Defense Business Board
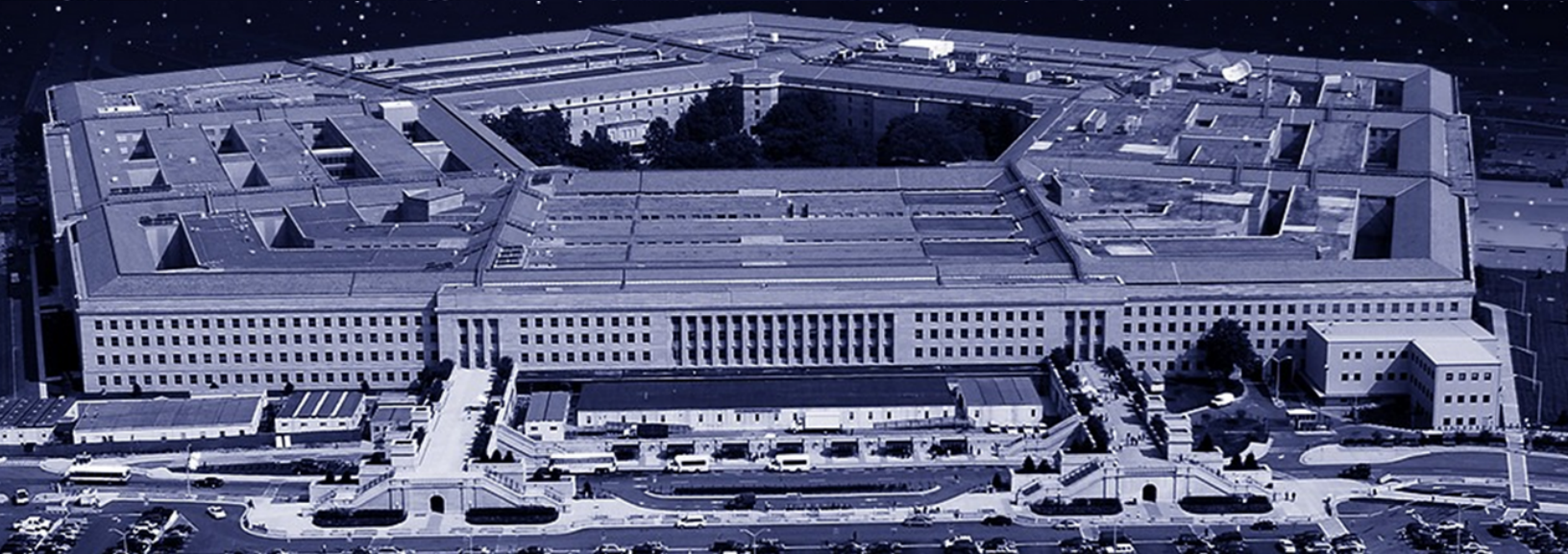## Business Operations Subcommittee

DBB FY24-01

A Review of Space Acquisition

November 15, 2023

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OFFICE OF PREPUBLICATION AND SECURITY REVIEW

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I. Executive Summary

Tasking

The Senate Armed Services Committee Report accompanying the Fiscal Year (FY) 2023 National Defense Authorization Act (NDAA) required the Secretary of Defense to conduct a review of the unity of effort decision-making process for space acquisition. The NDAA directed the review to determine whether a unity of effort is agile enough for the rapid deployment of space systems to keep pace with today's space industry. On May 9, 2023, the Deputy Secretary of Defense tasked the Defense Business Board ("DBB" or "Board"), through its Business Operations Advisory Subcommittee ("the Subcommittee"), to review the unity of effort decision-making process for space acquisition. The Terms of Reference (ToR) for this Study, found in Appendix A, guided the full scope of the Subcommittee's research, interviews, and analysis to provide recommendations to the Department of Defense ("DoD" or "Department") in the following areas:

- Specific statutory or regulatory changes to revise conflicting authorities in space acquisition across the DoD and/or to **improve the governance process**, as applicable;

- **Authorities and membership of the Space Acquisition Council (SAC) to maximize integration, ensure effectiveness, and clarify the roles and responsibilities** of the body;

- **Streamline acquisition business processes and enhance opportunities for innovation**; and

- Any other matters the Board determines are relevant to this task.

Approach and Methodology

The nine-member subcommittee, with support of the DBB staff, performed an intense, six-month study divided into two approaches. The first involved over 37 interviews with 60 individuals from across the DoD, federal government, intelligence community, and commercial entities that included:

- 29 Current and former DoD acquisition/operations leaders

- 15 Private sector executives

- 3 Academics and researchers

- 13 Non-DoD government leaders

The second approach was a comprehensive review of relevant academic studies, published articles, Government Accountability Office (GAO) reports, and prior DoD publications.

Report Roadmap

This report is organized into four major sections. Following section I (Executive Summary), Section II provides a brief overview of the U.S. defense acquisition construct and the commercial/geopolitical ecosystem in which it operates. While Section II primarily describes today's state of play in space acquisition, there are several observations included to provide

context for later findings. Section III documents the Subcommittee's eight major findings to respond to the ToR. Section III's findings are addressed in Section IV, with actionable recommendations to propel the United States Space Force (USSF) closer to the agile, innovative, unique acquisition center its founders dreamt it could be.

Introduction

The world is experiencing a revolutionary change in space with respect to systems and policies. The global space economy, now valued at $546 billion, has grown tremendously over the last decade with 8% growth in the last year alone across government and commercial segments.[1] The recent increase in launch opportunities and demand for commercial capabilities enabled tremendous growth in almost every sub-segment of commercial space.

This expansion has drawn interest from world governments, the investment community, defense contractors, and commercial companies and has resulted in innovation and new market entrants.

The U.S. Government has acted in recent years to channel these developments and innovations to deliver unparalleled space-enabled capabilities to the warfighter. The U.S. military is highly dependent on space-based systems owing to the advantages offered to warfighters over their adversaries. Consequently, that dependence necessitates that the space acquisition enterprise is conducted in an effective and efficient manner.

Bottom Line

The acquisition apparatus used to deliver space capabilities in the past cannot be utilized in the same way to keep pace with the emerging threats of the future. To be clear, the DoD acquisition system should not be abandoned, but it must endure more as a guide than the rule in the future. It must give way to smart people to apply smart techniques to optimize the business plan to the infinite permutations of capability acquisition that exist.

Further, it must expand the education and use of modern acquisition tools to capitalize on their benefits at scale. This concept was ignited by the FY2016 NDAA and championed by former Under Secretary of Defense for Acquisition, Technology, and Logistics, the Honorable Ellen Lord. Now, further action must be taken to achieve the ultimate vision—**to put the power in the hands of those closest to program execution and most likely to achieve success**.

The subcommittee spent a great deal of time studying the "unity of effort decision making process." The investigation into the structure of the DoD space acquisition organization, since the emergence of the Space Force, resulted in two primary conclusions:

1) Space acquisition is decades old; the option to organize it from a "clean sheet" is not possible. Every day, thousands of space professional are executing millions of dollars to fill critical warfighting gaps. To interrupt them to redraw the lines of acquisition authority would result in cultural and operational breakage that would far exceed the benefit.

2) The organizational structure is *not* the pacing issue that will keep space acquisition from becoming the effective, efficient development engine it needs to be.

The subsequent sections of this report will detail what the subcommittee noted as the critical findings the DoD must address to strengthen its acquisition system for the future of space, along with recommendations to help it get there. At a summary level, these observations, findings, and recommendations are found in table 1 below, traced to the requirements of the ToR.

Observations, Key Findings, and Recommendations Summary

Table 1: Observations, Key Findings, and Recommendations Summary

ToR Task Areas	Findings & Recommendations Summary
• Governance to Enable Agility • Space Acquisition Council (SAC) Effectiveness	**Finding Summary**: 1. Sufficient acquisition authority exists within the DoD but not all at the right place in the organization to maximize speed, innovation, flexibility, and assurance. More can be done to empower the Space Service Acquisition Executive (SAE). **Recommendation(s):** 1.1. The Space SAE should be given the authority to use the Middle Tier Acquisition (MTA) pathway for all Major Defense Acquisition Program (MDAP)-equivalent efforts. 1.2. The Space SAE should have the ability to further delegate Milestone Decision Authority (MDA) of MDAPs (i.e., ACAT I programs) to Program Executive Officers (PEOs). 1.3. The Space SAE should have the authority to grant Other Transactional Agreements (OTAs) expected to cost more than $500 million without seeking higher approval. 1.4. The Space SAE should be allowed to determine the membership of the SAC and the frequency of its meetings. Space SAE decisions made within the authority granted by the law *should not* be reviewed further by the SAC.
	Finding Summary: 2. Space acquisition professionals do not have the funding flexibility to enable them to optimally manage their programs or to adequately insert innovative technology. **Recommendation(s):** 2.1. There should be a "single color of money" for space programs to eliminate the need for a reprogramming action due to space acquisition-unique situations.

	2.2. The Below Threshold Reprogramming limit should be raised for Research, Development, Test, & Evaluation (RDT&E) and Procurement appropriations from $10 to $20 million to allow the USSF to redirect dollars more expediently.
	2.3. The SAE should be allowed to hold funds in a new Program Element (PE) for Management Reserve (MR) to be utilized for technology insertion, risk reduction, program acceleration, or corrective actions.
	Finding Summary:
	3. Non-value-added bureaucracy and approval levels distract acquisition professionals from their primary mission, increase decision-making timelines, stifle innovation, and contribute to a risk-averse culture.
	Recommendation(s):
	3.1. The NRO and Missile Defense Agency should remain separate from the Space Force.
	3.2. The Space Force should monitor the size of their oversight staff functions with a metric to ensure the Service remains a lean organization.
	3.3. Program Managers (PMs) should be able to choose which organizations can comment on their acquisition documents.
• Streamline Processes to Enhance Opportunity for Innovation	**Finding Summary**:
	4. The Joint Capabilities Integration & Development System (JCIDS) process is time-consuming, cumbersome, and limits opportunities to leverage commercial innovation.
	Recommendation(s):
	4.1. A follow-on DBB study should look at options to reform the JCIDS requirements process.
	Finding Summary:
	5. There is a lack of communication and understanding between the operational and acquisition communities. The divide challenges the Service's ability to expedite delivery of systems, products, and services to meet warfighter needs.
	Recommendation(s):
	5.1. The Integrated Mission Delta concept should be evaluated in 24 months and if found effective, expanded.

	5.2. Acquisition professionals should have at least two years of operational experience to become Materiel Leader-eligible (program manager on an MDAP).
• Additional Areas of Opportunity o Improved access to commercial space o Talent limitations o Transparency to Increase Trust	**Finding Summary**: 6. While much has been done to address the opportunity, there are identified barriers-to-entry for commercial suppliers—small, large, incumbents, and new entrants. More can be done to reduce the barriers that inhibit access to commercial innovation. **Recommendation(s):** 6.1. A tiger team should report directly to Senior DoD leadership on the status of security vetting for new commercial space businesses along with ways to expedite. 6.2. The SSC Commercial Space Office (COMSO) should catalog the capabilities offered by new commercial space entrants to raise awareness and aid market research. 6.3. The Space SAE should capture the reasons why companies express interest but ultimately, do not bid on opportunities. 6.4. The USSF should hire or contract with a highly qualified expert with venture capital and/or private equity experience to advise the COMSO Senior Materiel Leader on new and best practices to connect with innovators and signal to investors in the private sector.
	Finding Summary: 7. The dynamic nature of today's space industry requires a different approach to develop proficient acquisition professionals with business acumen. **Recommendation(s):** 7.1. Space acquisition professionals should receive training tailored to the attributes of their emerging industrial base, to understand the motivations and challenges of venture capital-backed and private equity startup companies to better leverage their innovative technologies. 7.2. Space acquisition professionals should receive instruction on tailoring the major capability acquisition pathway for the uniqueness of space systems.

	7.3. The Space Force should designate Materiel Leader assignments as controlled tours to increase program leadership stability and accountability.
	7.4. The Space Force should use the Intermediate Leadership Education (ILE) candidate list to send acquisition professionals not selected for ILE to an advanced acquisition education at a private university to develop business acumen.
	Finding Summary:
	8. Real time access to accurate, authoritative data fosters transparency and trust across stakeholders.
	Recommendation(s):
	8.1. The USSF should provide electronic access to authoritative acquisition data to provide transparency to and improve trust among external stakeholders.

Best Practices

Throughout its review, the subcommittee was impressed by the professionalism and ambition of the various Space Force and DoD Agencies to recognize challenges and foster ways to improve their own organizations and processes. Some of these efforts and activities are highlighted below:

- **Integrated Mission Deltas (IMDs):** While only a pilot program, this effort is a step in the right direction to bring operators and acquisition professionals together. Closely pairing operations and acquisition will foster greater collaboration for maintenance activities and enhance requirements understanding for future systems development.

- **Space Systems Command (SSC) Commercial Space Office (COMSO):** The standup of this office adds momentum and *potentially* dollars towards the Service's strategy to exploit commercial capabilities. It is chartered to help new entrants access opportunities as the single-entry point to DoD Space. COMSO encompasses the Commercial Satellite Communications Office, Space Domain Awareness Marketplace, SSC Front Door, SpaceWERX, and Commercial Augmented Space Reserves program.

- **Space SAE Leadership:** The Space SAE is challenging the bureaucratic culture across space acquisition by reducing administrative burden, leaning out staff functions, and providing a clear vision and explicit goals for the workforce. While it is too early to measure the outcomes of the SAE's vision described in *A Simple Formula to Go Fast in Space Acquisition* and *Space Acquisition Tenets*, the subcommittee recognizes the potential for these efforts to bring positive change.

- **NASA Best Practices**: With 65 years in the space business, NASA has demonstrated the ability to deliver the most advanced technology for space exploration and manned missions. NASA's depth of experience executing Other Transactional Authority (OTAs) arrangements enables it to partner with a variety of businesses to develop the disruptive technology its missions require. By organizing its workforce by mission instead of functional area and attaching a consistent cadre of leaders to guide the program from "cradle to grave," NASA has built a culture that aims to "make history, not repeat it."[2]

- **Effectiveness and culture at the National Reconnaissance Office (NRO):** Throughout the interviews and data collection, it was clear that the NRO is an exemplar of outstanding space acquisition processes. This relatively small organization delivers state of the art space systems that support intelligence and DoD operations. NRO culture encourages excellence, its program managers are deliberately developed, bureaucratic processes are minimized, and governance is highly focused and tightly integrated.

Final Comments: The DBB appreciates the Deputy Secretary's confidence in entrusting the Board with this important Study. We sincerely applaud the hardworking acquisition professionals of the DoD who toil tirelessly to support our warfighters. Without their dedication to the mission, America would not be the preeminent space power it is today.

Respectfully submitted,

Ms. Linnie Haynesworth
Subcommittee Chair

Dr. David Van Slyke
Subcommittee Co-Chair

Study Members and Signatures

Ms. Linnie Haynesworth serves as chair of the DBB Business Operations Subcommittee. Ms. Haynesworth and Dr. David Van Slyke, Subcommittee Co-Chair, led the *Review of Space Acquisition* Study.

Contributing members include Honorable Deborah James, Mr. David Beitel, Ms. Sally Donnelly, Dr. Christopher Gopal, Ms. Sarah Mineiro, Brigadier General Bernard Skoch (USAF, Ret.), and Ms. Patricia Zarodkiewicz. Member biographies are found in Appendix C.

Ms. Cara Allison Marshall is the DBB Designated Federal Officer (DFO); Lieutenant Colonel Kyle Harrington, U.S. Air Force, serves as a DBB Military Assistant and Alternate DFO; Lieutenant Colonel Raquel "Shady" Salim, U.S. Space Force, serves as subject matter expert detailed to the DBB; and were primary support officials to this Study. Ms. Gwyneth Murphy, analyst, augmented Study efforts.

The Subcommittee members presented the Study findings and recommendations to the DBB at an open public meeting on November 15, 2023. After discussion and deliberations, the Board approved the Study with comments as documented in Appendix G. The briefing slides presented and approved at the meeting are found in Appendix B.

Signatures

Ms. Linnie Haynesworth
Subcommittee Chair
DBB Co-Chair

Dr. David Van Slyke,
Subcommittee Co-Chair

Honorable Deborah James
Subcommittee Member
DBB Chair

Mr. David Beitel
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Ms. Sally Donnelly
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Dr. Christopher Gopal
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Ms. Sarah Mineiro
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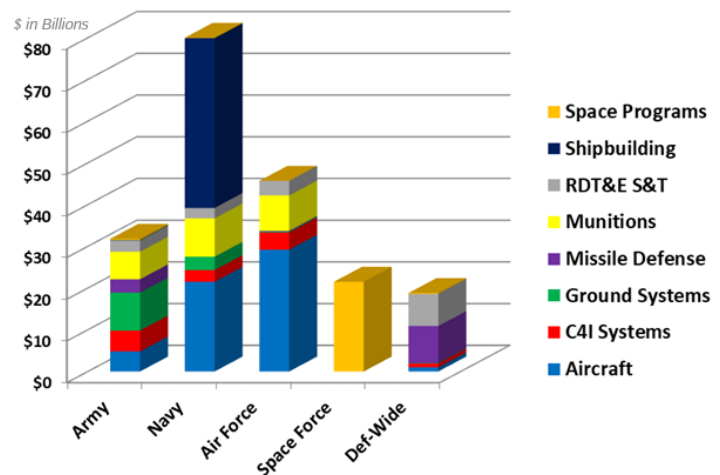Ms. Patricia Zarodkiewicz
Subcommittee Member

II. Background

Less than four years ago, Congress created the sixth armed service. The formation of the United States Space Force (USSF) coincided with the exponential growth in the domain over the last 30 years and amidst change in almost every way—technological advancement, commercial growth, global interest, and surging adversarial capabilities. Without question, space is now a contested warfighting domain, and the partition of the Space Force is rightful recognition of this shifting paradigm. U.S. warfighters enjoy many advantages over their potential and current adversaries owing to the proliferation of U.S. space systems. This creates a dependency on those systems that makes effective and efficient space acquisition imperative. Space Force acquisition authorities, organization, and business processes must all be structured and executed correctly to procure the systems needed to maintain the Nation's edge in space during a time of unprecedented evolution and competition.

DoD Space Acquisition Organizations

Prior to the Space Force, space acquisition for military capabilities was largely conducted within Space & Missile Systems Center (SMC) of the Air Force Space Command, one of the ten Major Commands within the Department of the Air Force (DAF). Major space programs accounted for less than one third of the Acquisition Category (ACAT) I programs in the Department or about 25% of the total investment budget they competed for annually.[3] In the DAF, space programs vied for resources and senior leadership attention with programs like F-35, B-21, nuclear modernization, and the replacement for Air Force One. Figure 1 provides insight into the Space Program investment funding with the standup of the USSF and deconfliction of other priorities such as aircraft and munitions.

Figure 1: FY23 Investment Funding Distribution by Component

Since the early-1990s, the Los Angeles-based SMC was the epicenter of space capability across all segments—from launching satellites into orbit to ground data processing.[4] The organization (and its pre-cursor) developed transformative capabilities like the Global Positioning System (GPS) architecture comprised of satellites, a ground control system, and user equipment. GPS was critical to the success of precision guided munitions in the 1991 Gulf War and has yielded more military and civil benefits than perhaps any space capability since.[5] In addition to GPS, SMC delivered satellites and ground sensing systems to provide and aid weather monitoring, secure communications, battlefield mapping, intelligence, tactical missile warning, and overall situational awareness to combatant commanders.[6]

To reach the "final frontier," SMC historically employed a rigorous, disciplined approach to acquisition, focused on delivery with "100% mission assurance."[7] SMC program personnel applied significant time and resources to ensure proper functioning once a payload reached its intended orbit. With launch of a heavy rocket to low earth orbit at an average cost of $31,000 per kilogram in 1989 (seven times the price it is today) and the government out-spending commercial space six to one, SMC had limited options to succeed and no room to fail.[8,9] But an uncontested space environment during that time enabled a low-risk posture. In 1989, the Soviet Union and the U.S. accounted for 89% of all objects launched into earth orbit or beyond. With the fall of the Soviet Union in 1991, the U.S. dominated space unchallenged. It focused its acquisition agility and budget priority on more immediate threats elsewhere.

In this environment, the SMC acquisition culture evolved into one of process, review, and conservatism. Moreover, SMC was not known for speed. During the 1990s and early 2000s, the DoD accepted longer timelines for mil-space systems and felt little pressure to accept greater risk. SMC matured into an institution that designed "exquisite" systems (large, complex, highly sophisticated), that packed as much capability as possible into each payload it planned to launch. An architecture of "golden school buses" developed which some officials now lament.

With SMC challenged with complex replacement systems and immersed in legacy processes and culture, the Department created new organizations to take a fresh look at space acquisition. The DAF established the Space Rapid Capabilities Office (SpRCO) in 2017 and the Office of the Secretary of Defense (OSD) established the Space Development Agency (SDA) in 2019. Part of the motive behind the creation of these new offices was to regain agility in space acquisition and to speed the transition to the architecture the space community had longed for, but the legacy process and culture could not prototype or transition to expediently: a proliferated network of small satellites, short useful life, incremental capability, and maximum use of commercial systems. Faster replacement cycles would provide more opportunities to inject innovation.

