Command



NOTES: ACC = Air Combat Command; AETC = Air Education and Training Command; AFGSC = Air Force Global Strike Command; AFMC = Air Force Materiel Command; AFSOC = Air Force Global Strike Command; AMC = Air Mobility Command; PACAF = Pacific Air Forces; USAFE = U.S. Air Forces in Europe.

¹⁷ The figure only shows the number in MPES for the MAJCOMs. There are approximately another 5,000 contractors in our data set that were associated with other organizations, primarily HAF, direct reporting units, and U.S. combatant commands.

Figure 2.2. Contractor Percentage of Total Personnel, by Major Command



NOTES: ACC = Air Combat Command; AETC = Air Education and Training Command; AFGSC = Air Force Global Strike Command; AFMC = Air Force Materiel Command; AFSOC = Air Force Global Strike Command; AMC = Air Mobility Command; PACAF = Pacific Air Forces; USAFE = U.S. Air Forces in Europe.

June 2019 MPES data showed around 7,300 contractors of all Air Force Specialty Codes (AFSCs) in space command. Focusing on the same contractor specialties as the SCTF report reveals approximately 2,900 contractors in these key disciplines, making up 25 percent of the total space cadre.¹⁸ Interestingly, this group of people contains 25 percent contractors and 14 percent civilians, meaning that the core of a military service based on this cadre would have two out of five people not in uniform. See Figure 2.3.

To understand how many contractors support operations, as opposed to fulfilling support or administrative functions, we filtered the data to include only personnel associated with operations groups and their subordinate units. Figure 2.4 presents the percentages of officers, enlisted personnel, civilians, and contractors in all AFSPC operations groups (which are listed in Figure 2.5). Figure 2.5 shows the personnel breakdown for each operations unit in AFSPC. Figure 2.5 shows that every operations group has contractors, implying that contractors are present in and integral to the operations of every space mission.

¹⁸ U.S. Air Force, 2018, p. 33.

Figure 2.3. Percentage Breakdown of Space Cadre Task Force

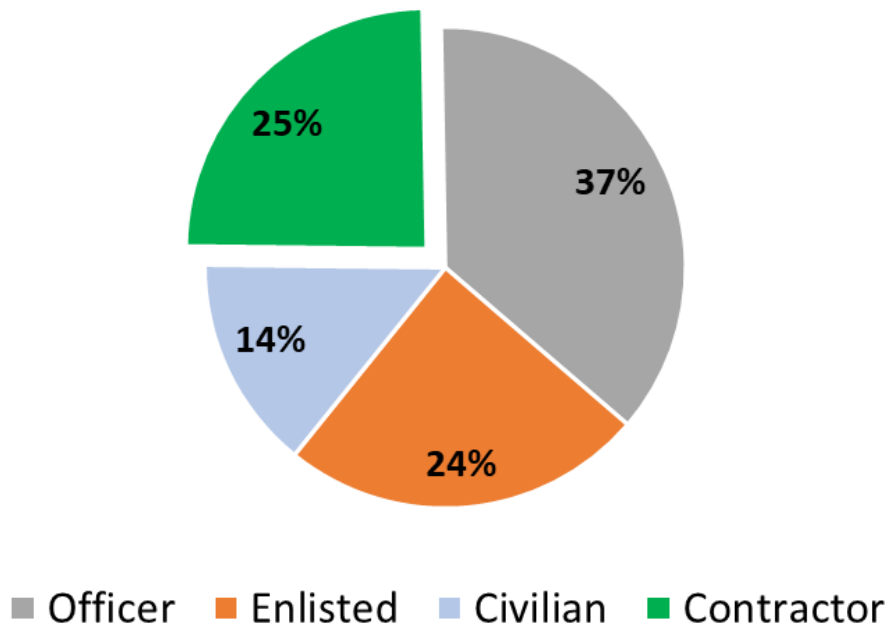


Figure 2.4. Percentage Breakdown of Air Force Space Command Operations Group Personnel

