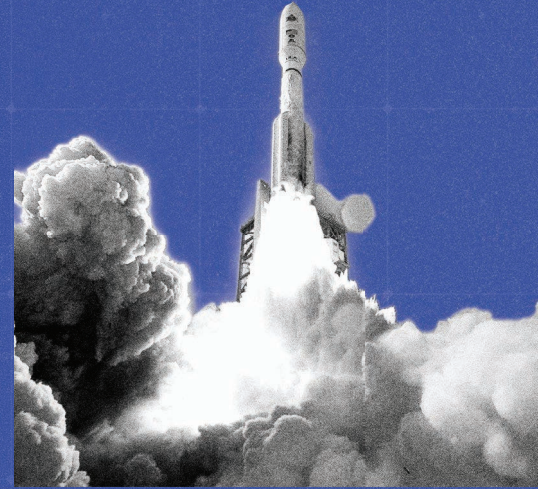





GETTING SPACE ACQUISITION RIGHT ↘




STEPS TO REALIZE ENDURING CHANGE >>>>



THE U.S. SPACE FORCE (USSF) FACES ADVERSARIES WHO HAVE DEMONSTRATED INCREASINGLY SOPHISTICATED CAPABILITIES TO DENY OR DEGRADE U.S. OPERATIONS IN AND THROUGH THE SPACE DOMAIN. ASSURING MISSION SUCCESS IN A FUTURE WARFIGHT MEANS THE UNITED STATES MUST DEVELOP AND ACQUIRE SYSTEMS THAT ARE RESILIENT TO THESE THREATS, AND IT NEEDS TO FIELD THOSE SYSTEMS AT A SPEED THAT MATCHES THAT OF THE EVOLVING THREATS. BUT THE CURRENT SPACE ACQUISITION SYSTEM IS NOT UP TO THE TASK.



TO INCREASE THE RESILIENCE AND THE WARFIGHTING CAPACITY OF THE SPACE ENTERPRISE, THE USSF MIGHT NEED TO WORK ACROSS DoD AND OTHER GOVERNMENT AGENCIES TO INTEGRATE AND SYNCHRONIZE COMPLEMENTARY CAPABILITIES IN MULTIPLE MISSION AREAS.



Traditionally, space system acquisition has operated on long, relatively inflexible life cycles, which is an acceptable approach when designing systems to be resilient to enduring threats. Yet these traditional approaches cannot keep up with a rapidly evolving threat. Motivated by a need for speed, some space programs are pursuing alternative acquisition pathways that, while faster, could come with unidentified risks to mission assurance.

But rapidly acquiring individual systems is only part of the story. Building an end-to-end space capability is also an important aim—one that requires the integration and synchronization of multiple elements whose development and fielding are managed not only by the Department of the Air Force (DAF) but also by other military departments and federal agencies. To increase the resilience and the warfighting capacity of the space enterprise, the USSF might need to work across the Department of Defense (DoD) and other government agencies to integrate and synchronize complementary capabilities in multiple mission areas.

Together, these complexities have contributed to a long list of acquisition challenges that the USSF needs to address.