On December 20, 2019, President Donald Trump signed the 2020 National Defense Authorization Act (NDAA), officially redesignating the Air Force Space Command to the United States Space Force. The acquisition offices of SMC were reorganized under the Space Systems Command as depicted in Figures 2 and 3 below. SDA and Space RCO transferred to the Space Force from OSD and the DAF, respectively, and became the Service's three main acquisition centers. Two other field commands, the Space Operations Command (SpOC), and the Space and Training Readiness Command (STARCOM) were created to comprise the operational, test, and training communities.

A few organizations within the DoD space ecosystem maintained their acquisition executive authorities after creation of the Space Force. They include:

1. **The National Reconnaissance Office (NRO)** – Established in 1961 and declassified in 1992, the NRO is a DoD Agency and an Intelligence Community member that develops and operates overhead reconnaissance systems in support of both the military and national intelligence communities. It receives taskings for its assets from two dozen domestic

agencies, including the National Security Agency (NSA) and National Geospatial Intelligence Agency (NGA) within the DoD.[10]

2. **The Missile Defense Agency** – Launched in 1983 under President Ronald Reagan's Strategic Defense Initiative, the office was later renamed to the Ballistic Missile Defense Organization, then to the Missile Defense Agency in 2002. Today, the agency continues to focus on developing hit-to-kill technologies in support of homeland and regional missile defense. The Missile Defense Agency primarily develops terrestrial capabilities, except for a handful of systems like the experimental Space Tracking and Surveillance System Demonstrator that includes a couple of satellites to provide data for its missile defense system architecture. It also procures space-borne sensors for its space-based kill assessment capability hosted on commercial payloads.[11]

3. **National Geospatial-Intelligence Agency** – Established in 2003 from the National Imagery and Mapping Agency, NGA provides products (e.g., imagery, imagery intelligence, geospatial information) to military and intelligence community decision makers that describe, assess, and physically depict physical features and geographic activities on the Earth. Although NGA's products are generated with the assistance of space assets, the agency does not develop and launch its own collection systems.[12]

Figure 2: Current Space Force Organization & Acquisition Chain of Authority for Major DoD Space Acquirers
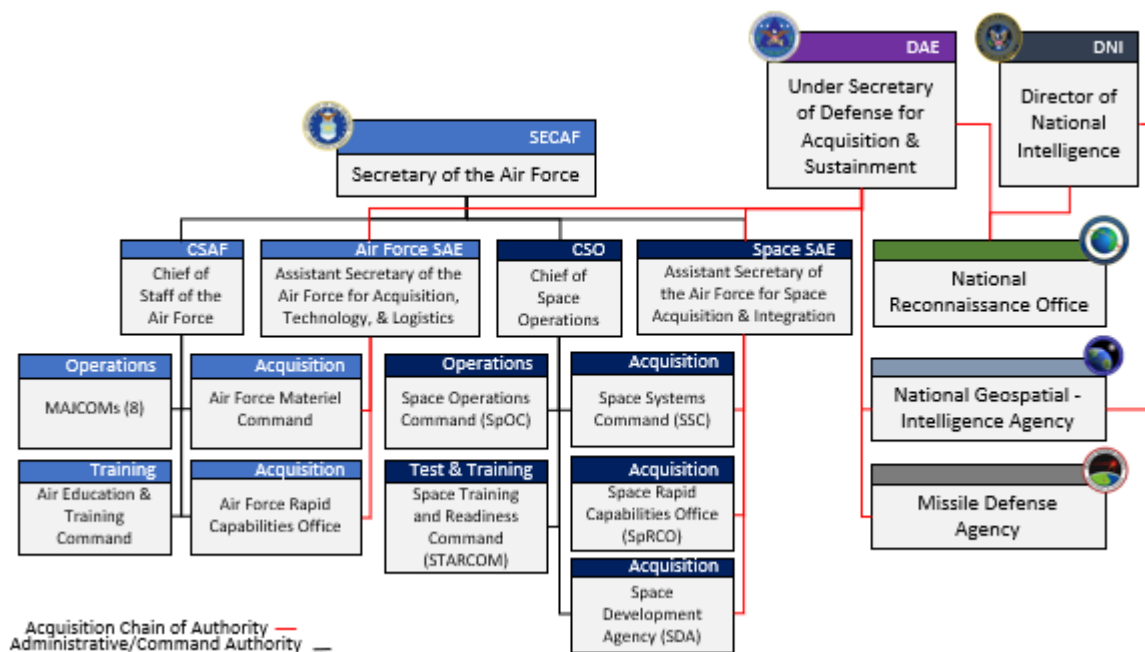
Figure 3: *Scope and Scale of the Unity of Effort: Organizations, Processes, People, and Major USSF Efforts*

Org.	Personnel	Program Elements	Requirements	Other Attributes
SSC	15,000	35	JCIDS	Responsible for 8 of 10 largest USSF efforts
SpRCO	200	2	JCIDS-exempt	DoD 5000-exempt
SDA	200	4	JCIDS-exempt	D/N use DoD 5000, except MTA
NRO	Undisclosed	Undisclosed	JCIDS-exempt	D/N use DoD 5000 or DFAR
MDA	2,500	2	JCIDS-exempt	DoD 5000-exempt

#	Program Name	Org.	Description	eACAT / ACAT	Cost	Start Date	First Delivery
1	National Security Space Launch	SSC	Provides Space Launch Services.	ID	$55.6	Oct 1998	Aug 2002
2	Next Generation OPIR – GEO	SSC	A satellite constellation to provide improved missile warning, missile defense, and battlespace awareness in geosynchronous earth orbit.	IB	$10.3	Aug 2018	Sep 2025
3	GPS IIIF	SSC	A satellite constellation that provides positioning, navigation, & timing and enhancements for user accessibility and operations in contested environments.	IB	$9.3	Sep 2018	Feb 2026
4	OCX	SSC	The upgrade to the GPS ground system.	ID	$6.1	Nov 2012	Sep 2017
5	Next Generation OPIR – Polar	SSC	A satellite constellation to provide improved missile warning, missile defense, and battlespace awareness in polar orbit.	I	$5.9	May 2020	Sep 2029
6	GPS III	SSC	The legacy constellation of satellites to provide navigation, positioning, & timing for military aircraft, ships, and ground personnel.	IC	$5.3	May 2008	Sep 2017
7	Wideband Global SATCOM	SSC	A satellite constellation that provides wideband satellite communication.	IC	$4.2	Nov 2020	Jan 2009
8	Tranche 1 Transport Layer	SDA	126 space vehicles that provide low-latency battlespace awareness data during a regional conflict.	I	$3.2	Feb 2022	Sep 2025
9	Tranche 1 Tracking Layer	SDA	7 infrared-sensing satellites that detect and track ballistic and hypersonic missiles launched by foreign adversaries.	I	$2.6	Jul 2022	Dec 2025
10	Enhanced Polar System - Recapitalization	SSC	A satellite constellation to provide continuous coverage in the polar region for secure, jam-resistant, strategic, and tactical communications.	IC	$2.5	Apr 2014	Jul 2018

The data in figure 3 above characterizes the scope and scale of major USSF acquisition offices and unclassified efforts. The NRO and Missile Defense Agency are included here for comparison only. Space Systems Command is the largest capability provider, with the most resources. It also operates under the most regulation, the most process steps, and with the most segregated budget of all DoD space acquisition organizations.
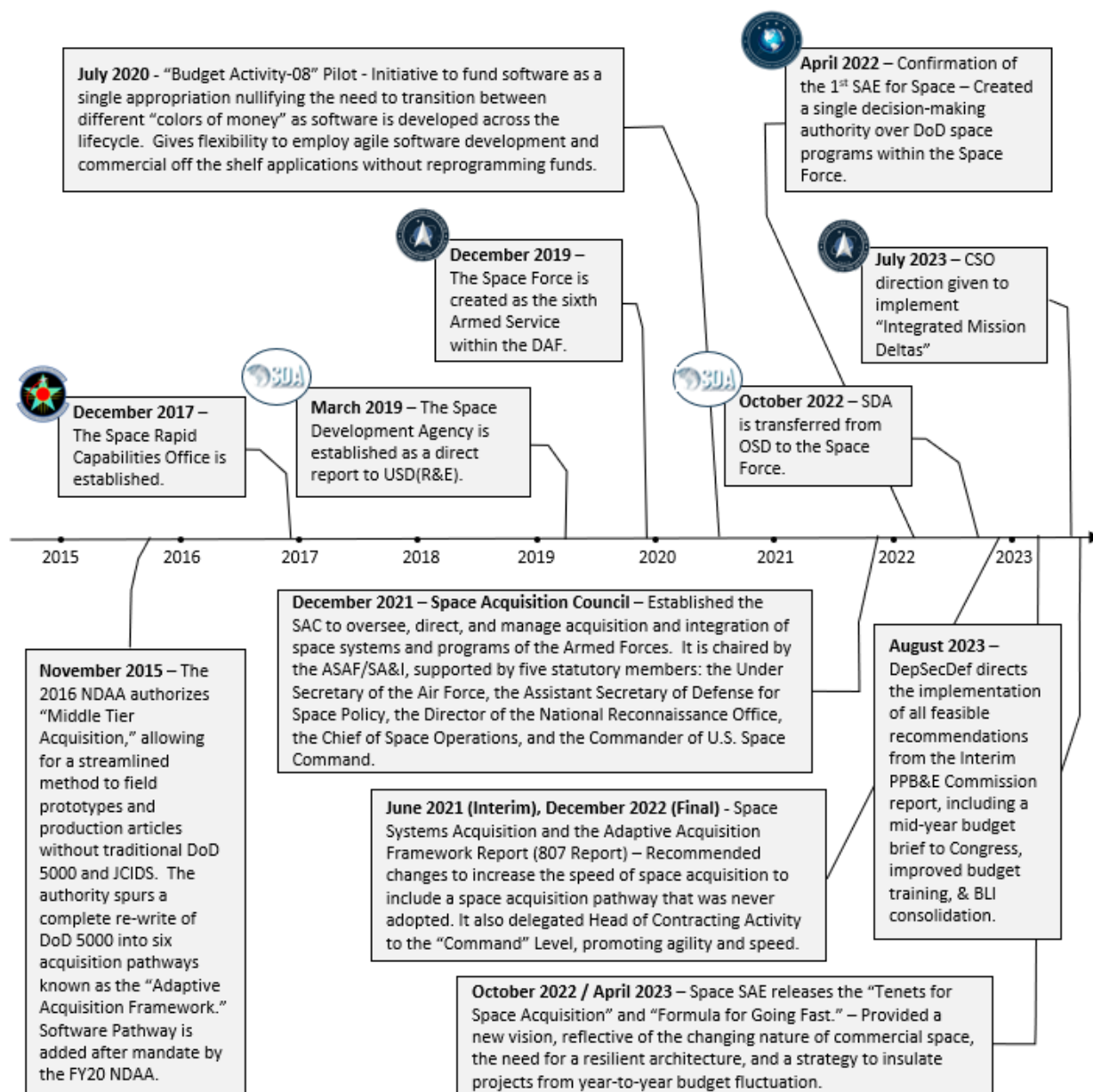
Figure 3 notes & citations are found in Appendix F

Recent Changes to Space Acquisition 2015 - 2023

Significant acquisition change occurred between 2015 and 2023, directly and tangentially related to the procurement of space systems. These modifications were made to enhance the speed of delivery and are in varying stages of implementation. It is premature to determine their effectiveness. Nonetheless, they provide a backdrop for this report and are therefore described further in Figure 4 below.

Figure 4: *Major Events in DoD Space & Acquisition - 2015 - 2023*

July 2020 - "Budget Activity-08" Pilot - Initiative to fund software as a single appropriation nullifying the need to transition between different "colors of money" as software is developed across the lifecycle. Gives flexibility to employ agile software development and commercial off the shelf applications without reprogramming funds.

April 2022 – Confirmation of the 1st SAE for Space – Created a single decision-making authority over DoD space programs within the Space Force.

December 2019 – The Space Force is created as the sixth Armed Service within the DAF.

July 2023 – CSO direction given to implement "Integrated Mission Deltas"

December 2017 – The Space Rapid Capabilities Office is established.

March 2019 – The Space Development Agency is established as a direct report to USD(R&E).

October 2022 – SDA is transferred from OSD to the Space Force.

2015　2016　2017　2018　2019　2020　2021　2022　2023

December 2021 – Space Acquisition Council – Established the SAC to oversee, direct, and manage acquisition and integration of space systems and programs of the Armed Forces. It is chaired by the ASAF/SA&I, supported by five statutory members: the Under Secretary of the Air Force, the Assistant Secretary of Defense for Space Policy, the Director of the National Reconnaissance Office, the Chief of Space Operations, and the Commander of U.S. Space Command.

August 2023 – DepSecDef directs the implementation of all feasible recommendations from the Interim PPB&E Commission report, including a mid-year budget brief to Congress, improved budget training, & BLI consolidation.

November 2015 – The 2016 NDAA authorizes "Middle Tier Acquisition," allowing for a streamlined method to field prototypes and production articles without traditional DoD 5000 and JCIDS. The authority spurs a complete re-write of DoD 5000 into six acquisition pathways known as the "Adaptive Acquisition Framework." Software Pathway is added after mandate by the FY20 NDAA.

June 2021 (Interim), December 2022 (Final) - Space Systems Acquisition and the Adaptive Acquisition Framework Report (807 Report) – Recommended changes to increase the speed of space acquisition to include a space acquisition pathway that was never adopted. It also delegated Head of Contracting Activity to the "Command" Level, promoting agility and speed.

October 2022 / April 2023 – Space SAE releases the "Tenets for Space Acquisition" and "Formula for Going Fast." – Provided a new vision, reflective of the changing nature of commercial space, the need for a resilient architecture, and a strategy to insulate projects from year-to-year budget fluctuation.

State of the Current Environment

The nature of the current space environment poses both threats *and* opportunities to the pace of space acquisition and technological innovation. Several trends characterize today's

environment: (1) rapid growth of the space industrial base, (2) expansion of China's technological capabilities, commercial space sector, and space mission, and (3) the impact of past space program overruns and delays. These trends serve, in combination, as a strong imperative for reviewing space acquisition governance to ensure the Department can harness commercial innovation, match and exceed the pace of U.S. adversaries and competitors, and prevent old acquisition challenges from defining the future.

Space Industrial Base Growth: Unprecedented growth in the commercial space sector is rewriting the space industrial base ecosystem. Previously, several major contractors (e.g., Northrop Grumman, Lockheed Martin, Raytheon, etc.) commanded the whole space industry; today, it is infused with emerging startups, consisting now of over 5,000 space-focused companies and billions of dollars in private sector investment.[13] Creating and launching space systems has become more cost efficient, streamlined, and accessible following the integration of innovative technologies and processes, allowing a huge variety of new entrants into the space industry.[14] This fast pace and high volume of commercial activity is expected to continue for the foreseeable future. *Fortune* projects the commercial space industry to grow 41% in the next five years alone.[15] This growth represents a critical opportunity for the Department since, as a *War on the Rocks* author and U.S. airman aptly stated, "You go to war with the industrial base you have, not the industrial base you want."[16]

Competition and Keeping Pace: While the U.S. remains the leader in civil and defense spending in space at almost 60% of total global spending, China comfortably holds the number two spot at 14%.[17] In the last few years, China has significantly increased its focus on space missions and is working to surpass 70 commercial and military launches over this year alone.[18] To support this increased dedication to space, the Chinese Government uses their military-civilian fusion strategy and launched a new model for commercial space support where they provide significant funding to companies that are serving both commercial and military functions.[19] In line with this expansion, the Institute for Defense Analyses estimated Chinese space companies raised $516 million in venture capital in 2018, which continues to increase each year.[20] This kind of growth may not be at the size or funding level of the U.S. commercial space sector, but according to analysis conducted at the Massachusetts Institute of Technology, China's recent achievements in bolstering its private space industry represents a critical pillar of its larger geopolitical strategy to replace the U.S. as the leading world power.[21]

Past Space Program Overruns and Delays: The rapid growth of global space industries is not the only trend that is shaping the current space environment. Past space program overruns and delays still reverberate in space conversations today, reminding the Department of what is at stake as it attempts to organize and execute its acquisition in service of its most critical missions. A 2021 RAND space acquisition report identified a long pattern of acquisition challenges, including cost and schedule failures, technical issues, and leadership, management, and cultural problems.[22] The report detailed how space programs such as the Space-Based Infrared System, Advanced Extremely High Frequency constellation, GPS IIIF, and GPS III all spanned at least ten

years from development program start to first launch and incurred notable cost increases during that period.[23] On technical issues and capability delivery, RAND analysts pointed to the Joint Space Operations Center Mission System and the Next Generation Operational Control System, noting that ground station problems contributed to delays to achieving full capability.[24] The report also identified a broader issue with enterprise synchronization and culture, calling out acquisition leadership fragmentation, unclear roles and accountability lines, and a risk-averse culture of workers who focus on metrics that produce an intolerance for the kinds of mistakes that often result from innovation.[25]

While two years have passed since the publication of the RAND report and adoption of its recommended changes, process streamlining, cultural transformation, commercial integration, and notable program improvements have taken place in the interim, the history of U.S. space program challenges remains a salient reminder of the foundation upon which the current space environment rests.

State of Current Acquisition Authorities

Integrated Life Cycle Management, the DAF's implementation manual for DoD policy on systems acquisition (DoD 5000), clearly defines the chain of acquisition authority from SAE, through the Program Executive Officer (PEO), to the accountable Program Manager (PM).[26] The publication directs minimal levels of review between the PM and their decision authority and emphasizes that it be these individuals alone who "exercise decision-making authority

Figure 5: *Acquisition Program Categorization*

Acquisition Category	Dollar Value	Decision Authority
ACAT I (MDAPs)	$525 M (RDT&E) $3.065 B (Procurement)	DAE or SAE
ACAT II	$200 M (RDT&E) $920 M (Procurement)	PEO or as delegated
ACAT III	Does not meet $ thresholds above	As delegated

on programmatic matters."[27] Decision Authority is termed "Milestone Decision Authority" (MDA) on programs utilizing the Major Capability Acquisition (MCA) pathway, one of the six pre-tailored processes described in DoD 5000. The SAE is the appointed MDA by law on programs categorized as Acquisition Category I (ACAT I), further detailed in Figure 5. The Defense Acquisition Executive (DAE) held this role for ACAT I efforts, also known as Major Defense Acquisition Programs (MDAPs), prior to a change made by the 2016 NDAA.

The role of individuals designated as the Decision Authority on an acquisition program is significant. They determine the program baseline. They have final say on the strategy used to acquire the new capability. They certify that a program is ready to move to the next phase in the acquisition lifecycle, often coupled with the award of multi-million-dollar contracts. They approve production and delivery of assets and are accountable for all statutes and policies levied on a program.[28] Thus, fluidity of communication between the PM and Decision Authority, through the PEO, is vital. One former PEO characterized the relationship by observing, **"If you compress the decision-making timeline, you compress delivery."**

Table 2: *Roles & Responsibilities for the Acquisition Chain of Authority*

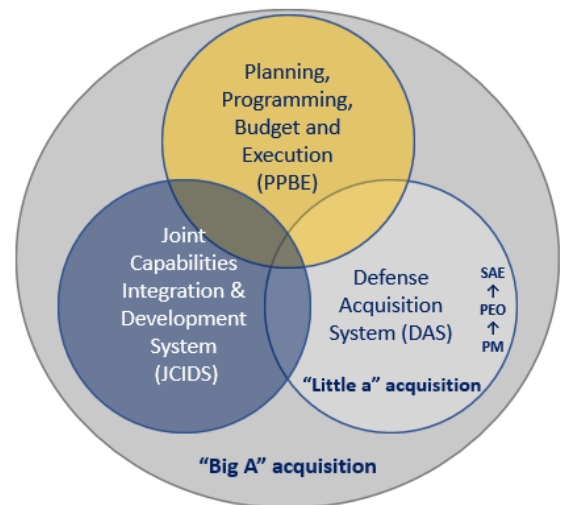| Role	Basic Responsibilities	Typical Grade / Experience

Defense Acquisition Executive (DAE)	• **Decision Authority** for all ACAT ID & equivalent programs:
	    • Approves acquisition and program strategies, to include tailoring
	    • Approves entry into each phase of the acquisition
	• Provides oversight to programs in purview
	• Accountable for cost, schedule, risk, and performance reporting for all programs to higher authority: OMB & Congress
		PAS* EX-III; Decades, although not exclusive to government service.

Under Secretary of Defense for Acquisition & Sustainment USD(A&S)	• Serves as the DAE & advisor to the SecDef for all matters acquisition • Establishes and enforces policies on and supervises the performance of acquisition in the DoD • Accountable for all pathways through the defense acquisition system • Serves as the Senior Procurement Executive • Approves the use of MTA pathway for programs that exceed the MDAP threshold • Serves as co-MDA, along with the Deputy Director for National Intelligence (DNI) for IC acquisition as described in DoD 5135.02	PAS* EX-III; Decades, although not exclusive to government service.

Service Acquisition Executive (SAE)	• **Decision Authority** for all ACAT IB, IC & equivalent programs:
	    • Approves Acquisition Strategy and program strategies, to include tailoring
	    • Approves entry into each phase of the acquisition
	• Provides oversight to programs in purview
	• Accountable for cost, schedule, risk, and performance reporting for all programs to higher authority: OSD, OMB, & Congress
		PAS* EX-IV; Decades, although not exclusive to government service.