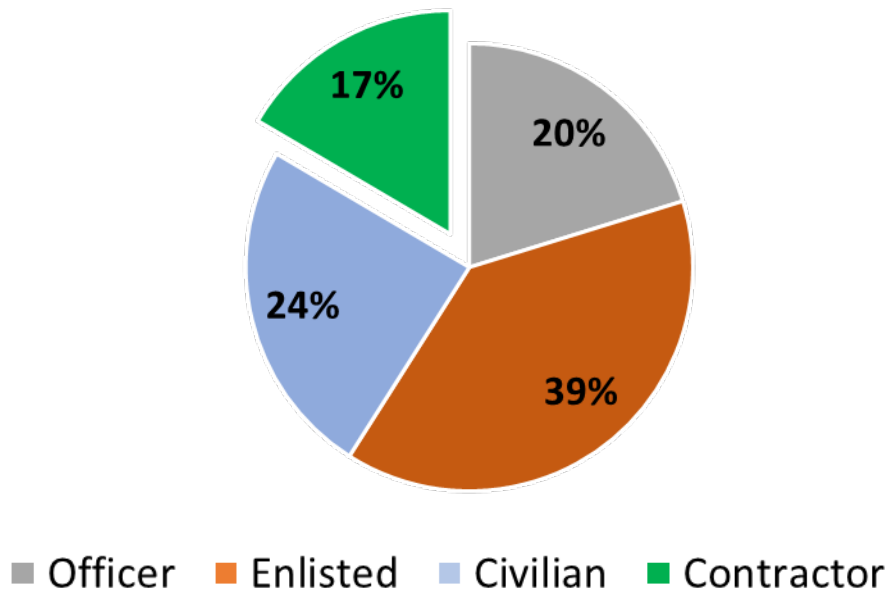
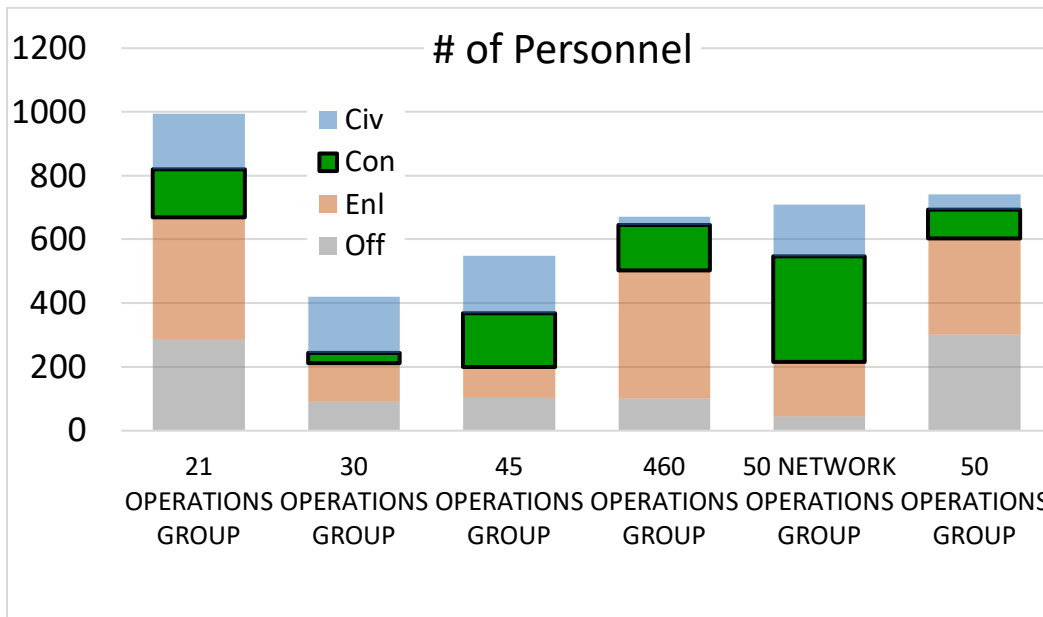


Figure 2.5. Personnel by Type Across Air Force Space Command Operations Groups



The numbers of contractors contained within the MPES data generally aligned with the unit’s count and expectations, which we received in meetings with unit subject matter experts (SMEs). However, the MPES contract identification information was outdated or incorrect, which led to a question of data quality in MPES.

