NATIONAL SECURITY SPACE ASSOCIATION

Acquiring Space Capabilities with Agility and Discipline at the Speed of Relevance

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Executive Summary

Threats to space assets have reemerged with great power competition. Consequently, the U.S. national security space community is debating what capabilities are needed to counter the threat and how to acquire those capabilities as quickly and efficiently as practicable. The need to outpace the rapidly evolving threat and sustain the U.S. comparative advantage in space is an urgent matter that requires the national security space enterprise to evolve the way it does business. This will involve necessary and difficult changes to both culture and operating models at every level of the U.S. government and industry. To this end, the National Security Space Association recommends that serious attention be given to the following recommendations regarding how to acquire space capabilities with agility and discipline at the speed of relevance:

1. **Develop a dedicated national security space acquisition workforce.** The United States Space Force (USSF) should establish a dedicated space acquisition workforce with a specialized education system and corresponding specialized career development system specifically tailored for the unique acquisition needs of space systems.

2. **Provide statutory relief to create financial and budget flexibility.** The national security space enterprise should have the financial and budgetary flexibility to adjust and align resources within a budget cycle for program and budget stability.

3. **Customize acquisition and financial policies for agility, speed, and discipline.** The USSF should be empowered to tailor acquisition and financial policies within a risk management framework to deliver mission capability on reduced timelines and, as appropriate, prioritize speed, agility, and discipline over other considerations.

4. **Maintain an unrelenting focus on mission success.** The national security space enterprise must stay focused on operational mission success and apply lessons learned to avoid repeating mistakes while accelerating acquisition timelines.

5. **Create deeper government-industry partnerships**. Industry plays an essential role in generating acquisition speed and agility, but it cannot do it alone. The U.S. government must align its strengths with industry, enhance trust and accountability, to improve the partnership.

6. **Align incentives across the government-industry program team.** Shared incentives aligned across the government (program managers, contracts and security officers, Federally Funded Research and Development Centers, Systems Engineering and Technical Assistance contractors) and industry team are fundamental to ensure the entire program team is focused and performing to achieve a successful outcome.

7. **Instill acquisition speed, agility, and discipline as values in U.S. military space culture.** New norms that delineate program decision-making authorities, define the appropriate breadth and depth of government-industry engagement, and bound other behaviors that impact the ability to accelerate a program must be established. Accountable, agile decision-making must be a best practice.

8. **Establish a foundation of rigorous systems engineering and architecture analysis.** It is essential to establish a strong foundation of systems engineering and architecture analyses, including operational requirements analyses, within the USSF to support critical decision-making processes.

9. **Implement rigorous program and transition planning.** Rigorous planning is essential for efficient and effective acquisition program execution that is key to fielding new space capabilities and force structure.

10. **Clarify and maintain "lanes in the road" for acquiring national security space systems.** Clear lanes in the road within the various elements of the combined government-industry team is essential for efficient and effective management of development and procurement programs.

11. **Encourage innovation at all levels of the enterprise.** The U.S. government should incentivize and seek to harness the innovation within its space organizations as well as with its traditional, non-traditional, and new private sector partners.

12. **Empower program managers and align authority, responsibility, and accountability.** Acquisition executives should empower program managers with the authority and responsibility to enable rapid decision making and hold them accountable to deliver on their commitments.

13. **Establish and align security governance to enable execution of national security space missions.** Consistent classification guidance should be promulgated to enable efficient and effective execution and oversight.

14. **Leverage industry's investment in advanced technology and processes.** The national security space enterprise should take full advantage of industry's immense investment in modern technology for the design, development, test, evaluation, and manufacture of space systems.

15. **Increase intersector and international cooperation to help deliver mission solutions**. The national security space enterprise should take full advantage of the private sector's resources, talent, technology, and know-how as well as facilitate industry's efforts to support allies and partners pursuing space programs for collective or mutual defense.

16. **Use competition properly to save money and drive innovation**. Competition is a powerful instrument for incentivizing cost savings and innovation. It is only one of the tools that should be used to ensure acquisition value.

A more detailed discussion of these points can be found in the attached Report. The National Security Space Association looks forward to engaging with Executive and Legislative branch officials on this topic in the coming months.