Assistant Secretary of the Air Force for Space Acquisition & Integration (ASAF/SA&I)	• Serves as the Space SAE • Responsible for and oversees all architecture and integration with respect to the acquisition of the space systems and programs of the armed forces • Chairs the SAC • Oversees and directs the SpRCO, SSC, and SDA • Advises and synchronizes acquisition projects for all space systems • Discharge Senior Procurement Executive duties as assigned	PAS* EX-IV; Decades although not exclusive to government service.

Program Executive Officer (PEO)	• **Decision Authority** for all ACAT II, III & equivalent programs, unless delegated further:
	    • Approves Acquisition Strategy, to include tailoring
	    • Approves entry into each phase of the acquisition
	• Provides oversight to programs in purview
	• Accountable for cost, schedule, risk, and performance reporting for all programs to higher authority: SAE, OSD, OMB, & Congress
	• Interacts with other PEOs and contractors to identify shared concerns, opportunities, and to gauge performance
	• Provides programs with intelligence support, facilities, & other resources
		GO/SES; Decades

Program Manager (PM)	• Accountable for cost, schedule, risk, and performance reporting for their program to higher authority: PEO, SAE, OSD, OMB, & Congress. • Responsible for program execution to deliver systems that meet documented user requirements • Ensure programs comply with regulatory and statutory guidance • Develop program strategies and plans	ACAT I: Col / GS-15; 19-25+ years ACAT II: Maj – Lt Col / GS13-14; 8-18 years ACAT III: Capt / GS-12; 4-8 years

Presidentially Appointed, Senate Confirmed

The Defense Acquisition System (DAS) constrains the authority of each of these individuals (i.e., PM, PEO, MDA). The DAS is one of three major processes the DoD uses to deliver warfighting capability as part of its Decision Support System for Defense Acquisition, illustrated in Figure 6.

1. **Defense Acquisition System (DAS)** – Guides the management of efforts that acquire effective, affordable, and timely systems for Defense Department users. The DoD Directive 5000 series of publications governs it.

2. **Joint Capability Integration and Development System (JCIDS)** – Supports the Chairman of the Joint Chiefs of Staff and the Joint Requirements Oversight Council (JROC) in identifying, assessing, and prioritizing joint military capability requirements. It is the process that initiates materiel procurements and non-materiel changes to existing doctrine, training, and policy.

3. **Programming, Planning, Budgeting, and Execution (PPBE)** – Resources the activities of the DoD through an annual process to produce the Secretary's Defense Planning Guidance, five-year program objectives memorandum, and the DoD portion of the President's Budget.[29]

In this way, defense acquisition is the ultimate team sport. Acquisition leaders that deliver the end items, systems, and services through the DAS must do so in concert with requirements and resource officials, without the power to direct their actions or set their priorities. They are beholden to the processes built to drive requirements and resources as well. This theme presented itself over and over during interviews, with several allusions to "Big 'A'" versus 'Little 'a'" acquisition. As one former senior military leader described, "The biggest issue is the overall acquisition process. It's not just buying things, it's budget, the requirements, the acquisition process, and the test process, each having their own roles."

Figure 6: DoD Decision Support System for Defense Acquisition

The interconnectedness of the systems is often lost on the casual observer, leaving the programs (and the DAS) to bear the brunt of the criticism when challenges eventually arise. "Most people will just say, 'acquisition is broken,'" one interviewee told the subcommittee, "well sometimes it is, that does happen, but more often then not, it's one of these other things."

The Weather System Follow-on (WSF) program is a good example. This ACAT I effort successfully met Milestone B in 2020, marking entry into the engineering and manufacturing development phase. PPBE leaders made assurances as part of the milestone certification that funding would be available to execute the product development and production plans. However, as noted in the program's 2021 Selected Acquisition Report (SAR), budget reductions internal to the Department in FY22 and FY23 threatened WSF's ability to exercise a pre-negotiated fixed price contract option.[30] Had it not been for a Congressional reprogramming action, the program would have incurred a cost increase to build its second space vehicle and a schedule delay of two years.[31]

Each leg of the "Big A" triumvirate has history. The PPBE process dates back to the Kennedy Administration in 1961.[32] Secretary Rumsfield created JCIDS in 2003 to ensure a comprehensive requirements process focused on capability needs of the joint force tied to strategy over individual service needs and current threats.[33] Through the DoD 5000 series of instructions, the DAS has governed the sprawling defense procurement empire since 1971.[34] Reviews and reforms have poked and prodded the DAS since its inception to optimize its outputs. Between 1971 and 2010, the Government reformed defense acquisition over 50 times, most visibly with the Nunn-McCurdy Provision of 1982, the Packard Commission of 1986, the Defense Acquisition Workforce Improvement Act (DAWIA) of 1990, the Federal Acquisition Streamlining Act (FASA) of 1994, and the Weapons Systems Acquisition Reform Act (WSARA) of 2009.[35]

Neither PPBE nor JCIDS have been the subject of nearly as much scrutiny during their existence, but the tide is turning.[36] In 2021, Congress directed the Secretary of Defense to assess the process for developing capability requirements for DoD acquisition programs.[37] A year later, Congress established an independent PPBE Commission to examine its effectiveness, consider alternatives, and to make legislative policy recommendations for improvement. The effects of these initiatives have yet to be felt within the sytems; their findings are still less than a year old.

III. A Review of Space Acquisition – Findings

The subcommittee's review uncovered eight areas for improvement, grouped as themes and described below. Recommendations to bolster these areas to speed the pace of innovation in the DoD are covered in section IV.

1. Space SAE Control / Authorities to do the Job

Throughout its interviews, the message to the Subcommittee was loud and clear: the Department has the authorities it needs. Now, the right people in the acquisition decision-making chain of authority need to be empowered and unburdened to use them.

> **Finding:** Sufficient acquisition authority exists within the DoD, but not all at the right place in the organization to maximize speed, innovation, flexibility, and assurance. More can be done to empower the SAE.

a. Middle Tier Acquisition (MTA) Authority

The greatest gift of the 2016 NDAA is in section 804, *Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding*. The law provided a new pathway to acquire fieldable products within five years, both JCIDs- and DoD 5000-exempt. The NDAA directed the Under Secretary of Defense for Acquisition, Technology, and Logistics to develop new guidance for program managers to use on these streamlined efforts. The Department could award contracts with simplified requirements, supported by less documentation. While statutory requirements were still compulsory, the Department was to establish a swift process to seek a Congressional waiver. The SAE was to serve as MDA for these efforts and was charged with selecting a program manager as a direct report, without intervening review or approval.

In 2018, USD(A&S) issued interim guidance for the pathway and solicited feedback from Components. Both the Navy and Air Force had issued similar guidance to its communities by this point as well. During testimony to the House Armed Services Committee in 2018, the Army's SAE praised the path, claiming the traditional acquisition system was not appropriate to aid modernization, describing it as "linear" and "closed" with "unacceptable timelines." The Air Force's SAE was equally enthused. He concluded an Air Force Guidance Memorandum about MTA implementation policy with, "I encourage you to make rapid acquisition our new Air Force standard, not an occasionally used exception. Speed awaits."

On December 30, 2019, USD(A&S) published its final MTA guidance in DoD Instruction 5000.80. The policy stipulated that programs exceeding the MDAP threshold obtain written approval from the USD(A&S) after review by an MTA Advisory Board made up of the Vice Chairman of the Joint Chiefs of Staff and four other OSD functional leaders.

By the end of FY20, the DoD had 69 active MTA programs with an estimated total value of $31.1 billion. Programs of all sizes (ACAT levels I, II, III) were utilizing the speed afforded by MTAs. Aircraft, hypersonic weapons, engines, and satellite programs all proceeded down the prototyping or procurement path under the guidance of MTA, proving the methodology could be used for weapon systems at scale. Notably, the F-15EX MTA program delivered two aircraft in the Spring of 2021, just two years after receipt of requirements.[38]

In September 2021, the DoD Inspector General reviewed a sample of 11 programs using the authorities granted under Section 804. The report found the acquisition culture changing, efficiencies increasing, and all 11 programs in compliance with DoD guidance. But some Department leaders worried potential misuse would lead to loss of the authority. They were concerned programs would skip important systems engineering planning, provide unrealistic schedules, or seek capabilities that were simply too complex for the fast track.

The fear resulted in an overcorrection in oversight that many interviewees noted as excessive. Larger efforts, required to meet USD(A&S)'s MTA Advisory Board, have found it increasingly difficult to earn the approval to use the MTA process. Timelines to get a certification from the council have grown from one month in 2021 to up to six months in 2023. "It's been damaging and has gone against Congressional intent," one DoD official said. "The ability to use that pathway should be simplified. Congress created SAEs for a reason. They need autonomy to perform decisions. When you add additional layers, it slows things down."[39]

At least one major program has decided not to pursue the pathway since the MTA Advisory Board's rise. What is, perhaps, worse is the perceived loss in trust that the lengthy oversight process signifies to the acquisition workforce—a step backwards from the culture of risk tolerance to which the Department aspires.

b. Milestone Decision Authority (MDA) Delegation

DoD and Congressional officials have sought to streamline acquisition for decades. A wide-ranging package of defense acquisition reform efforts in the 2016 NDAA provided the "teeth" to do so. It included the "automatic" delegation of decision authority to the services for all ACAT I

programs reaching milestone A after October 1, 2016. In that vein, the Honorable Ellen Lord, the Pentagon's "Chief Weapons Buyer" from 2017 to 2021, began delegating the bulk of existing major defense programs to the services. During her testimony to the Senate Armed Services Committee in 2017, she shared that, "OSD should function as a corporate office, very lean, enabling the services as businesses to execute programs they are responsible for."[40] Today, OSD is the decision authority for three Space Force programs, the Service (SAE) controls 22, and the PEOs or lower decide on the remaining ACAT II and III efforts following the policy guidance described in figure 5 above.

In 2021, the Air Force became the first service in the modern era to delegate an ACAT I program below the SAE when it delegated the B-2 Display Modernization program, a project with minimal non-recurring engineering, to the PEO for Fighters and Bombers. Although counter to delegation guidance set by Department policy, the Service assigned decision-making authority commensurate with the risk involved and not solely based on program cost. Other organizations have not adopted this practice despite its ability to shorten the distance between program and decision maker; breaking from policy defies Pentagon culture and is difficult to do.

Title 10 USC § 4204 is the law that describes MDA Delegation. It provides scenarios where the Secretary of Defense may decide to designate an alternate decision authority to the SAE for major programs. These instances include when the program:

1) Is addressing a joint requirement,

2) Would be better managed by a Defense Agency,

3) Has breached the Nunn McCurdy cost threshold,

4) Is critical to meeting an inter-agency requirement, or

5) Would have a greater likelihood of meeting cost, schedule, and performance thresholds.

While some circumstances (e.g., joint requirements, Nunn McCurdy cost breach, inter-agency interest) may justify an alternate MDA at a higher level in the organization, like in the case of the three space programs that remain with the DAE, the law does not restrict delegation to an MDA at a point lower in the organization. However, DoD Instruction 5000.85 does not include language to empower the SAE to exercise further delegation of ACAT I programs, leaving many SAEs to split their time over dozens of major projects.

Objectively, it is rational to trust the SAE with selecting a qualified alternate decision authority. They, like the DAE, are presidentially appointed, senate confirmed acquisition leaders, often with decades of experience, both inside and outside the Federal Government. For skeptics of decision authority delegation worried that program execution will suffer, the early data does not support their concerns.

Data collected by the Government Accountability Office (GAO) and OUSD(A&S) From 2012 through 2016, when the DAE was MDA for 46% of programs, showed that the average number of Nunn-McCurdy cost breaches was 2.6 per year.[41,42] Since the delegation reforms of the 2016

NDAA, the DAE is now the MDA for just 11% of all ACAT I programs, and the number of average Nunn McCurdy breaches has remained constant at about 2.3 per year. Although a small sample size, initial data indicates that program success may not be solely dependent on where a decision authority sits within the acquisition enterprise.

c. Integration Forums

i. The Space Acquisition Council

Embracing unity of effort across National Security Space (NSS) is key to its success. For the past two decades, endless review of the federal organization and governance of space has not helped to promote information sharing. Organizations fear that if their missions and activities are closely aligned with others, they will be consolidated or subsumed, and their culture of speed and innovation, autonomy, and authority will be lost. The loss of culture and autonomy was of distinct concern with respect to the NRO, from the perspective of employees and external observers alike. The creation of the USSF seems to have quieted these fears, for now. Multiple officials disclosed that within the last five years, integration, or at least the willingness to share, has improved. As one senior DoD official put it, "When rice bowls are not threatened, the community is able to come together to work through hard problems."

Policymakers understood the importance of integration when forming the Space Force. GAO, RAND, the Institute for Defense Analysis, and others have often cited coordination between defense space entities as a shortcoming in their reports since 2008. With the 2020 NDAA's establishment of the Space Acquisition Council (SAC), Congress mandated a forum to ensure, among other duties, "integration across the national security space enterprise."[43] Interviews found varying levels of satisfaction with the three-year-old body. About half of those polled found it to be useful as an information sharing forum and for growing partnerships.

The criticism of the SAC seems to stem from confusion over the body's objective and if its main purpose is to make decisions. The law empowers the council to "oversee, direct, and manage acquisition and integration [of] space systems and programs of the armed forces in order to ensure integration" and to "promptly review any determination made by the Assistant Secretary of the Air Force for Space Acquisition and Integration (ASAF/SA&I) with respect to architecture for the space systems and programs of the armed forces and either certify or decline to certify the determination."[44] This is awkward for two reasons:

1) The SAC is empowered to review space programs of the armed forces, but only two services are represented on the council. Statute omits other DoD agencies with equity from formal membership as well (e.g., Missile Defense Agency).

2) The ASAF/SAI is both the SAC Chair as well as the Space SAE. The law implies the ASAF/SAI will present their own decisions to the Council for "certification." Beyond that irony, the requirement for the chief decision maker in all USSF acquisition to hold a second review for a decision he/she already made is inefficient as well.

Despite these flaws, the forum has its proponents; nearly 50% of interview participants claim it is "effective." On the other hand, several interview participants discounted the SAC, pointing out that Council principals often send subordinates in their place, diminishing Council meeting effectiveness. The current administration seems to have embraced the potential of the group as a connection point, including many stakeholders the law does not require, like OSD, Missile Defense Agency, SSC, and others. With some adjustments, the forum is postured to achieve what past councils and governance bodies could not: integrating a distributed architecture to deliver resilient capabilities in space.

ii. The Program Integration Council

The Program Integration Council (PIC) predates the Space Force itself. The group is not directed by policy, regulation, or statute — it has no authority. Rather, space PEOs and leaders formed the PIC across NSS realizing long ago that coordinating their efforts was the right thing to do to deliver for their customers. The PIC is a "coalition of the willing," operating across Title 10 (defense) and Title 50 (intelligence) lines, complementing its collective expertise with other agencies with equity (e.g., NASA) from time to time as well. With the SSC's Space System Integration Office as host, it brings together dozens of organizations to work through engineering integration and system of systems conflicts. In interviews, the PIC was widely regarded at all levels as a positive force in the space community, with one former leader calling it, "hugely successful."

Some interview participants floated the idea of elevating the PIC on the organizational chart from its place in headquarters SSC to the ASAF/SA&I staff. They reasoned that the PIC could more easily resolve conflicts if it operated from the office of the single acquisition authority in the entire Space Force. Others countered this idea pointing out the following arguments: (1) Re-organization does not always solve problems; (2) The Space SAE does not have the authority to direct all NSS; and (3) The forum works because of the horizontal nature of the relationship. Bureaucracy, or perception of it, can often get in the way of two PEOs solving a program.
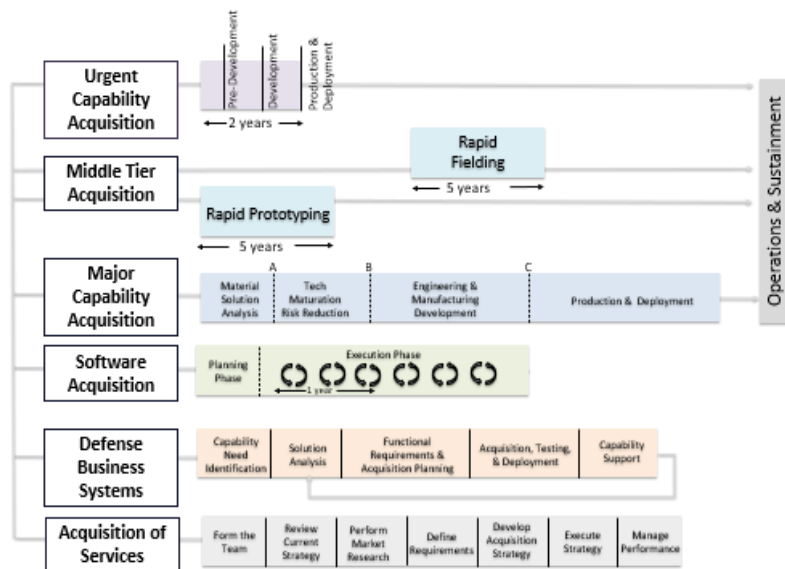
d. Tailoring-in

In the spirit of the 2016 NDAA, Hon. Lord also drove the overhaul of the DoD 5000 instruction that governs the defense acquisition system. The update divided guidance into separate issuances for six distinct acquisition pathways recognizing that a "one size" process does not fit all forms of procurement. The update, *Operation of the Adaptive Acquisition Framework*, offers a new approach when it comes to process and documentation. The revision empowers program managers to, "tailor in the regulatory information requirements that will be used to describe the management of the program."[45] This guidance is in reference to the nearly three dozen artifacts suggested by policy to document plans to address different elements of the acquisition.[46]

The tailoring-in of business processes is the next evolution in eradicating what one former official described as, "the death march through the Federal Acquisition Regulation." Historically, programs could pursue waivers to omit documents and business processes that did not add value, but it often took the same time to fulfill the requirement as it did to navigate the layers of offices needed to gain waiver approval. A 2016 GAO investigation studied

Figure 7: *The Adaptive Acquisition Framework*

these layers of approval, finding involvement of up to 56 organizations at eight levels above the program office. It recognized new attempts to streamline reviews but needed more time to determine results.[47]

In 2023, the Department does not appear to fully embrace the intent of these new approaches. Multiple interview participants cited the 56 individuals that have the power to "say no" still in the review process. The "56 individuals" lingers as a reference to the myriad of staff professionals and advisors that organizational business processes add, despite clear Department policy around chain of acquisition authority. While they do not technically have the authority to say "no," program personnel expend effort to satisfy their questions and opinions on what the boss might think. The churn adds time and detracts from program execution.

While careful review of program plans is necessary, finding balance in oversight is crucial to maximizing the focus of program personnel on execution. When programs identify the business processes and documentation they need, they fall subject to the default template and gambit of reviewers. "Tailoring-in" has promise, but it does not necessarily always minimize bureaucracy.

e. Other Transactional Authority

Since its start in 1958, NASA has utilized Other Transactional Authorities (OTA) to partner with the nation's best innovators. During the nation's first "space race" spurred by the launch of the Soviet's *Sputnik 1* satellite, NASA leveraged OTAs to short circuit the timeline to the smart, quick, innovation of the commercial sector. As an alternative to traditional defense contracts, OTAs place a premium on capability over compliance. OTAs side-step the onerous complexities of the two-thousand-page Federal Acquisition Regulation (FAR), its lengthy source selection procedures, and the cost accounting standards that often exclude non-traditional business participation. Shedding the FAR doesn't mean these agreements lack rigor, they are still legally

binding and afford the program office the freedom to negotiate and tailor the requirements that make sense for their effort, akin to private sector contracts.[48]

In the beginning, OTAs were utilized for basic, applied, and advanced research projects. Over time, they have increased in scope and usage. In 1989, Congress granted the Defense Advanced Research Projects Agency the authority to employ OTAs for their technical efforts. In the early 2000s, the Army leveraged OTAs to develop the Mine-Resistant Ambush Protected vehicle, crucial to reducing improvised explosive device damage during the Iraq and Afghanistan wars.[49] Through the 2015 and 2016 NDAAs, Congress further expanded their utility by making OTAs a permanent tool for the DoD to use on prototyping and follow-on production contracts. From 2015 to 2019, the use of OTAs exploded, growing from $700 million to $7.4 billion over that time—up 957%.[50]

Space Force usage is on the upswing as well. SDA's Tranche 1 Tracking program is a $1.6 billion effort. SSC is also using OTAs on launch. Despite their growth, OTAs are still only a fraction of the contracts awarded by the Department (18% in 2019).[51] Familiarity and experience with their usage across the acquisition workforce is low. Approval thresholds stand as a barrier to further implementation too. Prototyping efforts exceeding $500 million must seek approval from the Under Secretary of Defense for Acquisition and Sustainment, adding more bureaucracy to a process aimed at speed.