... But We Do Know Contractors Support Operations Through a Variety of Arrangements and Are Integral to the Mission

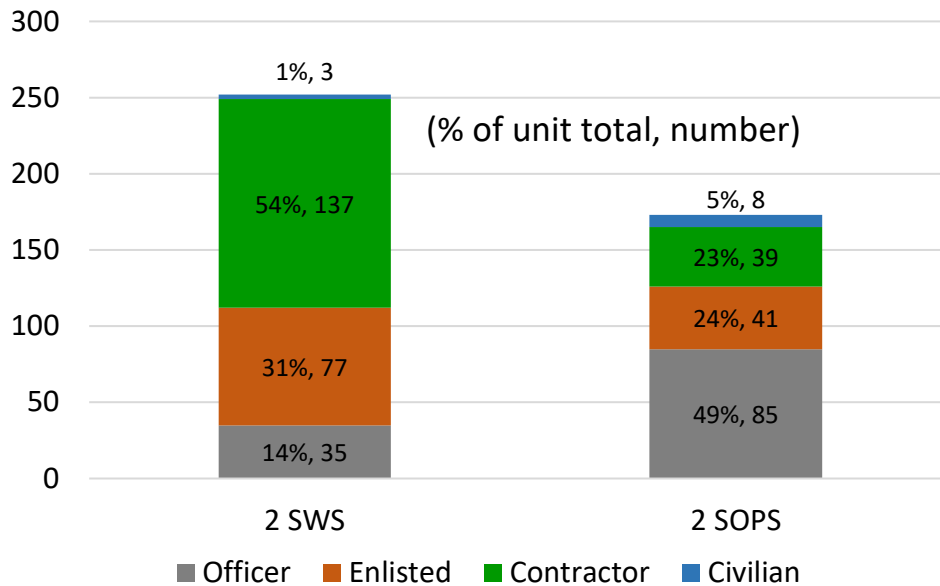
The two exemplar units, the 2 SOPS and 2 SWS, both have contractors supporting their operations. For both units, the Space and Missile Systems Center (SMC) handles all contract administration and performance reporting duties, with neither local wing contracting squadron involved. A consequence of SMC handling the contracts is that the unit leadership is relieved of the burden of administering the contract and the official performance monitoring of its contractors. A downside of the wing being removed from the contract administration is that local wing, group, and squadron leadership have less resources and flexibility to generate new contracts or modify existing ones. A significant difference between the two squadrons was the number of contracts supporting each. 2 SOPS is supported by a complicated mix of nine contracts, four companies, and three agreements (memoranda of understanding [MOUs]) with other government organizations. Table 2.1 shows these agencies and which part of the unit each supports. In contrast, 2 SWS appears to be supported by a single support contract for SBIRS operations. Figure 2.6 shows the breakdown of the two units by officer, enlisted personnel, civilian, and contractor status according to MPES data.

Table 2.1. 2nd Space Operations Squadron Support Contracts

Office	Contract Number	Company	Scope or Systems
Analysis	FA8823-17-C-0001	Boeing	IIA/IIF
	FA8823-18-C-0004	Lockheed Martin	IIR/IIR-M/III
	FA8823-17-F-0005	Peraton	DCO
	FA8823-19-C-0001	Infinity	GEARSS II
Sortie Generation	MOU	517th/Ogden	LADO
	FA8823-13-C-002	Lockheed Martin	GCS
	FA8823-19-D-0001	Lockheed Martin	GCS II
Sortie Support	MOU	Jet Propulsion Laboratory	
	MOU	Naval Research Laboratory	

NOTES: IIA/IIF/IIR/IIR-M; III = unique blocks of GPS satellites; DCO = Defensive Cyberspace Operations; GEARSS II = GPS Engineering, Analysis, and Remote Site Sustainment II; GCS = Ground Control Segment; LADO = launch and early orbit, anomaly resolution, and disposal operations.