Acquiring Space Capabilities with Agility and Discipline at the Speed of Relevance

Introduction

Today's global security environment is characterized by competition among the great powers. China's and Russia's efforts to reshape the world in ways favorable to their interests are undermining the rules-based international order at the expense of the security of the United States, our allies, and partners. Beijing and Moscow are developing, fielding, and operating surveillance, command and control, and weapons systems to deny freedom of passage through and operations in space. The threat is full spectrum, all domain, and fast paced. Indeed, it is turning inside the U.S. government's acquisition cycle.

Concurrently, advances in technology are providing new ways to improve the design, development, test, and manufacture of space capabilities. The growth of commercial and international space activities is also providing new opportunities for intersector and international cooperation. Indeed, the U.S. government is seeking to leverage commercial space investments as well as plan and conduct combined space operations with allies and partners.

Historic changes to U.S. national security space management and organization are being implemented to deter or, if necessary, defeat the threat or use of force in space. This includes establishment of the U.S. Space Force (USSF) as the sixth armed service to organize, train, and equip space forces as well as reestablishment of U.S. Space Command as the eleventh combatant command to plan and execute space operations. It also includes Presidential direction for enhanced space collaboration between the Department of Defense (DoD) and the Intelligence Community (IC).

Consequently, the U.S. national security space community is debating what capabilities are needed to counter the threat and how to acquire those capabilities as quickly and efficiently as practicable. The outcome will determine whether the United States is able to outpace the threat and sustain its comparative advantage in space. Implementing the new organization and management structure is giving impetus for the federal government to work with the private sector in novel ways to address both threats and opportunities. To this end, the National Security Space Association recommends that serious attention be given to the following recommendations regarding how to acquire space capabilities with agility and discipline at the speed of relevance.

Background

The domestic national security space market is a monopsony with one buyer and many suppliers. The U.S. government is the sole buyer; the multiple tiers (primes, subsystems, parts and components) of industry are the many suppliers. The suppliers include traditional, non-traditional, and new enterprises. The market is highly regulated; it is governed by numerous statutes, regulations, and policies such as the Truth in Negotiations Act, Federal Acquisition Regulations, Chairman of the Joint Chiefs of Staff Instruction 3170.01, Joint Capabilities and Integration Development, and DoD Directive 5000.1, The Defense Acquisition System. Every Major Defense Acquisition Program (MDAP) or Acquisition Category (ACAT) 1 program must follow these rules.

The rules provide best practices for the acquisition and financial workforce to reduce risk, control cost, and carry out government direction. They were not designed to deliver capabilities on an urgent basis. With few exceptions, the rules may be waived; however, obtaining a waiver often involves

an arduous process that is time consuming and requires the intervention and approval of the most senior government acquisition officials. It can take as long to be granted a waiver as following the rule in the first place.

In contrast to tanks, ships, and planes, a disproportionate share of the life-cycle cost in space acquisition is in the research and development phase. Indeed, upfront development cost typically is 20-40 percent of space programs' life cycle cost compared to other ACAT 1 programs that are often 10 percent or less. Moreover, space systems historically have been bought in limited quantities, 3-4 year production breaks are common, and orders tend to be spaced erratically.

The Cold War was of course the initial catalyst for the investment, invention, and innovation required to create defense and intelligence space capabilities. Confronted by the Soviet threat, the U.S. government gave the national reconnaissance and defense space programs the highest resource priority and was very tolerant of the risks involved in development. Indeed, the original Corona imagery intelligence satellite program was sustained through numerous initial failures. Program managers were able to obligate substantial funds at an early stage of the program to purchase the materials for a robust development and test program, thereby allowing multiple flight tests per year, even in the face of repeated failures. As the national security space program matured and policymakers, commanders, warfighters, and intelligence analysts became increasingly reliant or dependent upon space assets over the following decades, however, the federal government became considerably less risk tolerant.

The resulting risk-averse approach produces space systems with designs optimized for high performance and long life that require infrequent replenishment based on functional availability estimates. It caused abandonment of practices, such as front-loading programs with funding and the timely delivery of test articles, that were the hallmarks of speed and agility in the early days of the national reconnaissance and defense space programs. This approach limits technology insertion opportunities and disincentivizes capital investment in future production efficiencies. It also does not account for the probability of attrition in the event of conflict in space. In addition, the typical 8-10 year development and 6-8 year production cycles do not deliver capability on timelines relevant to a rapidly changing threat.