2. Funding Flexibility for Innovation

For any small business, scaling the mountain of process and regulation to win a DoD contract is a significant feat. But some only crest that mountain to find a valley of instability on the other side. "Even when you win, you haven't won," one venture capital-backed startup Chief Executive Officer (CEO) told the Subcommittee. "We won a Small Business Innovative Research award and found out the project had no funding. That seems weird. The lack of reliable dollars is [puzzling]. 'Selected but unfunded' is a concept that does not exist anywhere else." The anecdote is a microcosm of both the annual turbulence of the PPBE process and budgetary rules and restrictions that trap funding behind artificial barriers. "There is a whole machine that does the budget, and I don't know if they think they are being agile and innovative but changing the baseline every year is not a big deal to [these] folks. It's part of [their] culture," explained one DoD official familiar with the process.

Finding: Space acquisition professionals do not have the funding flexibility to enable them to optimally manage their programs or to adequately insert innovative technology.

Programs don't have the authority or tools to deal with the turmoil though, which can lead to missed opportunities or further trouble when projects need additional resources to correct a problem. The Space Force's budget, like the other components in DoD, is carved up into

different Program Elements (PEs) organized by appropriations category (e.g., RDT&E, Procurement, Operations & Maintenance). Major programs are often captured in their own PE (or budget line item) while smaller projects get grouped together. Financial managers can move money across PEs through a process known as "below threshold reprogramming," below a prescribed dollar threshold.

The threshold amount for investment accounts is set at the lesser of 20% of the PE or $10 million (cumulative increase or decrease per year). As detailed in Figure 7, prior to FY20, the reprogramming threshold for procurement

Figure 8: Reprogramming Thresholds by Appropriation Titles for Selected Fiscal Years. Notes & citations can be found in Appendix F.

Fiscal Year	Procurement	RDT&E
2000	$10 million	$4 million
2003	$20 million	$10 million
2005	$20 million or 20%	$10 million or 20%
2018	$20 million or 20%	$10 million or 20%
2020	$10 million or 20%	$10 million or 20%
2023	$10 million or 20%	$10 million or 20%

appropriations was set to $20 million but was revised by the explanatory report to accompany public law 116-93 and has remained at $10 million since. In the draft FY24 appropriations bill, the Congress has shown willingness to increase the threshold to $15 million for investment accounts. While not a return to the flexibility afforded prior to 2019, it's a positive step forward.

For larger changes during the year of execution, the Service must obtain Congressional approval through twelve layers of bureaucracy in a process known as Prior Approval Reprogramming (or Above Threshold Reprogramming) that can span six months or longer.[52] This restriction has left many PEOs frustrated that one program's cost savings cannot be used to correct another project's test failures or to insert innovative technology in another.

Budgeting by appropriations (e.g., RDT&E, Procurement, etc.) presents another challenge unique to space. First, the rise of commercial space solutions has enabled the Service to leverage a growing number of capabilities directly from the private sector. Space Force is spending a fair amount today on commercial space products and services. However, the way traditional systems overlay budget profiles against projects, with RDT&E followed by procurement, should the project identify a commercial solution early in its life, it must pursue lengthy reprogramming to swap development for procurement dollars to enable the purchase.

Space development doesn't neatly lend itself to the RDT&E/Procurement construct either. On other sides of the Department, take munitions procurements for example, RDT&E dollars purchase ten percent of the total expected buy as test assets. Once the design is finalized, procurement appropriations purchase hundreds or thousands of rounds to fulfill the remaining buy. This concept doesn't translate to large satellite programs or even ground stations, where only a few end items will be procured. For these efforts, all items will be fielded, but there is an arbitrary divide between which systems are procured with one "color of money" versus the other. This not only limits the manager's ability to reallocate funds between systems; it can be problematic across fiscal years as well. Moving from one appropriation to the next is considered

a new start and can invoke unnecessary delays during a continuing resolution when the Department is capped at the budget it had last year (in both amount and appropriation category).

By carving the budget up into different accounts, the Department is effectively running a bunch of small businesses, not one large corporation. Everything must run as expected, on cost, on budget, with little margin. "CFOs would be fired if they did that in the commercial sector, one leader remarked. In the private sector, Management Reserve (MR) is the single most important thing for a program to have and the single most important thing for the C-suite to review." But MR is a phrase never spoken in the Pentagon for fear of becoming a "bill payer" for other struggling projects.

"The programs that don't have it [MR], we create an incentive for them [the program manager] not to go any faster because there is a good chance they will leave and hand the baton to someone else to handle the hot potato. We are doing things that have never been done before but we have the hubris to think we understand them completely."

- Former Defense Leader

The NRO sees it differently. Each PEO itemizes a portion of their investment account clearly as MR to be used to mitigate risks and leverage opportunities. While the NRO still must adhere to reprogramming rules like other components, it at least has some room for error before moving budget across portfolios. This added flexibility has resulted in more predictable execution and in turn, greater budget stability. One defense leader summed the matter up by observing, "Those programs where you can get MR in, run completely different because they don't presume they know everything; they are much more open to boldly going where no one has gone before because they know they have cushion to absorb a blow." This is how a culture of innovation gets institutionalized through learning.

3. Structure – Unity of Effort Approach

The genesis of this Study was the Senate Armed Services Committee's report to accompany the NDAA for Fiscal Year 2023. The report's language bemoaned the fact that despite recent "fundamental reform" to space operations and its underlying acquisition, senior leaders continue to refer to the decision-making process as a "unity of effort" between SSC, Space RCO, SDA, and the Missile Defense Agency. It asks: *is the unity of effort approach rapid enough to keep pace with today's space industry?*

Generally, the DoD leverages a centralized organizational structure with a defined chain of command. Unity of command is critical to proper execution of the chain, where authority consolidates under one responsible decision maker. The decision maker can delegate authority to lower

> **Finding:** Non-value-added bureaucracy and approval levels distract acquisition professionals from their primary mission, increase decision-making timelines, stifle innovation, and contribute to a risk averse culture.

echelons to speed execution, but it can be elevated back to a single, central figure to resolve conflicts. The advent of the Space Force did not completely solve the disaggregation of space decision-making across DoD organizations, although it has become less so under the Space SAE with the reorganization of SDA from OSD and the transfer of all but a handful of space programs across the Air Force, Army, and Navy.

Through the Space SAE, a single acquisition leader now has the authority to direct priorities for space acquisition activities that were formerly distributed across the Military Departments and parts of OSD. In today's Space Force, unity of acquisition command exists through a clear line from SAE to PEO to PM. From a DoD perspective though, that is not entirely the case. There are still pockets of space acquisition taking place in offices like Missile Defense Agency and the NRO that seek direction and derive authorities from a different executive. At no point does their chain of authority trace back to the Space SAE. However, throughout its interviews, the subcommittee did not hear that the absence of a single DoD space acquisition decision maker to be causal to its challenges.

In fact, there is evidence that coordination and deconfliction is being accomplished without consolidating all the space acquisition groups together under one leader. The next generation missile warning and tracking combined program office is a good example. Through an agreement forged at the PIC (more on that below), acquisition professionals from SSC, SDA, and Missile Defense Agency are working together to build out the future architecture of missile warning satellites based on their areas of mission expertise and experience. The SDA is building smaller satellites at low earth orbit. Missile Defense Agency is responsible for medium field-of-view sensors. SSC is focused on geosynchronous and medium earth orbits, as well as ground control. The trio shares lessons learned, data, and technology through regular working group sessions.[53]

"The community is connected," one leader disclosed. "We are exploring the valid questions for the force structure together."

Forcing unity of acquisition command may break the organizational cultures that reside in the more innovative sides of USSF acquisition; those that have developed muscle memory for utilizing "novel" acquisition tools like MTA and Other Transactional Authority (OTA) or have been freed from JCIDS red tape. Redrawing the organizational chart may bury creativity in new layers resulting in what one interviewee referred to as "lukewarm water."

Although still in its infancy, the structural changes injected into acquisition through the advent of the Space Force appear to be making progress towards addressing GAO findings from the early 2000s that DoD space acquisition management was fraught with fragmentation and overlap. **No further consolidation is necessary—especially any that includes the Missile Defense Agency and the NRO**. While unity of command makes decision-making "easier," **further consolidation of space agencies into one organization might inadvertently contribute to the growth of what has been one of the barriers plaguing speed all along: bureaucracy**. To be more specific, the added layers of reviewers and processes meant to maintain uniformity and control ultimately slows progress and delays access to decision makers.

a. The Frozen Middle

In the DoD, the personnel that make up the layers of delay are often referred to as the "frozen middle." These staff professionals are not intentionally getting in the way, they are almost always well intentioned, but in their efforts to remove all risk from the process, they are preventing progress. One former senior official and interviewee contrasted the level of trust delegated to the operational community versus acquisition stating, "They give military people the ultimate authority for life and death but won't give military people [or civilians] the authorities to make decisions on a program without going through multiple committees in the Pentagon."

Another senior officer told us about his trouble getting approval on an acquisition strategy document from the DAE (the now former USD(AT&L)). "It took me a year to get through all the chokeholds. When I finally made it, the decision authority only wanted tweaks. It took me another six months to get back with those. I wasted a year and a half on just the

> *"What was slowing us down was these GS-13s on the staff that can take what the Secretary of Defense said and throw it away and make it irrelevant […] There are a handful of people at a low level in national security that if they say, 'sorry it's done,' it's done."*
>
> *– Former Senior Defense Official*

acquisition strategy. Then came the draft request for proposal, contracting authority, negotiation authority — we wasted five years just starting the program."

Industry partners have noticed too. One executive opined that, "No decisions are made until the last possible moment. Two thirds of what happens, happens that way. It doesn't work. Efficiency

is caused by people who understand priorities and drive conclusions. You move away from that with centralization and bureaucracy. [The decision] moves to those not related to the mission or the problem at hand or the acquisition requirement. It goes to people who cannot possibly understand what they are acquiring in any way. Checking boxes. It goes so slow. We protect ourselves against things that there is 0.1% chance of needing protection from. Let the business owners drive it to conclusion."

"Risk taking is a function of top cover—whether someone thinks you will fight and take risk for them," a former DoD employee explained. Senior leader messaging on risk has not permeated the frozen middle down to the program offices yet and the delay could not be more apparent to partners from "new commercial space." These fast-moving innovators, the antithesis of bureaucracy, have noticed a stunning contrast across their customer base. One industry official observed that "the DoD treats every launch the same, whether the fifth time or the five-hundredth and the cost of ignoring the maturity of the system is adding up." He went on to quantify the disparity saying, "A nominal commercial launch will have five meetings prior. NASA will have 35 meetings. DoD will have 1,400. If you think about all the time that goes into preparations for those meetings, you do wonder if its value added or not."

In this way, the frozen middle has come to amplify the culture the Pentagon would like to shed, but the system is postured to appease, not reject them. "The Pentagon is run more by consensus than anything else," said one Department leader. "You would think it would be dictatorial, but it's not at all. Every single item that goes up for any kind of approval gets staffed across the board at several layers. Each time that there's a non-concur, the person could just ignore it, but everyone goes above and beyond to ensure that everything is adjudicated, even for trivial decisions. It takes an extremely long time to adjudicate those comments." Getting a program approval through the process is tracked by some program managers as the biggest risk to the success of their effort.

"There are these two groups and [their opposing views cause churn within the organization]. One wants to radically trust and empower people—when you do that, you're innovating, mistakes will be made. The private sector accepts this, you learn from them…the other camp wants to replace people with big process, with lots of checks. I think the Government needs to make up its mind once and for all—I'd strongly advocate for people."

– Former DoD Leader

In response, the current Space SAE has implemented business rules to challenge the culture of the Pentagon. PEOs can bypass headquarters staff to speak directly with him. He receives documents directly to his inbox. Discussions and reviews exist without the series of pre-briefs and read ahead materials that characterize most meetings with senior leaders. Perhaps most significantly, the Space SAE has kept the frozen middle from slowing his interaction with

programs by minimizing the size of the oversight function within his span of control. His staff consists of just 83 government workers, less than one tenth of other sister service acquisition functional staffs. While this approach is a best practice, two problems remain: 1) SAE policies fluctuate with changing administrations and often revert to more conservative processes and 2) the SAE does not control two-thirds of decision point documents leaving them vulnerable to delays of the machine.

Case Study: An Alternative Acquisition System for the United States Space Force

The congressional defense committees included a request as part of the FY20 NDAA for a "plan to implement an alternative acquisition system" for the USSF. Embracing the opportunity to fashion a modern process suited to acquire the disruptive technologies likened to the new Service, the DAF gathered its experts to mull over the history and lessons learned from decades of development in space. Months of deliberation resulted in a report titled, *An Alternative Acquisition System for the United States Space Force.*

Within the report, the DAF listed nine changes to enact a tailored process for space. Among the nine, the report detailed unique acquisition category thresholds, MDAP definitions, and ideas on MDA delegation to empower officials. It covered "Efficient Space Procurement" codification, unique "New Start" procedures, tailored decision points, and reporting requirements to speed development and inject innovation. It detailed how it would restructure budget accounts for greater financial flexibility and laid out a plan to modify JCIDs to better connect with warfighter needs.

The report highlighted many of the same findings and recommendations made by the DBB herein. In fact, officials interviewed for this Study praised the report for the value of its recommendations, one-third of which required the support of Congress to enact. Unfortunately, the report, fully coordinated across the DoD, was submitted to Congress only later to be rescinded due to lack of coordination with OMB. While a portion of the ideas have been incorporated by the Department, many remain on hold, needing legislative assistance to implement. The *Alternative Acquisition System for the United States Space Force* serves as a prime example of bureaucracy impeding progress—good ideas become a victim of the process they aim to fix.

4. Requirements Process

Since its inception, resource sponsors have toiled in a byzantine requirements generation process, known as JCIDS, created to maximize and prioritize weapon system investments to fill the capability gaps of their warfighters. Five years into its existence, the GAO found that the process had not yet been effective in doing so.[54] In its attempt to gain consenses on requirements across the Department, guided by a 341-

> **Finding:** The JCIDS process is time-consuming, cumbersome, and impacts opportunities to leverage commercial innovation.

page handbook and 114-page directive, the mechanism has grown to become a capability gap itself.

Many interviewees highlighted JCIDS' glacial pace, describing a two-year timeline. Analysis backed their estimates. The Acquisition Innovation Research Center found that the average system takes 852 days (2.3 years) to get through JCIDS, from initial capabilities document validation to JROC signoff.[55] Because JCIDS documentation gates entry into different phases of the acquisition lifecycle, the process paces program initiation and ultimately, system delivery as well. Technology can advance significantly in two years, and that's just the time that passes before a program starts. Understanding the lag, warfighters often ask for as much as they can think of, not knowing the future state of the technology or how long before they will be able to ask for more again.

The solution-centric nature of the JCIDS process is also an issue that came up repeatedly in the interviews conducted for this Study. The prescriptive "what to buy/how to build" requirements, forged in the siloed JCIDS process, bind future program offices charged with developing the solution. With a narrow requirement, bidders are constrained from offering an innovative approach and are given no incentive to experiment. On the lengthy billion dollar acquisitions, where proposal requests only come once a decade, many companies only bid mature technology to improve their chance of winning the contract. One start-up business found this out the hard way when it approached a major prime about including its cyber solution in their proposal. "The Government does not want innovation in this program. If they wanted that, they would have asked for it. They didn't ask for it, so go away. You're a liability, not an asset."

Poor requirements also cost the DoD speed. As one private sector leader explained, "Stating the problem set at a high level and letting firms come up with their own specified outcomes, you can leverage commercial work and move at the speed of relevance. When inflexible requirements are set, you end up having to redesign the commercial piece and lose time."

It is no wonder why the organizations revered for their procurement speed in the DoD are also the ones relieved from using the traditional JCIDS path (Missile Defense Agency, SDA, SpRCO, Special Operations Command). Ironically, the best solution for improving JCIDS to date has been to avoid it altogether, as evidenced by the MTA and Software Acquisition Pathways, exempted from its use by law.[56] Like JCIDS, exempted pathways and organizations are focused on meeting warfighter needs, but they do so in much closer collaboration with current users and technologists. Missile Defense Agency has an annual summit with its Combatant Command to continually update and prioritize needs. SpRCO does as well. SDA meets with its warfighter council every six months and holds bi-weekly working groups in between. With a shorter fuse from need identification to contract and teamed with engineers, cost estimators, and industy, warfighters can better grasp a vision for the future, the art of the possible, and set requirements with greater attainability. They are not left to try to "spec the future" and can iterate faster as well. More frequent proposal requests, like SDA's series of satellite traunches (order to orbit in 30 months), mean greater opportunity to inject innovation.

5. Operations and Acquisition

Space is not a manpower intensive business; it is a technology intensive business. When the Space Force stood up in 2019, most of the 8,000 military personnel that transferred were either operators or acquisition professionals—people who employ technology or people who buy it.[57] It only seemed natural to organize the new service along these lines, with one field command for operators, SpOC, one for acquirers, SSC, and one to support them with test and training, STARCOM. The construct also eased the transition for the acquisition community, as it was largely a renaming of Los Angeles' SMC to SSC, leaving much of the former acquisition command of the defunct Air Force Space Command in place.

> **Finding:** There is a lack of communication and understanding between the operational and acquisition communities. The divide challenges the Service's ability to expedite delivery of systems, products, and services to meet warfighter needs.

While it may have eased the initial transition, the new Space Force organization accentuated the divide between its acquisition and operations communities. One acquisition official confessed that, "Everyone feels like operators and acquirers are not connected. Acquirers hate operators and think they're stupid. Operators are just as bad but in the opposite direction. I do not think it is healthy." Another official admitted that issues between the groups persisted over his entire 30-year career. "They have never touched each other's [career] fields and that has created distrust."

An interview with an operations commander provided further evidence of the rift. He described an environment of poor coordination, stove-piped communications, differing priorities, and downright disregard when talking about his relationship with program offices. From his perspective, acquirers focus too much on cost and schedule, but not the more important question: "Is this [development project] a useful tool still?"

Another former operator recalled coordination issues with system sustainment. "We had an early warning radar due for preventative maintenance. The acquisition community just scheduled it with no consideration for operational impacts. At the last minute, operations had to step in and stop the work, they had not coordinated for a backup resource to cover the mission need."

To better synchronize the communities, the Chief of Space Operations recently declared a pilot program that will start in Fall 2023 with two new prototype organizations, known as "Integrated Mission Deltas (IMDs)." An acquirer will now lead the GPS Delta with an organization that includes both operators and sustainment support out of Los Angeles. For electronic warfare, an operator will lead a combined unit out of Colorado Springs. After a year, the service will study the results of these multifunctional organizations before scaling up. In the future, the two

existing field commands may very well end up more integrated from an operator/acquirer perspective, with a body of synergistic missions in one command and a body of synergistic missions in the other. While IMDs will primarily focus on the intersection of acquisition and operations in sustainment, the Service also recently announced the creation of "System Deltas." System Deltas will be a consolidation of SSC units that design, develop, and deliver mission systems under a single command to collaborate with IMDs on system development.[58]

The IMD concept is an exciting prospect to increase sharing, transparency, and joint decision-making between operators and acquirers as they try to coordinate limited assets in arguably the Department's most resource-constrained service. "It is not like the airplane business," one senior leader explained, "in the airplane business you have several test jets that roll off the production line and are modified with a bunch of prototypes for the acquisition community to ring out [with a test force]. We do not have that opportunity [in space]. So, the very first production satellite must go through all the contractor lab tests, intersegment tests, etc., before transitioning to operations and during that timeframe there is major contention for resources between satellites and operators needed to support the war...and a big test the program office needs with satellite and operator time. The IMD is a win-win and that's the way we should go."

> *"We cannot afford to split a mission area's critical activities across organizational seams."*
>
> *Gen Chance Saltzman, USSF CSO*
> *Air and Space Forces Magazine*

Other agencies have had success under this model as well, both internal and external to the DoD. For instance, NASA is organized based on the mission, not by function. Engineers and program managers work side by side with operators on a program to explore Mars or get back to the moon. They all work towards one goal, under one leader, from cradle to grave. The NRO blurs the lines between the communities even more. "A strength of the NRO is we have historically been pretty agnostic," one employee told the Subcommittee. "We are pretty good at taking acquisition folks and having them be operators. We have operators that do acquisition. My first assignment was operational, its paying dividends as an acquisition leader now."

6. Commercial Industry Engagement

Ignited by a dramatic drop in launch costs, exponential progress in the development of "intelligent" and digital technologies, and ever-increasing investment from governments, private equity, and venture capitalists alike, the commercial space age is here. The boom has brought a host of new companies, large and small, into the sector at an exponential rate. From 2013 to 2022, investments were made into 1,791 unique companies driving significant outcomes.[59] Over 80

Finding: While much has been done to make it easier for commercial companies to do business with the DoD, more needs to happen to reduce the barriers that inhibit access to commercial innovation.

of the record 186 successful rocket launches in 2022 were accomplished by commercial companies. Space companies saw their revenues climb to $427 billion last year and expect further growth upwards of 41% over the next five years.[60] The trend, forecasted by NASA long ago, is expected to continue with companies advancing disruptive technologies across the space value chain, from space data as-a-service to in-space manufacturing, to space robotics, to NSS itself.[61]

Recognizing the opportunities offered from new partners, the Space Force has moved to take advantage of the growing sector. SSC estimates that it spends about $4 billion annually on commercial space services.[62] One senior acquisition leader suggested that it is the responsibility of the Government to grow the next generation of contractors to bring in diverse thought and new ideas. "We have a handful of prime contractors that have been the work horses in developing all the satellites on orbit today," he said. "But this shift to fighting in space, winning wars in space, offensive/defensive, resiliency features and the explosion of commercial technologies—we [the Government] need to be very conscious about how we foster and grow all those new business opportunities and make it no kidding profitable for them to engage the Government".