CONTRIBUTIONS OF RECENT RESEARCH

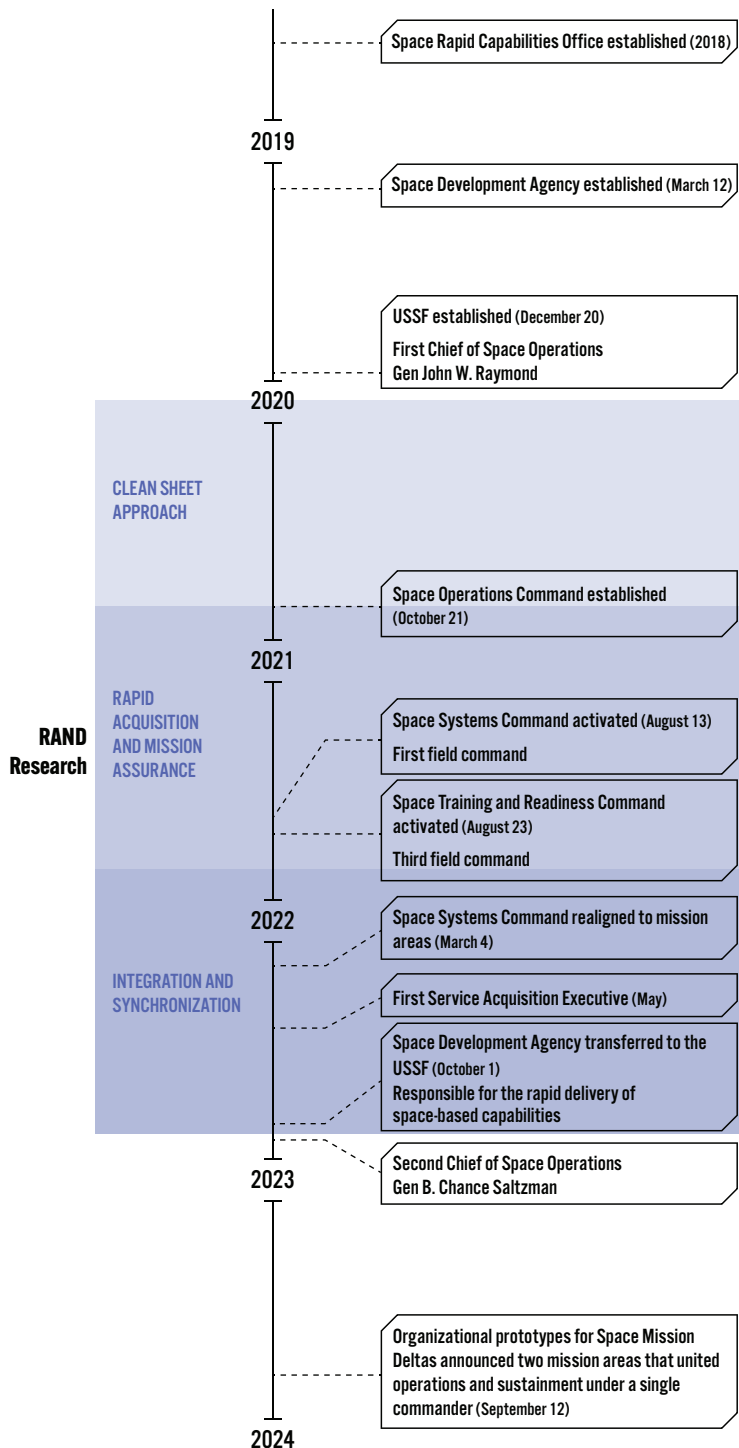
RAND Project AIR FORCE has conducted a series of research efforts focused on the challenges of space acquisition to help the USSF build effective space acquisition processes and a cohesive space enterprise. Notable among this body of work are efforts that explored

- 01_** a “clean sheet” approach to space acquisition
- 02_** how to ensure mission assurance while pursuing rapid acquisition approaches
- 03_** how to improve integration and synchronization with the stakeholder community.

Each of these efforts built from the prior work. This document highlights the key findings and recommendations from these three areas of RAND research.

At the same time, the USSF has undergone considerable change in the realm of space acquisition, as illustrated in the figure on the right. Some proposed changes from RAND’s analysis were implemented during this period of research or are in the process of being implemented. A 2023 Defense Business Board study titled *A Review of Space Acquisition* reported that many recommendations of the clean sheet report have been adopted by the USSF.

TIMELINE OF MAJOR EVENTS RELATED TO SPACE ACQUISITION AND RAND RESEARCH



A CLEAN SHEET APPROACH TO SPACE ACQUISITION

In 2019, to support the stand up of the USSF as the newest military service, DAF leadership asked RAND Project AIR FORCE to develop a clean sheet acquisition approach that would be designed around the new service's unique mission and calling. The resulting report, *A Clean Sheet Approach to Space Acquisition in Light of the New Space Force*, released in August 2021, drew on interviews with more than 45 current and retired senior leaders and space acquisition experts—most with several decades of acquisition and/or operational experience—and outlined the many challenges that have faced space acquisition.

The establishment of the USSF as a new service offered a unique opportunity to create a different culture and to incorporate innovative ideas and management structures. But the acquisition of space capabilities, including satellites and their components, user equipment, ground stations, and launch services, has been a notable challenge in the space domain. Among the challenges that have faced space acquisition are (1) the need for faster development, particularly in light of the rapid pace of adversary capabilities and the growth of commercial technologies; (2) the need to

integrate and synchronize the acquisition, fielding, and sustainment of satellites, user equipment, ground stations, launch services, and expected payloads; and (3) the need to develop processes for leveraging commercial capabilities. DoD space acquisition has a long history of difficulties related to technical challenges, high costs, long development timelines, fragmented leadership, and the lack of an enterprise-wide space architecture.