Similarly, budget flexibility is constrained by “full funding” financial rules requiring the entire cost of a satellite to be budgeted in the year in which it is ordered, even though production typically takes 5-8 years. This impedes funding production satellites given that a single vehicle’s cost can consume 20 percent or more of the entire space procurement budget. It also drives significant swings in the account across the Future Years Defense Plan and encourages taking risk with constellation health to create budget flexibility.

As with defense programs in general, acquisition reform has been a recurring issue for the national security space program. In the post-Cold War era, for example, the U.S. government attempted to recapitalize the majority of defense and intelligence space systems at the same time. Total System Performance Responsibility and other initiatives were intended to deliver capabilities more efficiently and effectively. The desire for a “peace dividend” led to cost replacing mission success as the primary driver in managing acquisition, resulting in excessive technical and schedule risk. With the expectation that space was a benign domain that would remain a sanctuary from conflict, requirements for protection and survivability were traded-off for improved performance and cost savings. The belief that

space systems development had become routine and costs could be cut by adopting commercial practices, abandoning oversight, and reducing systems engineering practices were misguided.

The Space-Based Infra-Red System (SBIRS), Future Imagery Architecture, and National Polar Orbiting Environmental Satellite System programs were beset by technical challenges, schedule delays, and cost overruns that led to the programs' being restructured, truncated, and terminated, respectively. Combined with the failure of defense transformation initiatives, including termination of the Transformational Communications Satellite and Space Radar programs, these problems led to criticism that space acquisition was "broken." Subsequently, the U.S. Air Force (USAF) and National Reconnaissance Office (NRO) restored their reputations for competent acquisition management by stabilizing major space acquisition programs through a focus on mission success, going "back to basics," and adopting an evolutionary acquisition approach.

Going back to basics involved the reintroduction of appropriate technical specifications and standards. It also placed a stronger emphasis on systems engineering and a robust mission assurance process. These provided the basis for verifying the quality of technical work and ensuring issues surfaced early in the program. The evolutionary approach relied on multiple risk reduction paths, using technologies that reached targeted maturity or readiness levels required for the phase of acquisition. Programs of record often included budget lines for maturing and integrating new and upgraded technologies. This enhanced confidence in the ability to meet schedule and cost commitments and deliver mission success. It also played a key role in sustaining critical elements of the space industrial base, especially at the supplier level.

Multi-vehicle purchases, technology on-ramps and planned upgrades, and incremental funding enabled production stability while sustaining factory and satellite constellation health. These acquisition practices helped stabilize the industrial base and enabled more efficient acquisitions. Procurement of the SBIRS and Advanced Extremely High Frequency programs, for example, produced savings on the order of 25-40 percent when implementing a 2-vehicle block buy versus a 1 at a time purchase of the same satellites. In effect, the national security acquisition community returned to what produced its successful programs in prior decades – appropriate internal controls, highly skilled people, continuity, agile decision-making, and accountability.

China's deployment and operation of a broad array of defense and intelligence space systems coupled with its successful anti-satellite weapons test in 2007 increased awareness of the re-emerging threat and lack of U.S. preparedness for a conflict that begins in or extends to space. As the U.S. government recognized it did not have the force structure needed to sustain its operational advantages and counter the threat, it began exploring alternative mission solutions and acquisition approaches. The ensuing debate over what to buy and how to buy it has been ongoing ever since without resolution. At this point in the debate there is a consensus about the need to field and operate a more resilient force structure; protect and defend vulnerable assets during the transition to a more resilient force structure; and increase acquisition agility and speed. There is no consensus, however, about how to measure resilience; trade-off performance, cost, schedule, risk, and resilience; leverage intersector and international cooperation; and maintain discipline while accelerating the acquisition process.

The initial phase of the debate regarding what to buy focused on aggregated versus disaggregated architectures. Aggregation involves consolidating strategic (nuclear) and tactical (non-nuclear) missions on larger, more complex, multi-purpose satellites in geosynchronous orbit.

Disaggregation involves separating nuclear and nonnuclear missions onto smaller, less complex, single-purpose platforms. The current phase of the debate centers on proliferated low earth orbit architectures versus hybrid architectures. The former involves significantly proliferating the number of small satellites in a low earth orbit constellation by leveraging commercial investments to create a sensor and communications layer for persistent, low latency, global awareness, tracking, targeting, and fire control. Hybrid involves using a combination of architectural approaches (e.g., distributed, diversified, proliferated) with different space vehicle sizes, complexity, and orbits.