But getting new companies through the Government procurement process is easier said than done, especially for companies developing cutting-edge technologies that the traditional requirements process has not yet caught up with to ask for. "Strap on your helmet, going 'federal' is a three-year journey," one venture capital-backed company CEO

> *"[The defense acquisition process] is so hard that if a small company came to me and said, 'How do I get in?' I wouldn't know what to tell them. It's a magic key you have to find. Braille in the dark. It is very complex."*
>
> *- Senior DoD Leader*

said. "If you are doing something innovative, you have a lot of hurdles because every opportunity that comes up from the Government is primed for technology that it is already convinced it wants to buy." He went on to lament that even DoD's innovation-friendly Defense Innovation Unit does not make the path to a more lucrative program of record any easier, even if short-term lower dollar value work is easier to obtain. Partnering with a major defense prime is another option, but even if it can be convinced to free up some Independent Research and Development dollars, without a requirement in the Government's request for proposal tied to new and innovative tech, it is a dead end because follow-on funds are not going to be allocated.

Winning an opportunity to showcase innovation is not the only challenge, some companies cannot even get in the door to compete. Obtaining security clearances just to understand the problem set can take months depending on the type and complexity of the investigation, especially for new, non-traditional commercial partners.[63] So can the facility accreditation to draft a classified proposal or start work on a winning bid. For larger, FAR-based efforts, winning

a contract would mean costly upgrades and audits of a firm's cost accounting system to comply with government standards.

In March 2022, the Space Force established a Commercial Space Office (COMSO) as its focal point to private industry. The office has plans to subsume a variety of disparate efforts to engage with the growing private sector, including the Commercial Satellite Communications Office, the Space Domain Awareness Marketplaces, the SSC Front Door, and SpaceWERX. The objective of the new COMSO is to incorporate commercial to the maximum extent possible, where it makes sense. Most importantly, it is integrated with the PEOs to help bridge the gap between where the programs are today, where they might be going, and how commercial space can meet them there (a bridge across the "valley of death"). In 2022, the COMSO conducted 11 "reverse" industry days, where private companies could describe their innovations with an audience of government acquirers. COMSO recently opened a facility in Chantilly, VA to foster collaboration and knowledge-sharing on new and disruptive technology with the Air Force Research Lab, the NRO, SDA, and NASA. The location serves as a good central location for industry too and a place to bring in companies to share its roadmap to future space architectures.

It will take time to measure the effectiveness of the new office and how much of "new commercial space" is selected to participate in future programs of record. While it is unclear whether the DoD is taking full advantage of the commercial opportunities available in the marketplace (there are over 5,500 commercial space businesses in the U.S. alone), if it cannot reduce some of the barriers to entry discussed above, it is only ensuring that these transformative technologies will be developed overseas and potentially, into the hands of the adversary.[64]

7. Talent / Leadership Development

Acquisition is an integrative and complex set of disciplines; space demands an integrative and innovative approach. Acquisition in the space field requires a skilled workforce to achieve technical outcomes that have never existed before. "Until the Space Force, there was not a dedicated acquisition field for space, that is kind of crazy to me," one official remarked. Experiences from other DoD environments and systems do not easily translate. When space was a command within the Air Force, it was not uncommon for a program manager or contracting officer to spend an assignment or two in a non-space role. The mobility has not helped to build a deep cadre of skilled space acquisition practitioners.

> **Finding:** The dynamic nature of today's space industry requires a different approach to develop proficient acquisition professionals with business acumen.

The nature of continuous change within the acquisition field itself over the last decade has compounded the dilemma. New processes and tools have added much to the calculus each program must consider when charting the course for their projects. What pathway should they choose? FAR-based contracts or OTA? Is there a commercial solution? Many acquisition professionals must work through these decisions with limited experience to draw from. The influx of new commercial space companies into the market is a challenge as well; most acquisition professionals have spent their careers navigating FAR-based contracts with the major prime defense contractors—not OTAs and the pressures of venture capital-backed firms.

> *"NRO has a strategic approach on how it grows its folks and how it invests in them. They are making long-term investments in their people and investing in their knowledge. You must grow program managers…with a mature understanding of systems engineering across the organization and how it works with the industrial base."*
>
> *- Senior Government Official*

Understanding the characteristics of a non-traditional defense businesses and how to partner with them is a whole new ballgame. How to unlock the innovation from an international partner is another. The subcommittee heard from one acquisition leader that a program recently spent almost two years trying to get the approval to talk to an ally about a capability while the bureaucracy tried to figure out how to interpret guidance. When asked what percentage of program mangers the Space Force has with the right business acumen to drive the innovation the service needs for the future fight, one senior government leader estimated, "just 20%."

"I learn by doing, not by reading about it," one accomplished, senior space acquisition professional told the subcommittee. Public-private partnerships, where the Government sends its acquisition professionals to a short sabbatical to work side-by-side with industry partners, is one "hands on" way to shore up this weakness. To its credit, the DAF has operated an Education with Industry (EWI) program for decades, connecting over 6,200 personnel with companies to date. However, the 10-month experience caps applicants at the mid-career level and includes just 30-60 participants a year, less than 1% of the total acquisition population. [65] It's also a "one-way street." Companies don't loan their workers to spend time embedded on government program teams. A drastic increase in participants may be impossible for the space acquisition workforce right now though. One space leader admitted the force is struggling to execute the scope of the work in front of it. "The budget has doubled but the amount of people has stayed flat," he said. If now is not the time to let more personnel go out, then it might be time to expand the program to let commercial partners, and their expertise, in.

The changing nature of the space industrial base demands unprecedented business skills and a grasp for how the new market operates. "Unlike in the past, today's Space Force acquirer is the minority buyer for many of the products it seeks," said one former DoD official. Formal education may be another way to bridge the gap. Each year the Space Force selects several dozen mid-

career military officers, government civilians, and partner nation representatives to participate in a one-year distinctive curriculum resulting in a Master of International Public Policy through a program known as Intermediate Leadership Education (ILE).[66] Expanding ILE to include offerings more focused on growing savvy acquisition leaders, is one opportunity to infuse greater business acumen into the workforce. For instance, the Space Force could identify a percentage of their acquisition corps not selected for traditional ILE opportunities to obtain an advanced acquisition education at a private business school with a focus on modern commercial practices, market forces, risk management, digital transformation, and other germane topics.
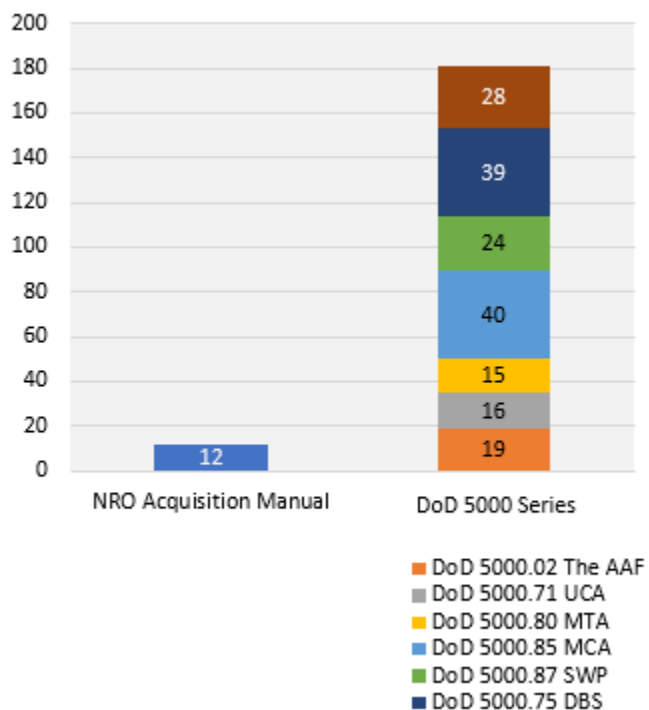
The NRO, by contrast, has a wealth of domain expertise in space acquisition and has adapted to the times. It benefits from housing much of its acquisition community in one location, divided by mission area. Its mission-driven culture has kept many of its experts and professionals in place for decades, making deliberate development easier. Most of its civilian PEOs have worked in their mission area, for 30+ years.

While it does not have additional authority per se, the NRO acquisition process is admittedly simpler as well—there are just 13 documents required at development and production milestones. The instruction that governs the acquisition process itself is 12 pages long, cover to cover in contrast to the DoD 5000 series at 181 pages, shown in Figure 8. The depth of system knowledge at the NRO lends itself to a process that gives program managers basic guidelines to do what make sense to deliver value to the warfighter. *Proficient* acquisition professionals do not need a policy that dictates every situation. The DAF has sent personnel to the NRO to execute programs for decades and they all have returned enriched by the experience. Roughly half of all Space Force PEOs have spent time there. The SSC Commander is an NRO alumnus, and the current SAE spent significant time there too.

Figure 9: Acquisition Policy Page Counts

Legend:
- DoD 5000.02 The AAF
- DoD 5000.71 UCA
- DoD 5000.80 MTA
- DoD 5000.85 MCA
- DoD 5000.87 SWP
- DoD 5000.75 DBS

NRO Acquisition Manual: 12

DoD 5000 Series (bottom to top): 19, 16, 15, 40, 24, 39, 28

While it is unfair to say Space Force acquisition development is not mission focused, it does not appear to be as focused on program execution as it could be. To be promotable, officers must balance program experience with other assignments to build the career path diversity required for promotion. Service schools, joint assignments, executive officer time, and staff tours provide leaders with perspective, but they do not build the business acumen needed to execute programs

quickly and decisively. The average time an USSF program manager will spend at one assignment is just three years.

"People pass through a program office in 2-3 years," said one government expert. "Having the experience would be helpful so people can address issues they have seen instead of always learning something new." "We move people too fast," said another former DoD official. Others recounted that in the past, the DoD extended leaders in assignments to drive accountability and continuity. DoD appears to have moved away from that. The result is pass-through program leadership and what one former senior military leader called, "diffused accountability," where no one is charge because multiple people split up the decision making over time. Another PEO agreed stating, "We rotate PMs and System Program Directors too soon for the effects of their decisions to be manifested."

This concept is somewhat foreign to the private sector, or even to other government agencies. It not uncommon for an industry PM to have a decade or more experience in the field and years longer on the project they are managing alongside their government counterpart. One executive from a large prime reflected on the disparity observing, "The rotation schedule [for government PMs] is too short to become proficient enough to go fast; it's a detriment to success on the DoD side."

Not all government organizations manage personnel this way. NASA attaches a leadership team to their missions at project initiation to follow progress over the life of the effort; for ten years or longer in some cases. For Space Force operators, career managers use "controlled tours" as a tool to ensure personnel stay in place for reasonable durations. Personnel with these assignment identifiers are not deployed, sent off to school, or otherwise reassigned while attached to control tour billets. However, the designator is used less frequently for acquisition PMs, a disservice to the projects they lead.

8. Transparency and Streamlining Program Reporting

Senior Pentagon leadership has made data sharing a priority of policy within the current administration. The Deputy Secretary's "Creating Data Advantage" memorandum from May 5, 2021, highlighted data as a strategic asset and charged leaders with ensuring all DoD data is visible, accessible, understandable, linked, trustworthy, interoperable, and secure.[67] The memo gave taskings to several Principal Staff Assistants with timelines aimed at freeing the data stovepipes that have long

> **Finding:** Real time access to accurate, authoritative data fosters transparency and trust across stakeholders.

hindered situational awareness and collaboration. But the decree, a transformative idea, only looked inward.

In every annual NDAA, there are requests for dozens of plans, reports, and status updates from Congress to the Department to obtain greater understanding of the billions of dollars

appropriated annually for national defense. Many of these inquiries are connected to investment programs, with appropriations accounting for one-third of the budget every year. In addition to annual "ad hoc" requests, the law and internal DoD policy stipulate periodic reporting requirements for major programs. Specifically, Congress requires an acquisition status report for MDAPs (ACAT Is) on an annual basis by law, known as the SAR. OSD requires a report card quarterly; the Defense Acquisition Executive Summary (DAES). Congressional staffers want to know how the budget is executing, the status of the development, and plans for achieving objectives; the basic "blocking and tackling" of program management. OSD officials also want this information.

Acquisition programs capture much of this data every month for their own management needs and maintain it in an authoritative, live, electronic database for inter-Service consumption. User populations can be segregated with access controls to ensure only the right data fields are visible to those with a need to know. Systems controls can grant "read only" permissions to mitigate data loss or to obscure program personnel contact information. Data does not go "live" without PEO approval to publish. In short, program managers enter the data, PEOs review it, and then make available to the SAE and Service oversight officials – but it stops there.

To answer external requests, data is pulled electronically from the Service's authoritative system, but (1) not in its entirety and (2) in static reports, three to six months old when finally delivered, especially in the case of the SAR, provided along with the President's annual budget. The result is a dated report with marginal utility.

Many interviewees alluded to the need for trust and transparency to develop the relationships across the Federal Government required for moving fast. Congress has shown the willingness to provide more and more authority. OSD is moving closer to the lean, acquisition enabler that Hon. Lord envisioned in 2017. It is time for the Services to take the next step by abandoning outmoded reporting mechanisms and allow overseers real-time access to data in the authoritative source.

IV. Recommendations

1. Space SAE Control / Authorities to do the Job

Finding:

1. Sufficient acquisition authority exists within the DoD but not all at the right place in the organization to maximize speed, innovation, flexibility, and assurance. More can be done to empower the Space Acquisition Executive (SAE).

Recommendations

Push authority to the acquisition decision makers, as far down the chain as possible to empower and enable them to promote innovation. Specifically:

1.1. The OUSD(A&S) should modify DoDi 5000.80 to delegate the authority to use and certify the MTA pathway to the Space SAE for all Major Defense Acquisition Program (MDAP)-equivalent efforts.

<div align="right">Estimated Task Duration: 1 month</div>

1.2. The OUSD(A&S) should obtain a memo from the Secretary of Defense exercising the provisions within 10 USC 4204 (b)(5) to give the Space SAE the ability to further delegate MDA of MDAPs (i.e., ACAT I) to Program Executive Officers (PEOs).

<div align="right">Estimated Task Duration: 1 month</div>

1.3. The OUSD(A&S) should draft and submit a legislative proposal to revise 10 U.S. Code § 4022 to delegate authority to the SAE to grant individual Other Transactional Agreements (OTAs) expected to cost more than $500 million. The Space SAE will provide USD(A&S) notification on every OTA approved for more than $500 million.

<div align="right">Estimated Task Duration: 12 months</div>

1.4. The Office of the ASAF(SA&I) should draft and submit a legislative proposal to allow the Space SAE to determine the membership of the SAC and the frequency of its meetings. The proposal should include:

- Language to eliminate the 10 U.S.C §9021(c)(2) requirement for the council to review and certify determinations by the ASAF/SA&I. This language conflicts with the authorities of the ASAF/SA&I as SAE, found in 10 USC §9016 and as MDA, in 10 USC §4204.

- Language to clarify the role of the SAC as the senior governance body to collaboratively solve conflicts and disputes elevated from the Program Integration Council (PIC) across the pertinent set of National Security Space (NSS) stakeholders. The language should also revise the Congressional reporting frequency to annually and to focus on the list of integration issues deliberated and determinations made by the council for resolution.

<div align="right">Estimated Task Duration: 12 months</div>

2. Funding Flexibility for Innovation

Finding:

2. Space acquisition professionals do not have the funding flexibility to enable them to optimally manage their programs or to adequately insert innovative technology.

Recommendations:

2.1. The OUSD(A&S) should draft and submit a legislative proposal like Budget Activity-08 (BA-08) for software, to establish a pilot for a "single color of money" for space programs. This will eliminate the need for a reprogramming action after the make-or-buy decision or other space acquisition-unique situations. The SAE will select up to five programs for the initial pilot.

Estimated Task Duration: 12 months

2.2. The DoD Comptroller, USD(C), should submit a request to Congress to raise the Below Threshold Reprogramming (BTR) limit for Research, Development, Test, & Evaluation (RDT&E) and Procurement appropriations from $10 to $20 million in the FY25 Joint Explanatory Statement to allow greater flexibility in redirecting dollars to fix problems or to react to new opportunities.

Estimated Task Duration: 12 months

2.3. The DoD and DAF Comptrollers (USD(C) and SAF(FM)) should work with the Space Force to create a new Program Element (PE) in the Space Force acquisition Management Reserve (MR), starting with the FY26 budget. The SAE will control and utilize the account for technology insertion, risk reduction, program acceleration, or corrective actions. The account should not exceed 10% of the largest Space Force PE in any given year. Funding should execute out of this account without a reprogramming action to the MR.

Estimated Task Duration: 24 months

3. Structure – Unity of Effort Approach

Finding:

3. Non-value-added bureaucracy and approval levels distract acquisition professional from their primary mission, increase decision-making timelines, stifle innovation, and contribute to a risk-averse culture.

Recommendations:

3.1. The NRO and Missile Defense Agency should remain separate from the Space Force.

3.2. The Office of the ASAF/SA&I should create a metric that measures dollars executed per staff member (government / military / contractor) within Space Force acquisition organizations. Space Force acquisition organizations should determine an acceptable

baseline and compare staff personnel quantity against it to monitor growth and ensure they remain lean. Organizations should be prepared to report their staffing metrics to the Space SAE.

<div align="right">Estimated Task Duration: 3 months</div>

3.3.   The OUSD(A&S) should modify DoDi 5000.85 to permit the Program Manager (PM) to tailor the list of organizations through which documents must be reviewed prior to the decision authority. PMs should maximize sharing of final signed documents as "information only" to stakeholders but optimize those allowed to comment utilizing the Assistant Secretary of the Air Force for Space Acquisition and Integration (SAF/SQX)-authored coordination matrix as a guide, but not policy.   PMs will submit these tailored coordination lists for MDA approval along with their list of proposed regulatory documents to "tailor-in" as part of acquisition strategy development and review.

<div align="right">Estimated Task Duration: 3 months</div>

4. Requirements Process

Finding:

4.   The Joint Capabilities Integration & Development System (JCIDS) process is time-consuming, cumbersome, and limits opportunities to leverage commercial innovation.

Recommendation:

4.1. The Deputy Secretary of Defense should task a follow-on DBB study to determine options to reform the JCIDS requirements process to emphasize goals and outcomes in the context of a Warfighter's mission and less-so in the context of hardware and software capabilities. This preserves trade space for later PMs and vendors to innovate with technology, techniques, and practices that emerge and evolve faster than the requirements process can accommodate. Acquisition professionals should encourage operators to state requirements in functional terms where possible. The Study should make recommendations on ways to improve the Analysis of Alternatives process with a specific focus on actions to expedite access to ally and partner developmental technologies. The review should also consider the role of systems and digital engineering in requirements development.

<div align="right">Estimated Task Duration: 9 months</div>

5. Operations and Acquisitions

Finding:

5.   There is a lack of communication and understanding between the operational and acquisition communities. The divide challenges the Service's ability to expedite delivery of systems, products, and services to meet warfighter needs.

Recommendation:

5.1. The Space Force should assess the effectiveness of the IMDs in 24 months. If found effective, it should create more.

Estimated Task Duration: 24 months

5.2. The Space Force should require acquisition professionals to have at least 2 years operations experience to become Materiel Leader-eligible (program manager on a MDAP). This can be an assignment to an IMD organization, the Special Experience Exchange Duties (SPEED) program, ops-coded billets, or direct support to COCOMs.

Estimated Task Duration: 48 months

6. Commercial Industry Engagement

Finding:

6. While much has been done to address the opportunity, there are identified barriers-to-entry for commercial suppliers—small, large, incumbents, and new entrants. More can be done to reduce the barriers that inhibit access to commercial innovation.

Recommendations:

6.1. The Deputy Secretary of Defense should establish a tiger team to streamline security vetting to increase supplier participation in space acquisition. The team should identify the timelines for Sensitive Compartmented Information Facility (SCIF) accreditation, authority to operate, and security clearance processes, and create recommendations to expedite access for commercial firms, including the use of shared classified environments.

Estimated Task Duration: 4 months

6.2. The Space SAE should direct that all space acquisition efforts determine root cause(s) of why companies choose not to participate in the space acquisition process following engagement in industry days / forums and create recommendations to address the actionable findings.

Estimated Task Duration: 1 month

6.3. The Space SAE should identify an office to formalize a mechanism (e.g., directory, database, etc.) to track and understand the capabilities of commercial space companies vetted across the enterprise. The goal is to provide information to acquisition professionals on the technology offerings of new and emerging entrants to raise awareness and maximize choices during the make or buy decision.

Estimated Task Duration: 12 months

6.4. Space Systems Command should hire or contract with a highly qualified expert with venture capital and/or private equity experience to advise the COMSO Senior Materiel Leader on new and best practices to connect with innovators in the private sector and to provide advice to programs on ways to signal market capital to invest in mission areas of interest where appropriate.

7. Talent / Leadership Development

Finding:

7. The dynamic nature of today's space industry requires a different approach to develop proficient acquisition professionals with business acumen.

Recommendations:

7.1. DAU should partner with a consortium of universities and professional organizations to develop training programs that increase the space acquisition workforce's insight into the new commercial sector (e.g., venture capital, private equity startups, etc.) to better understand the motivations, barriers, and challenges of industry partners by expanding training like ACQ315, "Understanding Industry."