These challenges demand a new approach to acquisition that is fast, agile, and tolerant to risk or even failure. Yet a new approach must also reflect several features of the USSF that are either unique—setting it apart from the other services—or particularly pronounced. Most notably, the USSF will be significantly smaller than any other military service by more than an order of magnitude. This means that there will be fewer people for processes that traditionally have been manpower intensive, including acquisition. A smaller service offers the opportunity for increased agility and reduced bureaucracy that comes with a flatter organization and a shorter chain of command.

**THE RESEARCH TEAM
PROPOSED A CLEAN SHEET
ACQUISITION VISION FOR THE
TECHNOLOGY-CENTRIC USSF:
ACQUISITION AS A WARFIGHTING
CAPABILITY RATHER THAN AS
A SUPPORT FUNCTION.**

The USSF is highly reliant on technology to develop and sustain its joint warfighting capabilities, perhaps even more so than the other services. USSF warfighters are technology operators and have much in common with space acquirers. This dependence on technology necessitates the USSF having a close, trusting, and collaborative relationship with industry. A service that has technology as a foundation for warfighting warrants an acquisition approach that is focused on ensuring that the required capabilities are available when needed.

Acquisition is typically viewed as a support function—providing support to the warfighter—and is often characterized as a risk-averse culture that is detached from the operational community. To be effective, acquisition processes must be rapid, agile, and, above all, threat informed, which means bringing the acquisition and operational communities closer together.

Space acquisition reform is not enough; space acquisition needs to be reenvisioned to account for this rapidly changing and complex environment. Thus, the research team proposed a clean sheet acquisition vision for the technology-

centric USSF: acquisition as a warfighting capability rather than as a support function. Reframing the role of acquisition will require a significant cultural change. The relationship between the operations and acquisition communities needs to be reshaped and engagement with industry needs to be reimagined to better connect partners and solutions with operators and their needs.

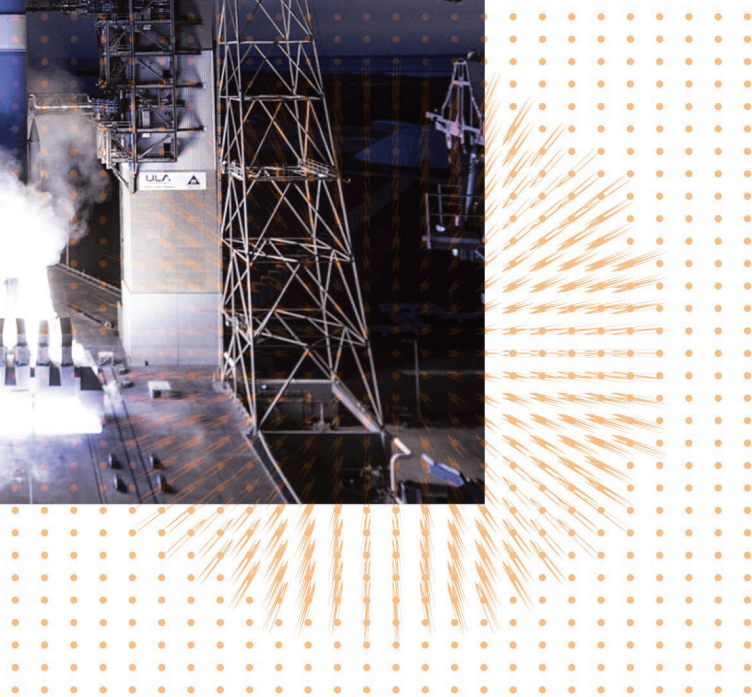


IMPLEMENTING A CLEAN SHEET VISION

To develop the vision of acquisition as a warfighting capability, the USSF needs to be as independent from the U.S. Air Force as possible, with broad leeway to set up acquisition policies and processes that best serve the space domain. This includes budget independence and budget flexibility that will allow dollars to be applied to the USSF's highest priorities. To provide threat-informed capability on an operationally viable schedule within cost constraints, the clean sheet approach of acquisition as a warfighting capability incorporates these features:

- » **REMOVE THE SEAMS THAT TRADITIONALLY SEPARATE OPERATORS AND ACQUIRERS**, so that everyone understands both technology and operations; operators will know how technology flows and changes, and acquirers will know how the technology is implemented and used in the field.
- » **CREATE AN ADAPTIVE TECHNICAL ARCHITECTURE**, based on warfighting doctrine and the concept of operations, to provide a framework for decisionmaking, countering the threat, and a road map for innovation.
- » **ESTABLISH A SINGLE SPACE ACQUISITION DECISIONMAKER FOR FLEXIBLE MANAGEMENT OF THE ENTERPRISE**, including focusing resources on the highest priorities, driving capability synchronization, and radically delegating to empowered subordinates.
- » **ENSURE THAT THE WORKFORCE—CONSISTING OF EXPERTS CULTIVATED THROUGH SELECTIVE RECRUITING, ASSIGNMENTS, TRAINING, AND PROMOTIONS—IS RISK TOLERANT, FLEXIBLE, COLLABORATIVE, AND ENTERPRISE-FOCUSED**, providing capabilities and not merely systems. Personnel must have the skill sets that allow them to understand technology from both an operator's and an engineer's or acquirer's perspective.
- » **BUILD INTERNAL AND EXTERNAL OUTREACH MECHANISMS**, including information-sharing and metrics, that emphasize strong relationships and mutual trust within and across the U.S. Congress, DoD, the USSF, the Intelligence Community, other federal agencies, and industry.
- » **FOSTER A TRUSTING AND COLLABORATIVE RELATIONSHIP WITH INDUSTRY**, such as by providing industry with a technology road map that includes (1) innovation on-ramps to accept emerging technology or to address changing threats and (2) divestiture off-ramps for obsolete capability. To be effective partners in this relationship, USSF personnel need to be aware of space-related technology developments and capabilities in the commercial industry and how they fit together with and contribute to enterprise capabilities that align with the overarching space architecture.





To pursue such changes requires drawing on the tenets of formal change management. Among the elements that deserve special attention by the USSF are leadership, mission clarity, motivation, enablement, metrics and performance measurement, communication, and management of resistance to change. The sustained support of relevant leadership is critical to the success of any major organizational change effort. To change culture, USSF leaders must be clear about what culture they seek to institute, how they wish to define and measure each element of culture, how the different elements relate to each other, and how they intend to use metrics to motivate personnel and to measure cultural change in the performance of personnel.

This clean sheet vision for acquisition embodies a systematic, comprehensive, and holistic approach rather than a menu of items from which to pick and choose. Picking and choosing could achieve small pockets of improvement but not the overall development of culture and effectiveness that would be possible from a holistic implementation. The USSF needs the flexibility and authority to invest in all of these changes across the enterprise, and Congress will need to provide the required authorities, including enhanced funding flexibility, to allow for investments and disinvestments as the architecture evolves. All of this can and should be done holistically and intentionally to create the right culture and to ensure effective change.

RAPID SPACE ACQUISITION AND MISSION ASSURANCE

Building on prior work, RAND researchers took a deep look at rapid acquisition approaches that are in place across the USSF and developed recommendations for anticipating and mitigating mission assurance risk in a 2022 report titled *Ensuring Mission Assurance While Conducting Rapid Space Acquisition*. To outpace increasingly effective adversary counter-space capabilities, the USSF is pursuing the rapid acquisition of warfighting capabilities. A key question, however, is whether the acceleration of acquisition by the USSF introduces any critical new risks.

In particular, do the adaptations and streamlining techniques that are being used to get new space systems to operators create vulnerabilities and challenges to mission assurance? An effective response to threat requires not only that systems are available when needed but also that they function as necessary and are robust against any challenge. This challenge is a balancing act for the USSF: How can the service take advantage of rapid acquisition without having to deal with new and unforeseen risks to mission assurance?

Drawing from a policy review and discussions with more than 40 subject-matter experts, the research team created a framework to identify the relative risk to mission assurance of various events and potential mitigation strategies.

RAPID ACQUISITION AND MISSION ASSURANCE RISK

Streamlined acquisition is not a new concept. Alternative urgent and rapid acquisition approaches have been available to meet warfighter needs for decades, and special acquisition organizations have been set up to facilitate those approaches. Furthermore, the tailoring of traditional acquisition programs has always been possible in order to get capabilities at the proverbial “speed of need.” The USSF has taken advantage of opportunities to rapidly deliver new capabilities to the warfighter. But the novelty of those approaches raised questions about whether they might increase risk to mission assurance.