In addition, debate continues about how to generate acquisition speed and agility while maintaining discipline. Indeed, how the federal government buys space systems is just as important as what it buys. Program/budget stability and efficient quantity buys are the keys to cost effective program execution and the long-term health of the space industrial base. There is general recognition the U.S. military technological lead is eroding, significant capability increases are needed every 3-5 years to address the threat cycle, and current acquisition models are not conducive to capitalizing on the frequent evolution of commercial technology.

Consequently, the U.S. government is restructuring development and procurement organizations and exploring new acquisition approaches. The USAF Space and Missile Systems Center was reorganized (SMC 2.0) to enable it to be managed as an enterprise rather than stove-piped directorates and program offices. The Space Rapid Capabilities Office was established to quickly develop and field cutting-edge, low cost, mission-essential capabilities. The Space Development Agency was created to unify and integrate defense space development efforts and accelerate the fielding of new capabilities.

Moreover, space acquisition organizations have increased use of Section 804 (of the 2016 National Defense Authorization Act) and Other Transaction Authorities to bypass requirements validation as well as certain acquisition and financial rules to "go fast." Section 804 or middle tier acquisition enables rapid prototyping and fielding by not being subject to the standard requirements and acquisition processes. OTAs refers to the authority to carry out certain prototype, dual-use, research and development projects taking advantage of economies of scale without burdening companies with the regulatory overhead that would make them non-competitive in the commercial (i.e., non-defense) sector. Such measures are good examples of authorities needed to enable acquisition speed and agility.

The national security space enterprise has assimilated the threat, is adjusting acquisition management and organizational structures, and is taking initial steps to increase acquisition speed and agility. More remains to be done, however, to consistently deliver at the pace and scale relevant to counter the threat and operate inside adversary acquisition and experimentation cycles. Tensions among speed, agility, discipline, oversight, and accountability will have to be balanced. The enterprise must take advantage of new opportunities, create greater flexibility, and compress timelines, while avoiding past mistakes and maintaining discipline to defeat the threat and sustain U.S. advantages in space.

Recommendations

The need to outpace the rapidly evolving threat is an urgent matter that requires bipartisan support, wise decisions, and bold actions in both the public and private sectors. Schedule has not been the paramount priority for major national security space procurements for decades. Until now, performance and cost have been king and schedule a relief valve. In contrast to about 3- and 5-year average schedules from authority to proceed to launch for the commercial and civil space sectors, respectively, the average time for the national security space sector is about 8 years.

The national security space enterprise thus must change the way it does business and pivot to acquire capabilities with agility and discipline at the speed of relevance. Indeed, fundamental and systemic change is required to anticipate or respond to the threat. The enterprise must move from speed beginning at program initiation to persistent velocity and alter its approach to requirements, design, risk, sourcing, and production. This will involve difficult changes to both culture and operating models at every level of the U.S. government and industry. The following recommendations summarize the updated authorities, rules, decision-making and oversight processes, and other changes necessary to accelerate the development and fielding of new space capabilities.

Develop a dedicated national security space acquisition workforce. It is well recognized that the acquisition of space systems has many unique aspects that make it a specialization within the greater defense acquisition community. Today, the acquirers of space systems are trained by the Defense Acquisition University and managed by the Services as if no specialization was required to be successful in acquiring space systems. Countless studies going back decades have found this assumption to be false. The USSF should establish a new space acquisition force with a specialized education system and corresponding specialized career development system specifically tailored for the unique acquisition needs of space systems. Professional competence includes both technical and acquisition managerial expertise.

Provide statutory relief to create financial and budget flexibility. The national security space enterprise should have the financial and budgetary flexibility to adjust and align resources within a budget cycle for program and budget stability. The ability to realign funding inside the budget to capitalize quickly on new ideas, innovations, and inventions or resolve problems is essential. Major space programs have very similar programming and budgeting challenges to the U.S. Navy's aircraft carriers. Full funding of aircraft carriers in the year they are ordered would consume an overwhelming share of the shipbuilding budget for that year. Consequently, Congress has granted the U.S. Navy a waiver for the past several decades to incrementally fund aircraft carriers and large-deck amphibious ships. The USSF and the NRO should have comparable financial and budget flexibility for major space programs.