Estimated Task Duration: 24 months

7.2. DAU, in collaboration with others, should provide instruction on tailoring the major capability acquisition pathway for space systems. DAU should require all program managers, engineers, test & evaluation, oversight, and contracting personnel working in the Space Force to complete this instruction as part of their practitioner-level Defense Acquisition Workforce Improvement Act (DAWIA) certification.

Estimated Task Duration: 12 months

7.3. The Space Force Enterprise Talent Management Office (ETMO) should designate Materiel Leader assignments as controlled tours to increase program leadership stability and accountability.

Estimated Task Duration: 24 months

7.4. The Space Force ETMO should use the Intermediate Leadership Education (ILE) candidate list to send acquisition professionals not selected for ILE to an advanced acquisition education at a private university to develop business acumen.

Estimated Task Duration: 12 months

8. Transparency and Streamlining Program Reporting

Finding:

8. Real time access to accurate, authoritative data fosters transparency and trust across stakeholders.

Recommendation:

8.1. The Space Force should provide electronic access to program data (e.g., cost, schedule, performance, financial execution) for all USSF programs, to OSD(A&S), the Office of Management & Budget (OMB), the GAO, and professional staff members of the armed services and appropriations congressional committees. Access should be granted to an appropriate subset of data elements already reported internally within the service today, once PEO-approved as part of the monthly acquisition report cycle. Electronic access will be granted in lieu of submitting annual and quarterly Selected Acquisition Reports (SAR) and Defense Acquisition Executive Summary (DAES) reports.

Estimated Task Duration: 12 months

V. Conclusion

In its early days, the Space Force was charged by Congress to reinvent the acquisition process to match the pace of technological advancement that characterizes the domain. As a brand-new Service, full of possibility, it was given a "clean sheet" to imagine the structure that could achieve the pace required to become the Department's most innovative organization. It was a rare chance to unburden capability development from the processes that long confined it. Upon delivery to Congress, the plan was retracted due to improper coordination—its first opportunity extinguished by the all-consuming bureaucracy it sought to leave behind.

Each day since, a risk averse culture, anchored to process and a zero-defect mentality continues to plague Space Force's ability to meet warfighter needs rapidly and reward individuals for taking prudent risk. The DoD's newest service must become a more innovative, agile, flexible, and rapid acquisition engine to counter the many threats the United States faces in space and to realize the vision its founders intended.

Appendix A – Terms of Reference (ToR)

MEMORANDUM FOR DEFENSE BUSINESS BOARD

SUBJECT: Terms of Reference — Review of Space Acquisition

In accordance with the Senate Armed Services Committee Report to Accompany the James M. Inhofe National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2023, I direct the Defense Business Board ("the Board"), through its Business Operations Advisory Subcommittee ("the Subcommittee"), to review the unity of effort decision-making process for space acquisition. This review shall specifically ask whether the unity of effort process is agile enough for the rapid deployment of space systems to keep pace with today's space industry. In conducting this review, the Board shall consider all options, from retaining the existing unity of effort structure to developing a clean sheet approach to space acquisition.

The Subcommittee shall submit its independent assessment and recommendations for the space acquisition decision-making process to the full Board for its thorough consideration and deliberation at a properly noticed and public meeting, unless that meeting must be closed pursuant to one or more of the exceptions found in title 5, U.S. Code, section 552b(c). The Board shall begin the study upon Terms of Reference (ToR) signature and submit its final, approved report to me not later than November 30, 2023. The report shall include:

- Recommendations for specific statutory or regulatory changes to revise conflicting authorities in space acquisition across the DoD and/or to improve the governance process, as applicable;

- Specific recommendations regarding the authorities and membership of the SAC to maximize integration, ensure effectiveness, and clarify the roles and responsibilities of the body;

- Recommendations to streamline acquisition business processes and enhance opportunities for innovation; and

- Any other related matters the Board determines are relevant to this task.

In conducting its work, the Board and its Subcommittee have my full support to meet with Department leaders. The Board staff, on behalf of the Board and the Subcommittee, may request the Office of the Secretary of Defense and DoD Component Heads to timely furnish as requested information, assistance, or access to personnel to the Board and the Subcommittee. All requests shall be consistent with applicable laws, applicable security classifications, DoD Instruction 5105.04, "Department of Defense Federal Advisory Committee Management Program," and this ToR. To support the effort, the U.S. Space Force will provide a full-time detailee to the Office of the Secretary of Defense/Office of the Director of Administration and Management (OSD/ODA&M) to support the Board's work on this study. The detailee shall be an acquisition professional from the Office of the Assistant Secretary of the Air Force for Space Acquisition and Integration and remain until the study is approved.

Material provided to the Board becomes a permanent part of the Board's record. Components are reminded that all data/information provided is subject to public inspection unless the originating Component office properly marks the data/information with the appropriate classification and/or Freedom of Information Act exemption categories before the data/information is released to the Board. The Board has physical storage capability and electronic storage and communications capability on both unclassified and classified networks to support receipt of material up to the Secret level. Each Component should remember that Board members, as special government employee members of a DoD federal advisory committee, will not be given any access to the DoD network, including DoD email systems.

The Board and the Subcommittee will operate in conformity with and pursuant to the Board's charter; title 5, U.S. Code, chapter 10 (commonly known as the "Federal Advisory Committee Act"); title 5, U.S. Code, section 552b (commonly known as the "Government in the Sunshine Act"); and other applicable Federal statutes, regulations, and policy. Individual Board and Subcommittee members and the Subcommittee as a whole do not have the authority to make decisions or provide recommendations on behalf of the Board nor report directly to any Federal representative. The members of the Subcommittee and the Board are subject to certain Federal ethics laws, including title 18, U.S. Code, section 208, governing conflicts of interest, and the Standards of Ethical Conduct regulations in 5 C.F.R., Part 2635.

Thank you in advance for your cooperation and support to this critical undertaking to inform subsequent decisions on how the Department addresses national security challenges in the coming decades.

cc:
Senior Pentagon Leadership
Directors of Defense Agencies
Directors of DoD Field Activities
Advisory Committee Management Officer, DA&M

Appendix B – Presentation Slides

FY2024 Assessment of the Department of Defense:
A Review of Space Acquisition

AN INDEPENDENT DBB REPORT — FY24-01
References to specific companies, commercial products, processes, or services do not constitute endorsement or recommendation by the Department of Defense or the U.S. Government.
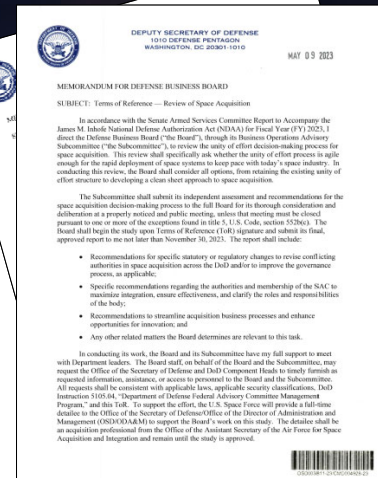
November 15, 2023

1

Task

The Deputy Secretary of Defense directed the DBB to:

- Identify recommendations for specific statutory or regulatory changes to revise conflicting authorities in space acquisition across the DoD and/or to improve the governance process.
- Identify specific recommendations regarding the authorities and membership of the Space Acquisition Council (SAC) to maximize integration, ensure effectiveness, and clarify the roles and responsibilities of the body.
- Provide recommendations to streamline acquisition business processes and enhance opportunities for innovation.
- Identify any other related matters the Board determines are relevant to this task.

2

The Subcommittee
Business Operations Advisory Subcommittee

Secretary Deborah James
DBB Chair

Linnie Haynesworth Chair	**Dr. David Van Slyke** Co-Chair	**David Beitel**	**Sally Donnelly**	**Dr. Christopher Gopal**	**Sarah Mineiro**	**Brig Gen Bernie Skoch** USAF (Ret.)	**Pat Zarodkiewicz**

DBB Staff

Cara Allison Marshall Executive Director	**Lt Col Kyle Harrington** Air Force Military Rep	**Lt Col Raquel Salim** USSF Acquisition SME	**Gwyneth Murphy** Analyst

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Approach & Methodology

Study Scope
Conducted six months of study and interviewed 29 current and former DoD acquisitions/operations leaders, 15 private sector executives, 3 academics & researchers, and 13 non-DoD government leaders.
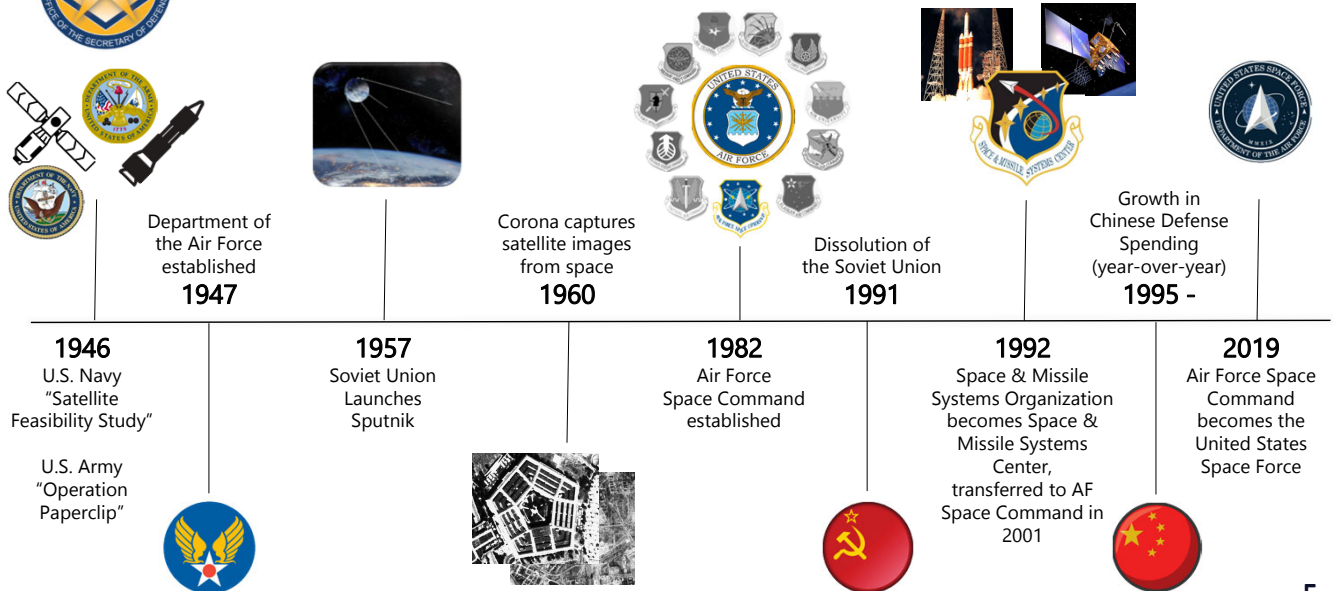
Data and Literature Review
Analyzed and synthesized data from academic studies, published articles, Government Accountability Office reports, and prior DoD publications.

4

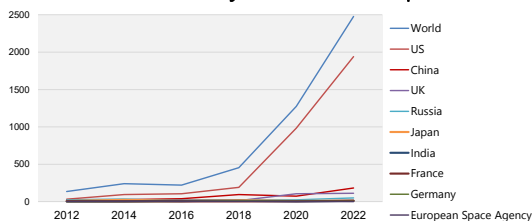**Background:** DoD Space: A Brief Introduction

Department of the Air Force established
1947

1946
U.S. Navy "Satellite Feasibility Study"

U.S. Army "Operation Paperclip"

1957
Soviet Union Launches Sputnik

Corona captures satellite images from space
1960

1982
Air Force Space Command established

Dissolution of the Soviet Union
1991

1992
Space & Missile Systems Organization becomes Space & Missile Systems Center, transferred to AF Space Command in 2001

Growth in Chinese Defense Spending (year-over-year)
1995 -

2019
Air Force Space Command becomes the United States Space Force

5

Sources cited on Slide 30

5

Background:

The Space Force: a service born at a time of unprecedented change
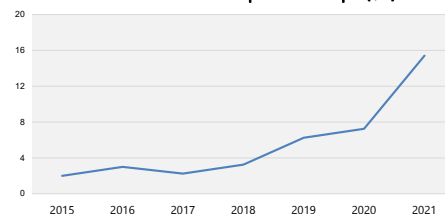
- Within Industry
  - Growth of commercial space companies
  - Falling cost of launch
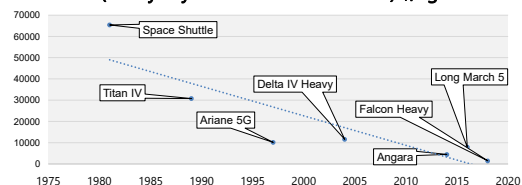 - New technologies
  - Surging investment

Total Investment in Space Startups ($B)

Annual Number of Objects Launched Into Space
— World
— US
— China
— UK
— Russia
— Japan
— India
— France
— Germany
— European Space Agency

Cost of Launch Over Time
(Heavy Payloads to Low Earth Orbit) $/kg
Space Shuttle
Titan IV
Delta IV Heavy
Long March 5
Ariane 5G
Falcon Heavy
Angara

6

Sources cited on Slide 30

Background:
The Space Force: a service born at a time of unprecedented change

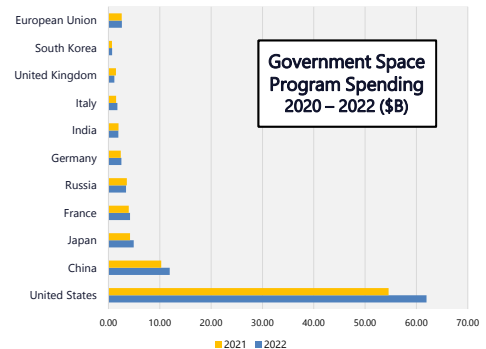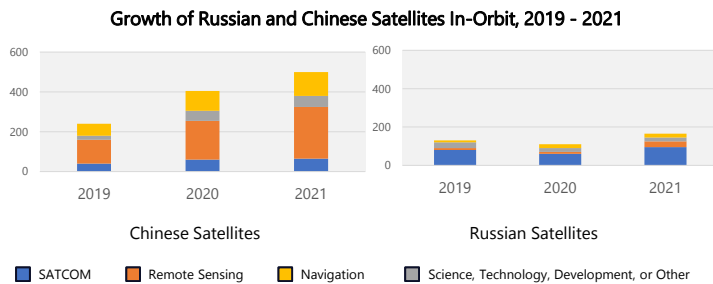- **Among Adversaries**
  - Growth in space presence
  - Increasing investment
  - Changing attitudes on the role of space in conflict

> Russia perceives the U.S. dependence on space as its Achilles' heel, which can be exploited to achieve Russian conflict objectives.
>
> Defense Intelligence Agency, 2022

Growth of Russian and Chinese Satellites In-Orbit, 2019 - 2021

Legend: SATCOM, Remote Sensing, Navigation, Science, Technology, Development, or Other

Government Space Program Spending 2020 – 2022 ($B)

7

7

Background:
The Space Force: a service born at a time of unprecedented change

- **During DoD acquisition process evolution**
  - Advent of the Adaptive Acquisition Framework
  - Creation of the Space RCO & Space Development Agency
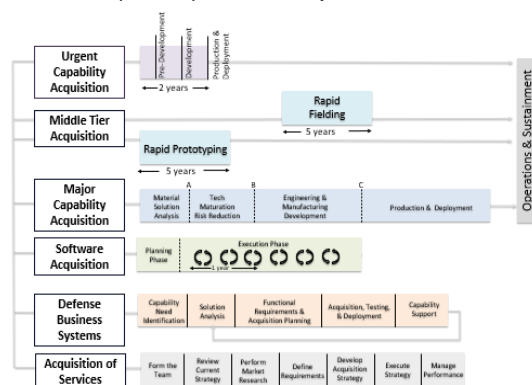 - Increasing appetite for risk

> You need an atmosphere where people can test new things, big things, things that might fail, but that could also succeed in a game-changing way.
>
> Deputy Secretary of Defense Kathleen Hicks, April 2023

Adaptive Acquisition Pathways, Est. 2019 - 2020

Space RCO
Est. December 12, 2017

Space Development Agency
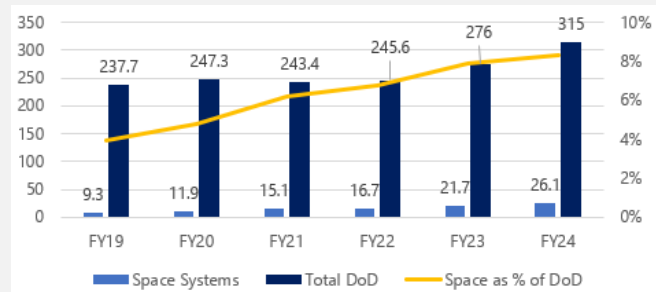Est. March 12, 2019

8

Background: Space Force Acquisition Overview

- **Leadership:**
  - 1 Space Service Acquisition Executive (SAE)
  - 7 Program Executive Officers (PEOs)

- **Program Count & Size:**
  - 24 ACAT I (>$525M RDT&E)
  - 4 ACAT II (>$200M RDT&E)
  - 11 ACAT III (<$200M RDT&E)

- **Investment Budget (2023):** $21.7 billion

> The Space SAE doesn't control every space program in the DoD—it takes a "unity of effort" to deliver the totality of capabilities to National Security customers.

Investment Budget for Space Systems vs. Total DoD ($B)

	FY19	FY20	FY21	FY22	FY23	FY24
Total DoD	237.7	247.3	243.4	245.6	276	315
Space Systems	9.3	11.9	15.1	16.7	21.7	26.1

Legend: Space Systems ▪ Total DoD ▪ Space as % of DoD —

USSF Acquisition Organizations

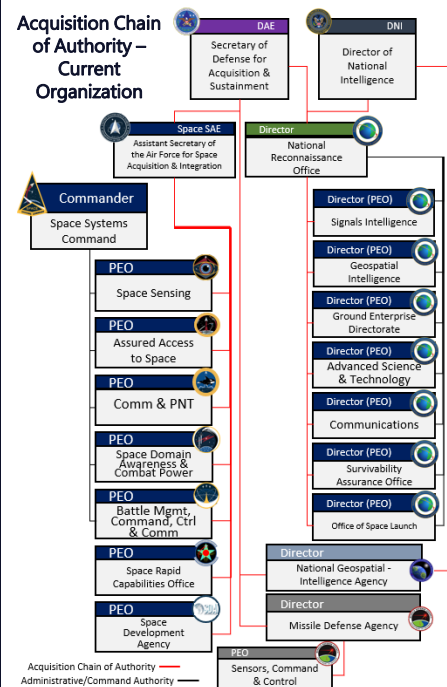| Org.	People	PEOs	Investment Accounts	Requirements Process	Acquisition Process
SSC	15,000	5	35	JCIDS	• DoD 5000
SpRCO	200	1	2	JCIDS-exempt	• DoD 5000-exempt
SDA	200	1	4	JCIDS-exempt	• D/N use DoD 5000

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Background: Unity of Effort

- **Integration is critical to making unity of effort work:**
  - Ensures disparate teams build complementary systems
  - Minimizes duplication of programs and capabilities
  - Is more effective than consolidation or reorganization

- **Forums created to coordinate efforts:**
  - Space Acquisition Council (SAE-Led)
  - Program Integration Council (PEO-Led)

> **Space Acquisition: Unity of command not required, but integration essential**

Acquisition Chain of Authority – Current Organization

10

Key Findings

Governance to Enable Agility

Space Acquisition Council Effectiveness

Streamlining Processes to Enhance Opportunity for Innovation

Additional Areas of Opportunity

1. Sufficient acquisition authority exists within the DoD but not all at the right place to maximize speed, innovation, flexibility, and integrity.

2. Space acquisition professionals do not have the funding flexibility to enable them to optimally manage their programs or to adequately insert innovative technology.

3. Non-value-added bureaucracy distracts acquisition professionals, increases decision-making timelines, stifles innovation, and contributes to a risk averse culture.

4. The JCIDS requirements process is time-consuming, cumbersome, and impacts opportunities to leverage commercial innovation.

5. There is a lack of communication and understanding between the operational & acquisition communities.

6. Significant barriers inhibit access to commercial innovation.

7. The dynamic nature of today's space industry requires a different approach to develop proficient acquisition professionals with business acumen.

8. Real time access to accurate, authoritative data fosters transparency and trust across stakeholders.

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Observations & Findings

1. Sufficient acquisition authority exists within the DoD but not all at the right place to maximize speed, innovation, flexibility, and assurance.