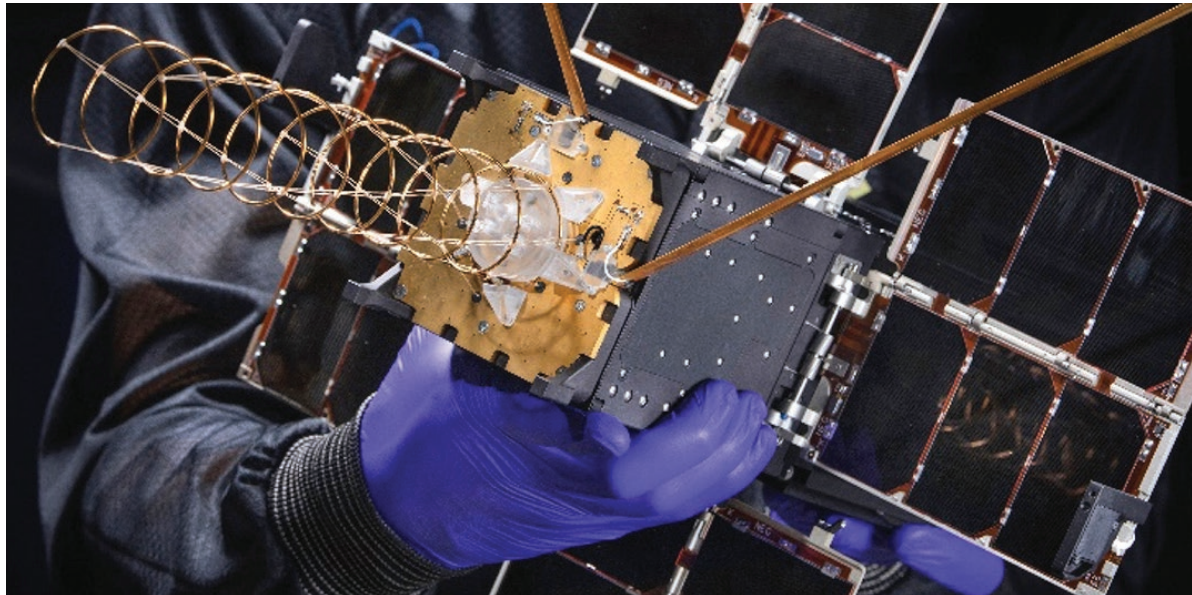


The research team began its assessment by identifying the key differences between streamlined and traditional acquisition as they relate to mission assurance risk. The critical difference, from a mission assurance standpoint, lies in the contrasting priorities for traditional and rapid programs. Traditional programs tend to be large and expensive, highly complex, and designed to have long lifetimes, driving low risk tolerance. Thus, traditional mission assurance is focused on performance objectives, which ensures that the technical and engineering aspects of the system meet the performance requirements with high confidence to maximize mission capability and reliability.

However, these traditional mission assurance objectives are inadequate for ensuring mission success in a contested space environment because they come at the expense of speed. A rapid program that delivers too slowly to meet the threat fails a key measure of mission success. Instead, mission assurance objectives for rapid acquisition need to be expanded to reflect operational and programmatic goals (in addition to technical goals).

THE TRADE SPACE FOR ENSURING MISSION ASSURANCE FOR A RAPID ACQUISITION PROGRAM IS BROADER AND MUST BALANCE SCHEDULE, SECURITY, RESILIENCE, RELIANCE, AND MISSION CAPABILITY AGAINST AN ACCEPTABLE RISK FOR EACH DIMENSION THROUGHOUT THE PROGRAM LIFE CYCLE.

The trade space for ensuring mission assurance for a rapid acquisition program is broader and must balance schedule, security, resilience, reliance, and mission capability against an acceptable risk for each dimension throughout the program life cycle. Thus, mission assurance approaches for rapid programs must be tailored, program-specific, and iterative, not fixed. This represents a new approach to evaluating mission assurance risks.



A FRAMEWORK FOR BALANCING RISKS

A risk management framework can help balance mission assurance objectives and facilitate the communication of risks with stakeholders. The framework proposed by the research team has the following five main steps:

- 01_ DETERMINE THE MISSION ASSURANCE OBJECTIVES, RISK POSTURE, AND APPROACH OR PLAN.** The mission assurance objectives should include metrics that are linked to mission success from a technical, programmatic, and operational perspective and capture the key elements that are required for the operators to perform their mission successfully.
- 02_ IDENTIFY AND ASSESS RISK ITEMS AND RISK MITIGATION OPTIONS.** This step is intended to build on the risk assessment that the program office is already performing with the DoD Risk Management Framework but uses more-granular risk categories that reflect mission assurance objectives.
- 03_ CONSTRUCT AND ASSESS COURSES OF ACTION AND SELECT THE ONE THAT IS OPTIMAL.** This step involves prioritizing the risks and making trade-offs to balance the risks to the mission assurance objectives because not all risks can be mitigated given schedule and resource constraints.
- 04_ COMMUNICATE COURSES OF ACTION, ASSOCIATED RISKS, AND THE IMPACT ON MISSION ASSURANCE TO STAKEHOLDERS.** Ideally, the stakeholder communities should be involved throughout the entire risk assessment process to provide inputs and facilitate alignments of the risk posture and processes that affect rapid acquisition.
- 05_ MONITOR, ITERATE, AND REFINE, AS NECESSARY.** As the programs proceed, new or unanticipated risks might be introduced, and the risk assessment processes will need to be repeated. Program offices should determine a frequency for routine risk monitoring and assessment.