Figure 2.6. Personnel Composition of 2 SWS and 2 SOPS



From discussions with SMEs in each of the units, we learned that contractors often have the most experience with the hardware, the systems, and the mission. Additionally, these interviews revealed that contractors often have the greatest technical expertise and are relied upon for the most challenging operational and analytical tasks facing these units. Contractors, for example, are critical for conducting orbit analysis to determine the precise thrust parameters and timing to correctly adjust or change satellite orbits. They are also indispensable in anomaly resolution, the troubleshooting and corrective actions taken when a satellite is not performing as expected. Personnel with the requisite knowledge and skills to perform these example tasks, and others,

simply do not exist in enough numbers in the officer, enlisted, or civilian ranks. To use a flying analogy, the arrangement could be compared to needing contractors to coach takeoffs and landings and perform the most challenging tactics for an operational flying squadron. This contractor reliance places space in a unique situation among operational military missions.

Deeper exploration and interviews with the 2 SOPS and 2 SWS reinforced that MPES likely contains the best data available on contractor numbers because it has been kept over multiple years and AFSPC units regularly entered data. Nonetheless, there are a few reasons that the information in the MPES database needs to be verified. A large proportion of the AFSPC unit entries indicated that “method 1” was applied, meaning that contractor numbers were submitted by contacting the contracting officer or contracting officer representative. There are two issues with this method that require resolution. First, the contract identification information was universally out of date for the contracts supporting 2 SOPS and 2 SWS. Three of the seven contracts referred to contract numbers that were beyond their period of performance by between one and three years. If the contracting officer representatives were consulted, as prescribed by method 1, were the numbers of contractors updated, but not the contract data? This is unlikely, because some of the contracts changed hands. The second issue is that all the contracts for the two units are administered through SMC channels and not through the local wings. This raises the question of whether it is more appropriate for the data collection to be conducted by the installation manpower flights (as prescribed by AFSPC policy) or by the offices responsible for the contracts at SMC (who should be more familiar with specific contract personnel). More work is required to resolve both questions.

Clearly, there are many contractors broadly supporting the Air Force and specifically within AFSPC operational units. In the next chapter, we examine whether the existing processes and documentation to manage these contracts and the contract personnel could be used to inform the larger readiness of AFSPC to conduct its missions.

3. Contractor Performance Reporting: Does It Track Readiness?

The previous chapter described the prevalence of operational support contractors and the important contributions these contracts provide for the space missions. Given the significant reliance on the support contractors, in this chapter we examine how contractor performance is tracked, whether that tracking is suitable for tracking readiness, and the extent to which operational commanders are aware of the readiness of their support contractors. While there are processes in place for the Air Force to effectively manage contracts and contractor performance, none of the existing practices provide either the frequency or level of detail needed to align with military readiness reporting.

The Air Force's official readiness reporting system, the Defense Readiness Reporting System (DRRS), does not track contractor performance or readiness in any way. DRRS does have extensive information on individual unit readiness, including detailed information on personnel availability and training, equipment possession, and status. DRRS also houses extensive information on units' ability to execute their assigned tasks, along with wide-ranging commanders' comments expanding on the limited information contained in the existing structured data fields. Contractors clearly support many of the assigned tasks of these units. However, it does not appear that any of the contractor capabilities are assessed in DRRS. Nor are contractor personnel accounted for as part of the unit personnel readiness or training tracking in DRRS. DRRS only reports readiness for military and civilian personnel listed on a unit's manning document.

An interesting fact is that the Air Force's data structure for its unit type codes (UTCs), which are used to uniquely identify specific unit capabilities and have associated personnel and equipment information, has a placeholder data field for number of contractors. In the latest version of the mission capabilities description document, which lists all UTCs across the Air Force, none include any contractors in this field.

Despite the lack of information in the official Air Force operational readiness reporting processes and systems, there are federally mandated processes for reporting contractor performance. These processes, systems, and documents support recording contractor compliance with contract terms and satisfy the statutory reporting requirements, but they do not appear adequate for providing the detail or frequency of updates for readiness reporting. We explain this in more detail in the rest of this chapter.

Federal agency contracting officers, or their representatives, are required to at least annually report on the performance of contractors. The basis for the requirement is found in Federal

Acquisition Regulation (FAR) Part 42, Subpart 15.¹⁹ FAR 42.15 seeks to maintain a record of contractor performance information. Other parts of the FAR describe the ratings and criteria for earning each of the levels.