- Adaptive Acquisition Framework built for speed, but 1 of 6 pathways require OSD approval

- 2016 NDAA enabled program delegation; but DoD instruction stops at SAE

- Other Transaction Authorities are a powerful tool, but hurdles discourage large efforts

- SAC functions satisfactorily as senior integration forum; but conflicts with SAE authorities

"If you compress the decision-making timeline, you compress delivery."
- Senior Defense Official

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Observations & Findings

2. **Space acquisition professionals do not have the funding flexibility to enable them to optimally manage their programs or to adequately insert innovative technology.**

- Space unique procurements (e.g., low quantity satellites) are complicated by the artificial divisions imposed by "colors or money"

- $10M transfer limit between investment accounts is insufficient to support agile acquisition

- The SAE does not have management reserve to execute on opportunities or mitigate risk across dozens of investment accounts segregated by program

"The budget process alone is absurd, if we were a business, we would fold."
- Senior Defense Official

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Observations & Findings

3. **Non-value-added bureaucracy distracts acquisition professionals, increases decision-making timelines, stifles innovation, and contributes to a risk averse culture.**

- Further consolidation of DoD space acquisition may bury the pockets of innovation that exist today in additional administrative burden

- Mitigations and metrics employed by some leaders to cut bureaucracy have not been institutionalized to endure past their tenure

- DoD has empowered programs to tailor documentation requirements; but review remains burdensome

"What was slowing us down was these GS-13s on the staff that can take what the Secretary of Defense said and throw it away and make it irrelevant…"
- Former Senior Defense Official

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Observations & Findings

4. The JCIDS requirements process is time-consuming, cumbersome, and impacts opportunities to leverage commercial innovation.

- Initial capabilities document to a validated requirement takes approx. 852 days

- Requirements are too prescriptive; remove vendor creativity & innovation

- Limits the ability of program engineers to work within warfighter trade space

- Solution to date—avoid it altogether

  - Space Development Agency utilizes an effective warfighter council for requirements validation and user engagement

  - Space RCO / Missile Defense Agency communicate with user directly

"When inflexible requirements are set, you end up having to redesign the commercial piece and lose time."

- DoD Official

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Observations & Findings

5. There is a lack of communication and understanding between the operational & acquisition communities.

- Newly launched Integrated Mission Deltas are a positive step towards closing the gap(s):
  - Within the organizational structure (Space Systems vs. Space Operations Commands)
  - In focus (cost, schedule, performance vs. system utility)
  - In priority for constrained resources (operations vs. sustainment)

- Other successful space acquisition organizations have found ways to disseminate experience
  - One Leader – NRO operators & acquirers both answer to the Director
  - One Team – NASA is organized based on mission; operators & acquirers work side-by-side

"We cannot afford to split a mission area's critical activities across organizational seams."

– Gen Saltzman, USSF CSO

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Observations & Findings

6. Significant barriers inhibit access to commercial innovation.

- Space startups/disruptive technologies are dissuaded by outmoded DoD requirements
- Security clearances are required in many areas of space development but take months to obtain
  - Facility accreditations are lengthy and require sponsorship
- Space System's Commercial Space Office is postured to be the focal point industry needs
  - Collaborates with SDA and NRO
  - Opportunity exists for COMSO to catalog breadth of commercial offerings available to the enterprise

"It is the responsibility of the Government to [grow] the next generation of contractors to bring in diverse thought and new ideas."

         - Senior Defense Official

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Observations & Findings

7. The dynamic nature of today's space industry requires a different approach to develop proficient acquisition professionals with business acumen.

- Recent authorities/pathways/techniques are not well understood and therefore, underutilized
- Few Space Force program managers possess the business acumen to drive the innovation the service needs
- Industry managerial experience often exceeds government counterparts
- DAF's Education w/Industry Program is valuable, but annual throughput limited to 30-60
- Joint and operational development opportunities exist for mid-career personnel, but not an option to grow acquisition business leaders

"Until the Space Force, there was not a dedicated acquisition field for space."

         - Government Official

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Observations & Findings

8. Real time access to accurate, authoritative data fosters transparency and trust across stakeholders.

- Space programs generate, track, document, and make decisions from a wealth of data
  - Tracked electronically in an authoritative database
  - Updated either monthly or quarterly
  - Reviewed and approved by Service leadership
- Oversight reporting (e.g., OMB, OSD, Congress) is completed outside the authoritative system
  - Reports are static; information is often 60-90 days stale once delivered
  - Officials are left underinformed; drives additional requests for briefings and meetings

> "Really, our existing [reports] are unsatisfactory. They're not timely. They lack granularity. They don't tie well to program milestones. They're detached from the numbers."
> - Government Oversight Official

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Recommendations Summary

The following charts provide recommendations in eight key areas:

1. Space SAE Control / Authorities to do the Job
2. Funding Flexibility for Innovation
3. Structure – Unity of Effort Approach
4. Requirements Process
5. Operations and Acquisition
6. Commercial Industry Engagement
7. Talent / Leadership Development
8. Transparency & Streamlining Program Reporting

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1. Space SAE Control / Authorities to do the Job

1.1 The Space SAE should be given the authority to use the Middle Tier Acquisition (MTA) pathway for all Major Defense Acquisition Program (MDAP)-equivalent efforts.

1.2 The Space SAE should have the ability to further delegate Milestone Decision Authority (MDA) of MDAPs (i.e., ACAT I) to Program Executive Officers (PEOs).

1.3 The Space SAE should have the authority to grant Other Transactional Agreements (OTAs) expected to cost more than $500 million without seeking higher approval. ⛪

1.4 The Space SAE should be allowed to determine the membership of the SAC and the frequency of its meetings. Space SAE decisions should not be reviewed further by the SAC. ⛪

⛪ Denotes Congressional assistance needed

Recommendations Summary:

2. Funding Flexibility for Innovation

2.1 There should be a "single color of money" for space programs to eliminate the need for a reprogramming action due to space acquisition-unique situations. ⛪

2.2 The Below Threshold Reprogramming limit should be raised for Research, Development, Test, & Evaluation (RDT&E) and Procurement appropriations from $10 to $20 million to allow the USSF to redirect dollars more expediently. ⛪

2.3 The SAE should be allowed to hold funds in a new Program Element (PE) for Management Reserve (MR) to be utilized for technology insertion, risk reduction, program acceleration, or corrective actions. ⛪

⛪ Denotes Congressional assistance needed

3. Structure – Unity of Effort Approach

3.1   The NRO and Missile Defense Agency should remain separate from the Space Force.

3.2   The Space Force should monitor the size of their acquisition oversight staff functions with a metric to ensure the Service remains a lean organization. Organizations should be prepared to report staffing metrics to the SAE.

3.3   Program Managers (PMs) should be able to choose which organizations can comment on their acquisition documents.

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5. Improve Operations & Acquisition Communication

5.1   The Integrated Mission Deltas concept should be evaluated in 24 months and if found effective, expanded.

5.2   Acquisition professionals should have at least 2 years of operations experience to become Materiel Leader-eligible (program manager on a Major Defense Acquisition Program).

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6. Improve Commercial Industry Engagement

6.1 A tiger team should report directly to Senior DoD leadership on the status of security vetting for new commercial space businesses along with ways to expedite.

6.2 The SSC Commercial Space Office (COMSO) should catalog the capabilities offered by new commercial space entrants to raise awareness and aid market research.

6.3 The Space SAE should capture the reasons why companies express interest but ultimately, do not bid on opportunities. The Space SAE should take appropriate action on the findings.

6.4 The USSF should hire or contract with a highly qualified expert with venture capital and/or private equity experience to advise the COMSO Senior Materiel Leader on new and best practices to connect with innovators and signal to investors in the private sector.

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7. Grow Acquisition Talent & Leadership

7.1 Space acquisition professionals should receive training tailored to the attributes of their emerging industrial base, to understand the motivations and challenges of venture capital-backed and private equity startup companies to better leverage their innovative technologies.

7.2 Space acquisition professionals should receive instruction on tailoring the major capability acquisition pathway for the uniqueness of space systems.

7.3 The Space Force should establish 3-year controlled tours for Materiel Leaders to increase program leadership stability and accountability.

7.4 The Space Force should use the Intermediate Leadership Education (ILE) candidate list to send acquisition professionals not selected for ILE to an advance acquisition education at a private university to develop business acumen.

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8. Improve Transparency & Trust

8.1 The USSF should provide electronic access to authoritative acquisition data to provide transparency to and improve trust among external stakeholders.

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Conclusion

- Space Force never had a chance to establish itself from "clean slate" to be the innovative technical engine its founders intended

- It was born into a system of constraints amidst a rapidly changing sector and mired in decades of culture, process, and systems surpassed by today's space environment

- Now is the time to modernize the Service's acquisition community to realize its potential to respond to today's threats

Adversaries are advancing. Act now to improve space acquisition.

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References

Chart 5

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Recommendations (Complete Text)

	Recommendations	Duration
1.1	The OUSD(A&S) should modify DoDi 5000.80 to delegate the authority to use and certify the MTA pathway to the Space SAE for all Major Defense Acquisition Program (MDAP)-equivalent efforts.	1 Month
1.2	The OUSD(A&S) should obtain a memo from the Secretary of Defense exercising the provisions within 10 USC 4204 (b)(5) to give the Space SAE the ability to further delegate MDA of MDAPs (i.e., ACAT I) to Program Executive Officers (PEOs).	1 Month
1.3	The OUSD(A&S) should draft and submit a legislative proposal to revise 10 U.S. Code § 4022 to delegate authority to the SAE to grant individual Other Transactional Agreements (OTAs) expected to cost more than $500 million. The Space SAE will provide USD(A&S) notification on every OTA approved for more than $500 million.	12 Months
1.4	The Office of the ASAF(SA&I) should draft and submit a legislative proposal to allow the Space SAE to determine the membership of the SAC and the frequency of its meetings. The proposal should include: • Language to eliminate the 10 U.S.C §9021(c)(2) requirement for the council to review and certify determinations by the ASAF/SA&I. This language conflicts with the authorities of the ASAF/SA&I as SAE, found in 10 USC §9016 and as MDA, in 10 USC §4204. • Language to clarify the role of the SAC as the senior governance body to collaboratively solve conflicts and disputes elevated from the Program Integration Council (PIC) across the pertinent set of National Security Space (NSS) stakeholders. The language should also revise the Congressional reporting frequency to annually and to focus on the list of integration issues deliberated and determinations made by the council for resolution.	12 Months
2.1	The OUSD(A&S) should draft and submit a legislative proposal like Budget Activity-08 (BA-08) for software, to establish a pilot for a "single color of money" for space programs. This will eliminate the need for a reprogramming action after the make-or-buy decision or other space acquisition-unique situations. The SAE will select up to five programs for the initial pilot.	12 Months
2.2	The DoD Comptroller, USD(C), should submit a request to Congress to raise the Below Threshold Reprogramming (BTR) limit for Research, Development, Test, & Evaluation (RDT&E) and Procurement appropriations from $10 to $20 million in the FY25 Joint Explanatory Statement to allow greater flexibility in redirecting dollars to fix problems or to react to new opportunities.	12 Months
2.3	The DoD and DAF Comptrollers (USD(C) and SAF(FM)) should work with the Space Force to create a new Program Element (PE) in the Space Force acquisition Management Reserve (MR), starting with the FY26 budget. The SAE will control and utilize the account for technology insertion, risk reduction, program acceleration, or corrective actions. The account should not exceed 10% of the largest Space Force PE in any given year. Funding should execute out of this account without a reprogramming action to the MR.	24 Months
3.1	The NRO and Missile Defense Agency should remain separate from the Space Force.	N/A
3.2	The Office of the ASAF/SA&I should create a metric that measures dollars executed per staff member (government / military / contractor) within Space Force acquisition organizations. Space Force acquisition organizations should determine an acceptable baseline and compare staff personnel quantity against it to monitor growth and ensure they remain lean. Organizations should be prepared to report their staffing metrics to the Space SAE.	3 Months
3.3	The OUSD(A&S) should modify DoDi 5000.85 to permit the Program Manager (PM) to tailor the list of organizations through which documents must be reviewed prior to the decision authority. PMs should maximize sharing of final signed documents as "information only" to stakeholders but optimize those allowed to comment utilizing the Assistant Secretary of the Air Force for Space Acquisition and Integration (SAF/SQX)-authored coordination matrix as a guide, but not policy. PMs will submit these tailored coordination lists for MDA approval along with their list of proposed regulatory documents to "tailor-in" as part of acquisition strategy development and review.	3 Months

Recommendations (Complete Text)

	Recommendations	Duration
4.1	The Deputy Secretary of Defense should task a follow-on DBB study to determine options to reform the JCIDS requirements process to emphasize goals and outcomes in the context of a Warfighter's mission and less-so in the context of hardware and software capabilities. This preserves trade space for later PMs and vendors to innovate with technology, techniques, and practices that emerge and evolve faster than the requirements process can accommodate. Acquisition professionals should encourage operators to state requirements in functional terms where possible. The Study should make recommendations on ways to improve the Analysis of Alternatives process with a specific focus on actions to expedite access to ally and partner developmental technologies. The review should also consider the role of systems and digital engineering in requirements development.	9 Months
5.1	The Space Force should assess the effectiveness of the IMDs in 24 months. If found effective, it should create more.	24 Months
5.2	The Space Force should require acquisition professionals to have at least 2 years operations experience to become Materiel Leader-eligible (program manager on a MDAP). This can be an assignment to an IMD organization, the Special Experience Exchange Duties (SPEED) program, ops-coded billets, or direct support to COCOMs.	48 Months
6.1	The Deputy Secretary of Defense should establish a tiger team to streamline security vetting to increase supplier participation in space acquisition. The team should identify the timelines for Sensitive Compartmented Information Facility (SCIF) accreditation, authority to operate, and security clearance processes, and create recommendations to expedite access for commercial firms, including the use of shared classified environments.	4 Months
6.2	The Space SAE should direct that all space acquisition efforts determine root cause(s) of why companies choose not to participate in the space acquisition process following engagement in industry days / forums and create recommendations to address the actionable findings.	1 Month
6.3	The Space SAE should identify an office to formalize a mechanism (e.g., directory, database, etc.) to track and understand the capabilities of commercial space companies vetted across the enterprise. The goal is to provide information to acquisition professionals on the technology offerings of new and emerging entrants to raise awareness and maximize choices during the make or buy decision.	12 Months
6.4	6.4. Space Systems Command should hire or contract with a highly qualified expert with venture capital and/or private equity experience to advise the COMSO Senior Materiel Leader on new and best practices to connect with innovators in the private sector and to provide advice to programs on ways to signal market capital to invest in mission areas of interest where appropriate.	12 Months
7.1	DAU should partner with a consortium of universities and professional organizations to develop training programs that increase the space acquisition workforce's insight into the new commercial sector (e.g., venture capital, private equity startups, etc.) to better understand the motivations, barriers, and challenges of industry partners by expanding training like ACQ315 "Understanding Industry."	24 Months
7.2	DAU, in collaboration with others, should provide instruction on tailoring the major capability acquisition pathway for space systems. DAU should require all program managers, engineers, test & evaluation, oversight, and contracting personnel working in the Space Force to complete this instruction as part of their practitioner-level Defense Acquisition Workforce Improvement Act (DAWIA) certification.	12 Months
7.3	The Space Force Enterprise Talent Management Office (ETMO) should designate Materiel Leader assignments as controlled tours to increase program leadership stability and accountability.	24 Months
7.4	The Space Force ETMO should use the Intermediate Leadership Education (ILE) candidate list to send acquisition professionals not selected for ILE to an advanced acquisition education at a private university to develop business acumen.	12 Months
8.1	The Space Force should provide electronic access to program data (e.g., cost, schedule, performance, financial execution) for all USSF programs, to OSD(A&S), the Office of Management & Budget (OMB), Government Accountability Office (GAO), and professional staff members of the armed services and appropriations congressional committees. Access should be granted to an appropriate subset of data elements already reported internally within the service today, once PEO-approved as part of the monthly acquisition report cycle. Electronic access will be granted in lieu of submitting annual and quarterly Selected Acquisition Reports (SAR) and Defense Acquisition Executive Summary (DAES) reports.	12 Months

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Appendix C – Subcommittee Biographies

DEFENSE BUSINESS BOARD

THE HONORABLE DEBORAH LEE JAMES

CHAIR, DEFENSE BUSINESS BOARD and
FORMER SECRETARY, US AIR FORCE

From December 2013 through January 2017, Deborah served as the 23rd Secretary of the United States Air Force with responsibility for 660,000 military and civilian personnel and a budget of nearly $140 billion. She was the second woman to ever lead a military service in the United States.

Prior to this role, she served as President of SAIC's Technical and Engineering sector, a $2 billion, 8,700-person enterprise. Earlier in her career, Deborah held other P&L positions and worked in the Legislative Branch of government and the Department of Defense (DoD).

Deborah has deep expertise in strategic planning, risk management, public policy, cyber security, space, logistics, and innovation. Deborah is a proficient speaker on business and government topics, including issues in national security and world affairs, politics in Washington, business transformation leadership, mergers and acquisitions, cost reduction strategies, and diversity and inclusion.

She is an accomplished keynote speaker and enjoys working one-on-one as an Executive Mentor with C-suite level professions, sharing her expertise and providing advice on team building, organizational change management, partnering with the Federal Government, and transformational technology. Deborah is the author of the new book "Aim High: Chart Your Course and Find Success" and she periodically appears on *MSNBC*, *CBS*, and other national news programs. Finally, Deborah serves on various for-profit and non-profit boards of directors. Deborah became a member and Chair of the Defense Business Board upon her appointment in September 2021.

Previous Experience

- 23rd Secretary of the United States Air Force
- SAIC, President, Technical and Engineering Sector
- SAIC, Executive Vice President, Communications and Government Affairs
- SAIC, General Manager, Command and Control Business Unit
- Business Executives for National Security (BENS), Executive Vice President and Chief Operating Officer
- Vice President, United Technologies, International Operations, and Marketing
- Assistant Secretary of Defense, Reserve Affairs, DoD
- Armed Services Committee, US House of Representatives

Education

- Columbia University, School of International & Public Affairs - MIA, International Affairs
- Duke University - AB, Comparative Area Studies

Today's Affiliations

- Member, Board of Directors: Textron, Unisys, Noblis, Systems & Technology Research, Atlantic Council, and PenFed Foundation
- Advisor: Beacon Global Strategies LLC, Leanln.org, Massachusetts Institute of Technology, Lincoln Laboratory, Ursa Major Tech, and SOSi
- Executive Mentor, ExCO Leadership
- Senior Advisor, Center for Strategic and International Studies

DEFENSE BUSINESS BOARD

LINNIE M. HAYNESWORTH

CO-CHAIR, DEFENSE BUSINESS BOARD; FORMER VICE PRESIDENT, NORTHROP GRUMMAN; and INDEPENDENT BOARD DIRECTOR

Ms. Haynesworth serves as a Board Director on three public company boards, where she is a member of the Audit, Technology, and Governance and Sustainability committees.

Linnie also serves on non-profit boards, including the Fairfax County Economic Development Authority (FCEDA) Commission and the Flint Hill School Trustees. She has also served as a Board Member of the Northern VA Technology Council and the Intelligence & National Security Alliance (Audit Committee).

Ms. Haynesworth is a highly regarded operational leader with an extensive background in technology integration; cybersecurity risk management; strategic planning; and large complex software-intensive system development, delivery, and deployment to US government and international customers. With P&L operational responsibility for multiple billions dollar-plus divisions, she retired in 2019 as the Sector Vice President and General Manager of the Cyber and Intelligence Mission Solutions Division for Northrop Grumman Corporation's (NGC) Mission Systems sector. Linnie also led Engineering, Supply Chain, and Product Development functions for the NGC Space sector.

Ms. Haynesworth received her BS in Electrical Engineering from the University of Southern California (USC) and is the 2019 recipient of the USC Viterbi School of Engineering Mark A. Stevens Distinguished Alumni Award. Linnie also earned the National Association of Corporate Directors (NACD) Cybersecurity Oversight Certification from Carnegie Mellon University Software Engineering Institute (2022).

DEFENSE BUSINESS BOARD

DR. DAVID VAN SLYKE, PhD

DEAN, THE MAXWELL SCHOOL OF CITIZENSHIP & PUBLIC AFFAIRS, SYRACUSE UNIVERSITY

David M. Van Slyke is Dean of the Maxwell School of Citizenship and Public Affairs at Syracuse University and the Louis A. Bantle Chair in Business-Government Policy. Prior to becoming Dean in July 2016, Van Slyke was Associate Dean and Chair of Maxwell's Department of Public Administration and International Affairs. He is a tenured, full professor at the Maxwell School and the College of Arts and Sciences and a two-time recipient of the Birkhead-Burkhead Award and Professorship for Teaching Excellence.

Van Slyke is a leading international expert on public-private partnerships, public-sector contracting and contract management, public and nonprofit management, and policy implementation. He was a Director (2016- 2021) and is a Fellow (2010-Present) of the National Academy of Public Administration (NAPA) and has been a member of NAPA's Expert Advisory teams for the Office of the Inspector General at the Department of Homeland Security and U.S. Postal Service. He is a former co-editor of the *Journal of Public Administration Research and The*ory and the *Journal of Strategic Contracting and Negotiation*. He is actively engaged in the Network of Schools of Public Policy, Affairs, and Administration; the Association of Professional Schools of International Affairs; the Volcker Alliance; and the University Leadership Council on Diversity and Inclusion in International Affairs Education. He also sits on the editorial boards of several top-ranked public affairs and nonprofit management journal.