These steps are generally similar to the risk management process that is currently being used, except that trade-offs are required among multiple mission assurance objectives. This framework provides a disciplined approach to making risk trade-offs and is structured so that mission assurance is taken into account at the outset of a program.



KEY ACTIONS FOR U.S. SPACE FORCE LEADERSHIP

The research team identified some key actions for USSF program managers and leadership to address identified risks:

» **EXPAND THE MISSION ASSURANCE OBJECTIVES FOR RAPID ACQUISITION**

to reflect the addition of new operational and programmatic goals on top of the technical system goals.

» **ADDRESS THE RISKS ASSOCIATED WITH RAPID ACQUISITION.** These problems are not unique to space acquisition, and they each have identifiable mitigations.

» **ENSURE THAT PROCESSES ACROSS USSF ACQUISITION AND OPERATIONAL COMMUNITIES ARE UPDATED** to address the need to onboard capabilities more quickly. As these issues cross organizational boundaries, the acquisition community cannot address all of the challenges, so other communities, including requirements and financial management, will also need to make some changes.

» **PROACTIVELY MANAGE THE RISKS TO MISSION ASSURANCE THAT ARE ASSOCIATED WITH RAPID ACQUISITION BY USING A RISK ASSESSMENT FRAMEWORK AND MANAGEMENT PROCESS.** The

framework provides a structured way to conceptualize mission assurance from the inception of the program and an approach for making risk trade-offs to ensure mission success.

All of these recommendations require senior leadership recognition of and attention to the issues, a focus on early and frequent communication across stakeholder communities, and a plan for and sustained attention to the implementation of change.

IMPROVING INTEGRATION AND SYNCHRONIZATION

RAND researchers took on the specific challenges of synchronizing and integrating space acquisition, both vertically (i.e., across space, ground, and user segments) and horizontally (i.e., across the stakeholder community, including services, other government agencies, and industry). Synchronization of the broader space enterprise is critical to delivering space capabilities on a faster timeline to outpace adversary threats.

A 2023 report, *Improving Integration and Synchronization of Space Acquisition and Fielding*, provided additional depth on ongoing disconnects in the areas of organizational roles and responsibilities and authoritative architectures to drive a coherent vision for innovation and acquisition decisionmaking. As the research team came to understand, issues of integration and synchronization apply not only to the acquisition of technical solutions but also, more broadly, to the integration and synchronization of human capital, partnerships, data, and technical solutions.

More than 60 interviews with subject-matter experts and senior decisionmakers across DoD, other federal agencies, and the private sector contributed to the research.

The team also mapped approximately 90 different stakeholders in the current USSF acquisition ecosystem and the relationships among those organizations to understand how the current system functions, which in turn illuminated disconnects.

The research team identified several areas that have a measurable effect on integration and synchronization in space acquisition: building resiliency to budget instability, defining capability or mission architectures, aligning space acquisition and operational organizations, and transitioning innovation to operational capabilities.

BUDGET RESILIENCY

Budget instability at the program level and budget inflexibility overall make it difficult to execute and deliver integrated and synchronized capabilities. The resilience of program planning to budget instability has not historically been a consideration when partitioning mission capability between USSF program elements. But the relative inflexibility of DoD's Planning, Programming, Budgeting, and Execution system

makes it difficult to field capabilities to counter rapidly evolving threats.

Budget uncertainty is a common theme regarding the difficulties of synchronizing and fielding integrated space capabilities. Continuing resolutions have contributed to worsening budget volatility in recent years. This has a particularly large effect on the transition of technology from experimentation to programs of record because the new programs cannot be funded.

The USSF needs to create resource-loaded roadmaps of mission capability architectures and to conduct sensitivity analyses to better understand and prepare for the effects of budget actions, such as continuing resolutions, changes to funding levels, or program cancellations. This knowledge needs to be incorporated into investment planning to improve budgetary resilience. Understanding the effect of budgetary volatility on the space defense industrial base must also be part of investment planning, and Congress must be part of that conversation.