We examined multiple redacted Contractor Performance Assessment Reporting System (CPARS) reports for the contractors supporting the 2 SOPS and 2 SWS.²⁰ Each report conformed to the FAR and contained the required elements. Many of the reports also contained additional sub-areas describing in more detail specific areas of importance for individual contracts.²¹

Even the CPARS reports that contained additional information, like the sub-areas mentioned above, did not have the level of detail or operational focus which would be useful for reporting readiness. Additionally, the annual frequency of the reports limits their utility for readiness reporting.

Some contracts mandate additional quality assurance (QA) reports that are specified as part of the contract terms and occur with a greater frequency than the annual CPARS reports. One such example we examined was for one of the GPS support contracts of the 2 SOPS. These reports contained a greater level of detail than in CPARS because they were tailored to regularly evaluate whether the contractor is complying with specific terms in the Performance Work Statement (PWS), which sets detailed expectations. The QA report we reviewed had multiple examples that would be more suitable for readiness reporting. Example items from the QA report included information about contractor availability and the ability of the contractor to move to an

¹⁹ Federal Acquisition Regulation Part 42, Subpart 15, *Contractor Performance Information*, 2020. Some of the areas it includes are the contractor's record of

1. Conforming to contract requirements and to standards of good workmanship; 2. Forecasting and controlling costs; 3. Adherence to schedules, including the administrative aspects of performance; 4. Reasonable and cooperative behavior and commitment to customer satisfaction; 5. Reporting into databases (see subpart 4.14 and reporting requirements in the solicitation provisions and clauses referenced in 9.104-7); 6. Integrity and business ethics; and 7. Business-like concern for the interest of the customer.

FAR 42.15 goes on to describe the minimum included performance review elements:

1. Technical (quality of product or service); 2. Cost control (not applicable for firm-fixed-price or fixed-price with economic price adjustment arrangements); 3. Schedule/timeliness; 4. Management or business relations; 5. Small business subcontracting, including reduced or untimely payments to small business subcontractors when 19.702(a) requires a subcontracting plan (as applicable, see Table 42-2); 6. Other (as applicable); 7. Evaluation factors may include subfactors; 8. Each factor and subfactor used shall be evaluated and a supporting narrative provided. Each evaluation factor . . . shall be rated in accordance with a five-scale rating system (i.e., exceptional, very good, satisfactory, marginal, and unsatisfactory).

²⁰ We received and reviewed all available contractual reports for the two squadrons of interest over a two-year period. For each contractual arrangement listed in Table 2.1, we obtained either the CPARS or the relevant MOU. For the GEARSS II contract, we obtained a single quarterly quality assurance report. The exercise sought to understand what type of information might be available in these types of reports that could be used for tracking readiness.

²¹ For example, the SBIRS support contract included the following additional sub-areas: Technical (Product Performance, System Engineering, Software Engineering, Hardware Engineering), Logistic Support, Management Responsiveness, Subcontract Management, and Program Management.

alternate location and perform its duties. Both examples are similar to military personnel readiness information in DRRS. Where monthly QA contractor reporting exists, it may serve as a foundation for contractor readiness.

Previously, the space domain was treated as a sanctuary, free from the potential for enemy attacks and a need to defend U.S. satellites and ground infrastructure. Military space operations, and the reliance on contractors for important elements of that mission, developed under that expectation of a benign space environment. In such an environment, there was little emphasis on warfighting or tracking readiness to do so. Now, during any future conflict, the U.S. military and the Air Force expect a CDO space environment. To effectively operate in the CDO environment, it is important that all contributors to space operations (military, civilian, and contractors) are trained and deemed ready to face those challenges. Operational military units accomplish such training and track mission readiness to face these threats.²² Air Force leaders at all levels use this reporting to understand the preparedness of forces and their likelihood of success against various threats. However, no equivalent readiness information exists for the contractors that support space operations.

The Air Force, like all federal agencies, tracks contractor performance via the CPARS system with annual reporting. Although these reports satisfy reporting requirements, they do not contain information that would be applicable to understanding how prepared these contractors are to perform their parts of the mission in a contested environment. Thus, military leadership lacks insight into the warfighting preparedness of contractors providing critically important space mission capabilities.²³

²² DRRS is the primary data application where operational units report readiness information, including training. More information on DRRS and the reporting process can be found in AFI 10-201, *Force Readiness Reporting*, Washington, D.C.: Department of the Air Force, March 3, 2016.