He has provided expert guidance to the Office of Management and Budget, Government Accountability Office, U.S. Coast Guard, Department of Defense, World Bank, and a range of philanthropic foundations. As part of his executive education teaching and research, he has worked extensively with senior leaders in government, nonprofit, and business organizations in China, India, Russia, Singapore, and Thailand. He has been interviewed on, and his work cited in, *CNN*, *Washington Post*, *Bloomberg Tax*, *National Public Radio's Morning Edition*, *National Public Radio/American Public Media's MarketPlace*, *CBS News*, *US News & World Report*, *Governing*, the *Capital Pressroom*, *Washington Times*, *Government Executive*, I*nsideDefense*, *Xinhua Global Times in China*, *Federal Computer Week*, *Washington Technology*, *Defense Industry Daily*, *Federal News Radio*, and *GovLoop*.

Van Slyke's book, "Complex Contracting: Government Purchasing in the Wake of the U.S. Coast Guard's Deepwater Program" is the recipient of the American Society for Public Administration Section on Research Best Book Award for 2014 and honorable mention for the Public and Nonprofit Section of the Academy of Management best book award for 2016. He is winner of the 2015 Distinguished Alumnus in Public Administration and Policy award from the Rockefeller College of Public Affairs and Policy at the University at Albany, and the 2007 Best Article Award published in the *Journal of Public Administration Research and Theory*. Van Slyke earned a Ph.D. in Public Administration and Policy from the Rockefeller College of Public Affairs and Policy at the University at Albany, State University of NY.

DAVID BEITEL

CHIEF TECHNOLOGY OFFICER
ZILLOW GROUP

As Chief Technology Officer of Zillow Group, David Beitel oversees the internal and external technical engineering, product development, and technology operations teams. David joined Zillow in 2005 as a member of the founding team and is one of the company's first executive leaders.

In addition to his role as CTO, David helped develop and build Zillow from a small startup to a household name and was named the region's Most Innovative CTO by the *Puget Sound Business Journal* in 2012. He also received the Large Enterprise Seattle CIO ORBIE Award for 2021.

Prior to Zillow, David was CTO of Expedia, where he joined as one of its earliest team members and spent 12 years contributing to its success. David started his career at Microsoft in the Handheld Computing group.

David earned a BS in Computer Science and Master of Engineering in Computer Science from Cornell University. He is a Board Trustee and Advisor with a number of advocacy, education, and charitable organizations, including Cornell University CIS, University Prep, and T4A.org.

DEFENSE BUSINESS BOARD

SALLY DONNELLY

FOUNDING PARTNER
PALLAS ADVISORS

Sally Donnelly is a Founding Partner of Pallas, a strategic advisory firm specializing in navigating complex national and international security dynamics. Her public service included roles as Senior Advisor to the Secretary of Defense; Director of the Washington Office for the Commander of U.S. Central Command; and Special Assistant to the Chairman of the Joint Chiefs of Staff.

In the private sector, Ms. Donnelly was the Founder and Chief Executive Officer of SBD Advisors, a Washington, D.C.-based consulting firm, advising technology and corporate clients as well as non-governmental organizations on strategic positioning, communications, and policy issues.

Previously, she spent more than 20 years at *Time Magazine* serving as the magazine's correspondent for the Iraq War, the Moscow bureau, and on the aviation and airline beat. She was the head researcher of the 1988 book "Mikhail S. Gorbachev: An Intimate Biography" and worked on the 1989 book "Massacre in Beijing."

Ms. Donnelly serves on the Board of the Quincy Institute for Responsible Statecraft. Additionally, she is a non-resident senior fellow at the Rockefeller Brothers Fund and on the Leadership Council for the Bob Woodruff Foundation. Ms. Donnelly holds a BA in History from Hollins College and a Master's in Russian Politics from London School of Economics.

DEFENSE BUSINESS BOARD

DR. CHRISTOPHER S. GOPAL, PhD

EXECUTIVE, CONSULTANT, AUTHOR & EDUCATOR
GLOBAL SUPPLY CHAIN & OPERATIONS

Dr. Gopal has more than 35 years of experience consulting and providing industry executive management in global supply chain and operations strategy, execution, and technology. His expertise has focused on innovating, structuring, improving, and managing supply chain operations, business processes, services, and technology-use for leading global companies.

For products companies, this has included developing innovative supply chain, customer life cycle experience, and information strategies on a global basis, cost reduction, risk mitigation, stabilizing and improving operational efficiency, and executing for world-class results. In the services arena, he has built and run world-class professional services and consulting practices for major companies; consulted in supply chain strategy, management, and technology with leading global companies; and has developed technology solutions, innovative new services in accelerated strategy and process design, and executive education programs.

Dr. Gopal has held executive positions at leading companies, including VP Worldwide Operations & Services for Overland Storage; VP World-Wide Operations for Dell Computer; Partner & Director of Global Supply Chain & Operations Services for Ernst & Young Consulting; as well as executive VP positions at Unisys and SAIC.

Dr. Gopal is a recognized thought leader in the field of global supply chain & operations. He is the co-author of three books -- the latest being "Supercharging Supply Chains: Creating Shareholder Value through Operations Excellence" (Now published in Japanese). He has authored several articles and is an invited speaker at numerous international business conferences for *Business Week*, Defense Logistics Agency, the *Harvard Business Review*, the Milken Institute Global Forum, and the Council for Supply Chain Management Professionals, among others. He has been nominated to the *SC Digest 2020* "Supply Chain Gurus" panel and was also a member of the 2015-2019 panels.

He has served as an Advisor and Board Member to leading–edge technology companies, including a leading corporate social responsibility platform company; he has assisted with several startups. Dr. Gopal served as an Advisor to a prominent think tank project in Washington on Industrial Competitiveness, and he recently served on a White House sub-committee on Manufacturing Technologies.

Currently, Dr. Gopal is a Strategic Advisor to OCX Cognition, a company that consults and develops software to integrate and organize the Integrated Supply Chain and Customer Life Cycle Experience. He consults with companies in supply chain & operations, risk mitigation, e-business, technology, and solutions development. He teaches at the University of California San Diego and University of Southern California (USC). Dr. Gopal serves on the Advisory Board of the Global Supply Chain Management Center at USC. He holds a PhD in Business from the University of Southern California; an MBA from the Cranfield School of Management, UK; and a BSc in Physics, Science, and Mathematics from Bangalore University, India.

Sarah Mineiro
Founder and CEO of Tanagra Enterprises

Sarah Mineiro is the founder and CEO of Tanagra Enterprises a defense, intelligence, space, science, and technology consulting firm based in the national capital region. Sarah has worked within the national security and defense sector for over 20 years. Over her career Sarah has worked in venture capital backed private industry, the Executive, and Legislative branches of government.

Previously, Sarah was the Senior Director of Space Strategy for Anduril Industries, a hypergrowth VC-backed defense unicorn specializing in AI/ML enabled defense technologies. Sarah was responsible for developing the company's space strategy, aligning internal company resources to product development, and business development. Sarah was the Staff Lead for the Strategic Forces Subcommittee for the House Armed Service Committee (HASC). She led the Subcommittee's legislative and oversight activities of all Department of Defense and Military Intelligence Program space programs, U.S. nuclear weapons, missile defense, directed energy, and hypersonic systems. Sarah was the senior legislative advisor to Chairman Mac Thornberry on all strategic forces issues. In this role she was the primary drafter and negotiator of the Space Force and Space Command legislation for the House Republicans.

Prior to joining the HASC, Sarah served in the Office of the Under Secretary of Defense for Policy (OSDP), the Office of the Under Secretary of the Air Force for International Affairs (SAF/IA) and she started her career as an intelligence analyst for the National Air and Space Intelligence Center in Dayton, Ohio. She was the lead employment analyst on foreign counterspace systems including space situational awareness sensors, directed energy, and kinetic kill vehicle systems.

Sarah is a board member of the Space Force Association and National Defense University Foundation. She has been awarded Secretary of Defense Medal for Exceptional Civil Service. She has served on the Defense Innovation Board, and currently serves on the board of advisors for several space start-ups. She is an Executive Mentor with the Zed Factor fellowship, a newly established nonprofit seeking to increase participation of underrepresented communities, including women of color and LGBTQ+ individuals, in the space ecosystem. Sarah is also a Senior Fellow with the Potomac Institute for Policy Studies as well as an adjunct senior fellow with the Aersopace Security Project at CSIS.

DEFENSE BUSINESS BOARD

BRIG. GEN. BERNARD SKOCH, US AIR FORCE (RET)

CHAIR OF THE BOARD
AIR & SPACE FORCES ASSOCIATION

Brigadier General Bernie Skoch (USAF, Ret.) graduated from the University of Arkansas with a Bachelor's in Industrial Engineering. Upon graduation, he was commissioned as a Second Lieutenant in the Air Force. His 29-year Air Force career took him throughout the United States, Europe, Asia, the Pacific, and the Middle East on permanent and temporary duty until retiring at the rank of Brigadier General.

Skoch has more than 25 years of experience in leadership positions developing, managing, and implementing communications and information systems at the Wing, Major Command, and Air Staff levels of the United States Air Force as well as at the Defense Information Systems Agency (DISA). During his time at DISA, he served as the Principal Director for Customer Advocacy and as the Principal Director for Network Services. At Headquarters USAF, he served as Director of Mission Systems, Director of Communications Operations, and Director of Chief Information Officer Support where he was responsible for aligning information technology systems with business process improvements. He has developed policies for global voice, video, radio, data, and satellite systems. While on the Joint Staff, Skoch led transformation of the mainframe-based DoD-wide Worldwide Military Command and Control System to the distributed Global Command and Control System, substantially improving system support to Combatant Commands.

As Director of Communications at Pacific Air Forces, he led the creation of the COPE SPARK family of initiatives which significantly improved warfighter communications and data support throughout the Pacific.

Upon retirement from active duty, Skoch was a consultant to numerous IT-sector companies and to the Federal Government. In 2010, following an unsuccessful run for the U.S. House of Representatives, Skoch was appointed National Commissioner of the National Youth Cyber Education Program, CyberPatriot, a program operated by the not-for-profit Air and Space Forces Association. Skoch oversaw the planning and implementation of CyberPatriot and provided leadership and support for the program's development. Under his leadership the program grew into the largest Cyber Defense STEM Education competition in the world, reaching over 250,000 K-12 students, stimulating their interest in science, technology, engineering, and mathematics related studies, as well as increasing their awareness of cybersecurity threats.

Skoch is a graduate of Air Command and Staff College, Air War College, and the Program for Senior Officials in National Security at Syracuse University and Johns Hopkins University. He holds a Master's in Management and Supervision from Central Michigan University.

Bernie is a certificated Commercial Pilot and FAA certificated drone pilot, and is an amateur astronomer and a ham radio operator. Bernie and Debbie, his wife of 50 years, have six children, twenty-one grandchildren, and one great grandchild.

PATRICIA J. ZARODKIEWICZ

PRESIDENT
PATZ CONSULTING, LLC

Pat Zarodkiewicz, President, PatZ Consulting, LLC, provides national security, organizational dynamics, and leadership consulting to private and federal markets. In addition to her consulting, she currently serves on the Aerospace Corporation's Board of Trustees and the Board of Advisors for the Intelligence & Security Academy LLC, and is an advisor to Core4ce, LLC.

She is a retired Senior Executive with nearly 34 years of experience in the Department of the Air Force. In her final USAF position as the Administrative Assistant to the Secretary of the Air Force (SAF/AA), she provided advice to the Secretary of the Air Force and Chief of Staff on executive personnel and Headquarters management; led an organization responsible for over $5.6 billion annually; and supported 37,000 people. As the Air Force's Senior Security Official, she led the Air Force's insider threat program, information, personnel, and industrial security policy and provided oversight of Special Access Programs. Pat served as the Acting Under Secretary for five months in 2017 and was the senior transition official for the Air Force. She served as the Chair of the Strategic Planning Committee for the $6 million DoD Concessions Committee and was the Chair and Board Member of the Air Force Board of Military Corrections.

Prior to her SAF/AA role, Pat served as the Deputy Administrative Assistant to the SECAF and was the Principal Deputy Financial Management and Comptroller for two years. She served as the Deputy Director of the Headquarters Staff. Her previous positions include Deputy for Budget, Assistant Secretary of the Air Force for Financial Management and Comptroller (SAF/FMB); the Deputy Comptroller and Comptroller, HQ Air Force Materiel Command; and the Director of Budget Investment, SAF/FMBI. Her career includes 20 years of experience in financial management at base, Major Command, and Headquarters.

Pat's leadership was recognized with two Meritorious Presidential Rank Awards; one Distinguished Presidential Rank Award; the Air Force Exceptional Service award; the Navy Superior Public Service Award; and the Army Meritorious Public Service Award.

Pat was a Distinguished Graduate in 1995 from the Industrial College of the Armed Forces, graduating with a MS in National Resource Strategy, and her studies focused on Space Programs. Pat has a Master's in International Affairs from American University and a BA in Economics and Political Science from the University of Rochester. She attended the Seminar XXI program at Massachusetts Institute of Technology.

Appendix D – Acronym List

ACAT – Acquisition Category

ACQ – Acquisition

ASAF (SA&I) – Assistant Secretary of the Air Force for Space Acquisition and Integration

BA – Budget Activity

CEO – Chief Executive Officer

COMSO – Commercial Space Office

CSO – Chief of Space Operations

DAE – Defense Acquisition Executive

DAES – Defense Acquisition Executive Summary

DAF – Department of the Air Force

DAS – Defense Acquisition System

DAU – Defense Acquisition University

DARPA – Defense Advanced Research Projects Agency

DAWIA – Defense Acquisition Workforce Improvement Act

DBB – Defense Business Board

DepSecDef – Deputy Secretary of Defense

DNI – Director of National Intelligence

DoD – Department of Defense

DoDi – Department of Defense Instruction

eACAT – equivalent Acquisition Category

ETMO – Enterprise Talent Management Office

FAR – Federal Acquisition Regulation

FASA – Federal Acquisition Streamlining Act

FFRDC – Federally Funded Research and Development Centers

FY – Fiscal Year

GAO – Government Accountability Office

GO – General Officer

GPS – Global Positioning System

GS – Government Service

IMD – Integrated Mission Delta

JCIDS - Joint Capability Integration & Development System

JROC – Joint Requirements Oversight Council

MCA – Major Capability Acquisition

MDA – Milestone Decision Authority

MDAP – Major Defense Acquisition Program

MTA – Middle Tier Acquisition

NASA – National Aeronautics and Space Administration

NDAA – National Defense Authorization Act

NGA – National Geospatial Intelligence Agency

NRO – National Reconnaissance Office

NSS – National Security Space

OSD – Office of the Secretary of Defense

OSD(A&S) – Office of the Secretary of Defense for Acquisition & Sustainment

OMB – Office of Management and Budget

OT(A) – Other Transactional Agreement

PE – Program Element

PEO - Program Executive Officer

PIC – Program Integration Council

PM – Program Manager

PPBE – Programming, Planning Budgeting, and Execution

RAND – Research and Development

RDT&E – Research, Development, Testing & Evaluation

SAC – Space Acquisition Council

SAE – Service Acquisition Executive

SAR – Selected Acquisition Report

SCIF – Sensitive Compartmented Information Facility

SDA – Space Development Agency

SES – Senior Executive Service

SSC – Space Systems Command

SMC – Space & Missiles Systems Center

SPEED – Special Experience Exchange Duties

SpOC – Space Operations Command

SpRCO – Space Rapid Capabilities Office

STARCOM – Space Training and Readiness Command

ToR – Terms of Reference

USD (AT&L) – Under Secretary of Defense for Acquisition, Technology, & Logistics

USD (A&S) – Under Secretary of Defense for Acquisition & Sustainment

USD (R&E) – Under Secretary of Defense for Research and Engineering

USSF – United States Space Force

WSARA – Weapons System Acquisition Reform Act

WSF – Weather System Follow-on

Appendix E – Disclosures

This Study, DBB FY24-01, *A Review of Space Acquisition*, is a product of the Defense Business Board (DBB). The board's recommendations herein are offered as advice and do not represent DoD policy.

The Secretary of Defense established the DBB in 2002 to provide the Secretary and Deputy Secretary of Defense with independent advice and recommendations on how "best business practices" might apply to the overall management of the DoD. DBB's members, appointed by the Secretary of Defense, are senior corporate leaders with demonstrated executive-level management and governance expertise.

DBB members possess a proven record of sound judgment in leading or governing large, complex organizations and are experienced in creating reliable and actionable solutions to complex management issues guided by proven best business practices. All DBB members volunteer their time to this mission.

Authorized by the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended) and governed by the Government in the Sunshine Act of 1976 (5 U.S.C. § 552b, as amended), 41 CFR 102-3.140, and other appropriate federal and DoD regulations, the DBB is a federal advisory committee whose members volunteer their time to examine issues and develop recommendations and effective solutions to improve DoD management and business processes.

Appendix F – Figure Notes & Sources

Figure 3: *Scope and Scale of the Unity of Effort*

1. Program Element Notes:

    The program element totals are for investment appropriations only. The USSF provided the PE quantity for USSF organizations through a data call initiated for this study. Missile Defense Agency data was obtained from FY23 Defense-Wide Justification Books found at https://comptroller.defense.gov/Budget-Materials/FY2023BudgetJustification/.

2. Personnel Quantity Notes:

    Personnel quantities were sourced through the websites below:

    - SSC: https://www.ssc.spaceforce.mil/About-Us/About-Space-Systems-Command
    - SpRCO: https://spacenews.com/secretive-military-space-agency-stepping-out-of-the-shadows/
    - SDA: https://www.sda.mil/whats-with-all-the-u-s-space-related-agencies/#:~:text=The%20Space%20Development%20Agency%2C%20which%20stood%20up%20in%20March%202019,led%20by%20its%20director%2C%20Dr.
    - NRO: https://www.nro.gov/About-NRO/
    - MDA: https://www.mda.mil/nofear.html [FY18 No FEAR Report to Congress]

3. Requirements Notes:

    - SSC: Programs utilizing the MTA and software pathways derive their requirements through non-JCIDS processes.
    - NRO: NRO requirements are submitted to JROC for awareness but are not typically generated through the JCIDS process.

4. Program Start Date / First Delivery:

    - Program start is milestone B for all major defense acquisition programs; for middle tier acquisition, it is the date of initial contract award.
    - Program start date and first delivery data is from 2018, 2019, and 2021 Annual Selected Acquisition Reports for major defense acquisition programs.
    - MTA data is from:
        - https://www.gao.gov/assets/gao-21-105249.pdf
        - https://breakingdefense.com/2023/05/space-force-polar-orbiting-missile-warning-sats-move-toward-production/
        - https://spacenews.com/space-development-agency-awards-1-5-billion-to-lockheed-martin-and-northrop-grumman-for-72-satellites/

Figure 8: *Reprogramming Thresholds by Appropriation Titles for Selected Fiscal Years*

"DoD Transfer and Reprogramming Authorities: Background, Status, and Issues for Congress." Congressional Research Service. June 17, 2020. https://sgp.fas.org/crs/natsec/R46421.pdf

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Appendix G – Public Comments

No public feedback was received on the presentation of the study as part of the DBB Quarterly Board meeting held on November 15, 2023.

Appendix H – Recommended Follow-on Studies

1. **Reforming JCIDS** – A follow-on study would review the process the Department uses to derive and deconflict requirements to deliver capability to its warfighters. The study should leverage the work previously conducted by the Acquisition Innovation Research Center and recommend ways to implement a modern approach to requirements generation that is more expedient, responsive, adaptable, and problem-focused.

Appendix I – Questionnaires

TAB B

Request for Information – *Review of Space Acquisition*

1. How many USSF personnel are assigned to each of the organizations listed below?
   a. SDA
   b. SpRCO
   c. PEO MBC3
   d. PEO Space Sensing
   e. PEO Assured Access to Space
   f. PEO Space Domain Awareness
   g. PEO Comm & PNT
   h. NRO
   i. SSC HQ (Not assigned to the 5 PEOs)
   j. SQ

2. How many Program Managers are in the USSF?
   a. What percentage of Program Managers hold the Level III or Advanced certification?

3. How many contracting officer professionals in the USSF hold a warrant?

4. What is the total FY23 investment budget for each of the organizations below, the total number of acquisition programs/projects, and the total number of PEs?
   a. SDA ($ / # / PE count)
   b. SpRCO ($ / # / PE count)
   c. PEO MBC3 ($ / # / PE count)
   d. PEO Space Sensing ($ / # / PE count)
   e. PEO Assured Access to Space ($ / # / PE count)
   f. PEO Space Domain Awareness ($ / # / PE count)
   g. PEO Comm & PNT ($ / # / PE count)

5. Please provide the number of:
   a. Programs by ACAT Level (or Equivalent)
   b. Programs by Milestone Decision Authority/Decision Authority
   c. Programs by Acquisition Pathway
   d. FAR-based vs OTA contracts (with total dollar value)
   e. Total # of Red Programs (and criteria used to rate them) by PEO
   f. Total # of Yellow Program (and criteria used to rate them) by PEO
   g. Total # of Green Programs (and criteria used to rate them) by PEO

6. Please provide the number of new starts in FY22 and FY23, by year.

7. Please provide the number of active ACAT ID Major Capability Acquisition Programs. Of this number, how many have ever breached their Acquisition Program Baseline?
8. Please provide the number of active ACAT IC Major Capability Acquisition programs. Of this number, how many have ever breached their Acquisition Program Baseline?
9. Of the active ACAT II/III programs in the USSF, how many have ever breached their Acquisition Program Baseline?
10. How many acquisition program documents (any pathway, any ACAT) are in TMT currently for coordination or signature?

Appendix J – Endnotes

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