More-transparent congressional interaction will be needed if the USSF is to mitigate the effect and magnitude of budget instability. Although working more closely with Congress and other stakeholders in the financial management community could reduce some budget uncertainty in space acquisition, the USSF will likely need to adopt tools and techniques that allow it to manage the resilience of its investment planning to that budget uncertainty. What is needed, in the short term, is to implement a cultural change that values more-open communication with Congress and builds alignment across the USSF (field commands and acquisition community), the DAF, the Pentagon, and the greater U.S. space enterprise.

ARCHITECTURAL FOCUS

Many USSF organizations are involved in or with space-related architectural decisions; however, the research team found significant confusion about the roles and responsibilities of those organizations and, in turn,



about who owns or has decisionmaking authority for elements of the space architecture. No organization has ownership of the capability architecture or roadmaps.

But to formalize accountabilities for architecture, the USSF first needs to define what architecture consists of and use those definitions to document in mission statements and charters the roles and responsibilities of the various organizations involved. Relatedly, the USSF workforce needs to be educated on architecture vision, definitions, responsible offices, and relationships among systems and missions within the architecture.

The research team also observed that there is an insufficient amount of system-of-systems design talent within the USSF—something that the Service Acquisition Executive needs reliable access to. In the short term, there are ways to assign architectural roles and responsibilities within the Space Warfighting Analysis Center, the Space Systems Integration Office, and the Office of the Assistant Secretary of the Air Force for Space Acquisition and Integration to ensure that the Service Acquisition Executive has unfiltered access to needed resources. But this arrangement might not be a sustainable strategy. In the long term, the USSF needs to conduct a workforce study to determine how best to create and sustain organic system-of-systems and system engineering expertise in the USSF.



ALIGNMENT OF U.S. SPACE FORCE ORGANIZATIONS

As a new armed service, the USSF is continuing to determine its needs, strengths, and weaknesses and is making dramatic changes to address them all. Creating new organizations, or changing the scope and authorities of existing organizations, is an ongoing process. In addition to new organizations, existing organizations are undergoing changes to their roles, responsibilities, and authorities and, in turn, how they interact with each other. The changes are difficult to keep track of, and communication about these changes has often been muddled.

Many acquisition-related organizations lack defined and approved mission statements or charters, and other entities have potentially overlapping or redundant responsibilities—all of which leads to a general lack of understanding across the workforce about accountabilities, authorities, and touch points. Much of the uncertainty stems from the rapid pace of organizational churn and can be lessened by formalizing mission statements and charters that clarify organizational intent, with a particular eye toward distinguishing the acquisition chain of command from organize, train, and equip responsibilities.

USSF missions affect all domains of warfare that depend on projecting military power in and through space. However, a lack of agreement on functional topics, including the partitioning of USSF missions or mission areas, contributes to confusion

on how organizations should integrate and synchronize. Harmonizing such functional concepts as much as possible would help increase understanding of how organizations align and ensure that the right stakeholders are included in the appropriate mission-focused venues and forums.

Furthermore, the operational community is often uncertain about how it can provide needed information to the acquisition community—another problem fueled by the organizational churn and inconsistent decomposition of USSF missions. Although many venues for communication and feedback pathways exist, these communication processes need to be improved. Making consistent options available through known processes, forums, and user agreements would improve communication between operators and acquirers.

TRANSITIONING SPACE INNOVATIONS INTO OPERATIONAL CAPABILITIES

A significant challenge to harnessing innovation and experimentation is the lack of visibility into the many ongoing efforts across the USSF and, in some cases, across the space enterprise. Experimentation and innovation are being carried out in several newer space acquisition organizations that are smaller and tend to be more focused on rapid, innovative solutions, but this experimentation is not visible centrally or across organizations.

To address this, the research team recommended better communication throughout the USSF. Organizations that are involved in space innovation need to improve stakeholder visibility into their efforts; the inclusion of all experiments and innovation into capability roadmaps will also improve visibility. Given the many organizations outside the USSF that are involved in space-related innovation, communication mechanisms should extend beyond the USSF to include other federal agencies.

But setting up organizations that focus on innovation and experimentation and increasing awareness of their activities is only part of the solution for improving

space capabilities. These solutions need to ultimately be transitioned to programs of record, which means that organizations need to be incentivized to accept the cost, schedule, and performance risks that are involved in integrating newer technology. The research team observed that acquirers in the USSF are incentivized at the individual program level instead of at the enterprise level, which limits their willingness to incorporate new or emerging technology. To improve technology transition, the USSF needs to implement a cultural change that values enterprise and mission success over personal or individual program success. In addition, it needs to investigate options for recruiting and retaining acquisition talent to ensure that there are sufficient acquisition personnel with the skills and experience to readily adapt innovation and experimentation into programs of record. Greater focus on the pursuit of such options is necessary.