²³ With the rare exception of those contracts that include some level of additional QA reporting outside CPARS.

4. Conclusions and Recommendations

Contractors substantially contribute to operational space missions and are found in every operations group in AFSPC. These operations-support contractors often have more systems and technical expertise than the uniformed and civilian personnel they support.

AFSPC has, by far, the largest proportion of contractors across all Air Force MAJCOMs. The Air Force's own study to understand which personnel were integral to space operations, the *Space Cadre Personnel Review Report*, showed that 25 percent of these key personnel were contractors, which we independently confirmed through analysis of MPES data.²⁴ Of all the personnel in AFSPC operations groups, 17 percent are contractors.

Responsibility for tracking these support contractor numbers falls on wing manpower flights that are outside the chain of command of both the operations groups and the SMC teams charged with contract management authority for these AFSPC support contracts.

Contractor performance is tracked by SMC using acquisition and contracting tools and compliance constructs, which is not the same type of tracking done for readiness reporting of military personnel in operational units. Thus, the information in these reports is neither applicable for readiness reporting nor analogous to the readiness information typically reported by military units. SMC maintains contract management expertise and economies of scale but is removed from operations. The operations units may not be equipped or manned to comply with contract management requirements. Unit leaders we met with told us that they felt they were not equipped to manage all contract aspects of their support contractors. Nonetheless, operations units seem to have some input to support contract requirements and recurring performance assessments. This input is at the discretion of the contracting officer and contracting officer's representative, who may solicit input from the operational units. However, it is not clear that units understand the limits of contracts in terms of CDO operations. The whole arrangement works through the professionalism of the contractors, personal relationships, frequent meetings, and liaison positions, rather than through a unified military chain of command.

Based on SME discussions, from the squadron to the MAJCOM level, official readiness reports, and the fact that all contract management is outside the operational chain of command, we found that the operational military hierarchy is unaware of the readiness of the important capabilities that contractors contribute to space operations. One step toward more awareness of contractor readiness would be to establish the definitions of the readiness of capabilities provided by contractors, and processes for tracking this readiness, both of which are currently missing in the Air Force.

²⁴ U.S. Air Force, 2018.

Like performance reporting responsibilities, contract management duties lie outside the chain of command of operational units from the squadron through the Numbered Air Force level. None of the CPARS reports seem appropriate for reporting readiness, but the more detailed and frequent quality assurance products, when available, might serve as a foundation to build readiness reporting for contractors.

Recommendations

Incorporate contractor readiness information into operational reporting. The reporting need not mirror the reporting for military units, but rather could start modestly by reporting on operationally relevant capabilities—for example, a review of contract terms to understand what is expected in the event of natural disaster or adversary attack. Is the contractor required and prepared to continue operations? Possibly at an alternate location? How well is the contractor prepared to continue operations in a CDO environment? Does the contract require modification for CDO operation? Later contractor readiness reporting could expand to include personnel and resource accounting.

Improve personnel reporting. This update should consider manpower needed to support the Space Mission Force and an integrated personnel picture. One factor to account for is personnel who both are contractors and serve in the reserve component. The space community should quickly update its subordinate unit manning documents and consider including essential support contract personnel.

Examine more units across AFSPC and the Air Force to test these findings more broadly and to develop a more complete picture of contractor support and readiness across the Air Force space enterprise.

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In the past, the space domain was treated as a sanctuary—there was little emphasis on warfighting or tracking readiness to do so. But today the U.S. military and the Air Force expect a contested, denied, or operationally limited space environment, and it is important that all contributors to space operations—military, civilian, and contractors—are trained and ready to face these challenges. The Air Force has systems to track the readiness of operational military units, but no equivalent readiness information exists for contractors and the missions they perform to support space operations.

The authors of this report reviewed contractor personnel tracking in Air Force databases, examined contractor information for two Air Force Space Command (AFSPC) squadrons, and interviewed subject matter experts within these two squadrons and at Space and Missile Systems Center (SMC). The authors find that contractors contribute substantially to Air Force space mission, and they provide recommendations on how the Air Force can better monitor the readiness of these personnel.

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