Cultural change also must extend to developing a more responsive acquisition system. This means overcoming requirement inflexibility, ensuring adequate

funding to support technology transition, allowing for greater flexibility in funding allocation, and developing criteria for when to terminate aging systems and delayed programs.

Ultimately, developed capabilities must be effectively fielded from the acquisition community to the space operational community. This requires synchronizing and integrating newer capabilities with legacy systems that are already operational, which involves planning throughout the acquisition life cycle for the eventual transition. The challenges in fielding new technologies are the same as those already mentioned: a lack of a roadmap that identifies opportunities to insert technology into operations and insufficient resources and incentives to execute the transition.

The acquisition and operational communities need to have a clear, shared vision about how and when technologies should be integrated into the broader capability architecture. And funding needs to be set aside and timed to on-ramp or rapid-transition technologies.

REALIZING ENDURING CHANGE

Since its inception, the USSF has made policy and organizational changes to the space acquisition enterprise. But many challenges remain and much work still needs to be done toward developing a true unity of effort in space acquisition. Continued commitment will be necessary to achieve this vision and to realize enduring change. There are some common themes that run through this research: the need to remove the seams between the acquisition and warfighting communities, to improve lines of communication, to clarify roles and responsibilities in the space acquisition enterprise, to develop the needed technical talent in the workforce, to clarify pathways to transition technology to the field, and to forge effective relationships with the space industrial base. This analysis reinforces the work that needs to be done and suggests recommended paths forward.



This document describes work done in RAND Project AIR FORCE and documented in *A Clean Sheet Approach to Space Acquisition in Light of the New Space Force*, by William Shelton, Cynthia R. Cook, Charles Barton, Frank Camm, Kelly Elizabeth Eusebi, Diana Gehlhaus, Moon Kim, Yool Kim, Megan McKernan, Sydne J. Newberry, and Colby P. Steiner, RR-A541-1, 2021 (available at www.rand.org/t/RR-A541-1); *Ensuring Mission Assurance While Conducting Rapid Space Acquisition*, by Cynthia R. Cook, Éder M. Sousa, Yool Kim, Megan McKernan, Yuliya Shokh, Sydne J. Newberry, Kelly Elizabeth Eusebi, and Lindsay Rand, RR-A998-1, 2022 (available at www.rand.org/t/RR-A998-1); and *Improving Integration and Synchronization of Space Acquisition and Fielding*, by Bonnie L. Triezenberg, William Shelton, Megan McKernan, Sarah W. Denton, James Dimarogonas, Brian Dolan, Shane Manuel, Gwen Mazzotta, Sydne J. Newberry, Laurinda L. Rohn, Karen Schwindt, Yuliya Shokh, and Jordan Willcox, RR-A1735-1, 2023 (available at www.rand.org/t/RR-A1735-1). To view this document online, visit www.rand.org/t/RBA1735-1. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.



Limited Print and Electronic Distribution Rights: This document and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited; linking directly to this product page is encouraged. Permission is required from RAND to reproduce, or reuse in another form, any of its research documents for commercial purposes. For information on reprint and reuse permissions, please visit www.rand.org/pubs/permissions.



IMAGE CREDITS: Cover—BlackJack3D/Getty Images, MicroOne/Adobe Stock, courtesy illustration by ULA/Lockheed Martin/45th SW PA, 1st Lt. Charles Rivezzo/U.S. Air Force, ssstocker/Adobe Stock; page 2—U.S. Space Force photo, Andrew Derr/Adobe Stock, la miko/pexels, Staff Sgt. Kayla White/U.S. Air Force, page 4—Nmedia/Adobe Stock; page 5—Tech. Sgt. JT Armstrong/U.S. Space Force; page 6—Airman 1st Class Brooke Wise/U.S. Space Force; page 7—courtesy photo by United Launch Alliance, bill81/Adobe Stock; page 8—Lockheed Martin and U.S. Space Force; page 9—2nd Lt. Idall Beltré Acevedo/U.S. Air Force; page 10—bill81/Adobe Stock, U.S. Air Force photo; page 11—Dennis Rogers/U.S. Space Force, bill81/Adobe Stock; page 12—Airman 1st Class Zachary Hada/U.S. Air Force; page 13—courtesy illustration by Lockheed Martin, huafires/Getty Images, AlexLMX/Getty Images, bill81/Adobe Stock; page 14—Van Ha/U.S. Air Force; page 15—bill81/Adobe Stock.

© 2024 RAND Corporation

www.rand.org



RB-A1735-1