Customize acquisition and financial policies for agility, speed, and discipline. The national security space enterprise should not be held captive to DoD's standard rules designed for buying weapon systems and military equipment that have very different characteristics and challenges than space systems. Just as the NRO and Missile Defense Agency were authorized to establish acquisition rules and processes to address urgent security challenges, the USSF should be empowered to tailor acquisition and financial policies within a risk management framework to deliver mission capability on reduced timelines and, as appropriate, prioritize speed, agility, and discipline over other considerations.

In addition, the operational requirements process should be adjusted to move at pace with agile acquisition processes.

Maintain an unrelenting focus on mission success. The national security space enterprise must stay focused on mission success and apply lessons learned to avoid repeating mistakes while accelerating acquisition timelines. In the 1990s, as a joint Defense Science Board (DSB)-Air Force Scientific Advisory Board (AFSAB) study determined, cost replaced mission success as the primary driver in managing space acquisitions. As noted, this resulted in excessive technical and schedule risks as well as programs being restructured, truncated, and terminated. The acquisition system was strongly biased to produce unrealistically low cost estimates throughout the process leading to inadequate budgets and programs that could not be executed. The government-industry team must be excellent stewards of the scarce resources allocated by taxpayers for defense and intelligence space programs. Mission success must remain the priority for national security space acquisition programs.

Create deeper government-industry partnerships. Industry plays an essential role in generating acquisition speed and agility, but it cannot do it alone. The U.S. government must align its strengths with industry, enhanced trust and accountability, to improve the partnership. Arms-length and adversarial relationships are time consuming, create friction, and are cumbersome. The most innovative and successful national security space programs were a product of close working relationships between government officials and contractor teams. Going fast requires the mutual commitment of all stakeholders. The government will have to prioritize speed from requirements through delivery, change its risk posture, and tailor or focus oversight. Industry will have to invest in and adopt commercial-like approaches. In addition, DoD should provide key contractor teams with insight into its security architecture (Unclassified to Special Access Program) to assist industry partners in aligning resources and effectively executing Independent Research and Development (IRAD) to create innovative mission solutions.

Align incentives across the government-industry program team. People behave in ways consistent with how they are incentivized. Given the federal government's role as a monopsonist and regulator of the national security space market, it establishes and controls the incentives that determine industry's behavior. Taxpayers and overseers are right to require fair prices and best value from the private sector; industry, in turn, is right to expect to earn profit for its work for the public sector. Clear, open communication of shared incentives aligned across the government (program managers, contracts and security officers, Federally Funded Research and Development Centers (FFRDCs), System Engineering and Technical Assistance (SETA) contractors) and industry team are fundamental to ensure the entire program team is focused and performing to achieve a successful outcome. Performance correlates with incentives; shared incentives will improve acquisition performance.

Instill acquisition speed, agility, and discipline as values in U.S. military space culture. Both the U.S. government and industry have been indoctrinated, educated, and trained with the current set of requirements, policies, processes, behavioral norms, and expectations regarding space acquisition. For the USSF to create a military space culture and transform from the one instilled over previous decades, the government and industry must educate, train, and institutionalize new ways of doing business. New norms that delineate program decision-making authorities, define the appropriate breadth and depth of government-industry engagement, and bound other behaviors that impact the ability to accelerate a program must be established. Accountable, agile decision-making must be a best

practice. Program managers must be empowered to manage programs versus managing the bureaucracy.

Establish a foundation of rigorous systems engineering and architecture analysis. Systems engineering and architecture analyses, to include operational requirements analyses (e.g. Analyses of Alternatives) provide decision support essential for requirements validation and trades, acquisition planning, management, and execution, and portfolio management. A structured system engineering approach is integral to design and development. Similarly, rigorous and objective architecture analysis is integral to capability gap identification, risk assessment, and investment decisions. In the absence of rigorous, objective decision support, future national security space force structure and resource allocation decisions will be made based on subjective criteria. Consequently, it is essential to establish a strong foundation of systems engineering and architecture analysis, tightly coupled with operational requirements management, within the USSF to support critical decision-making processes.

Implement rigorous program and transition planning. Rigorous planning is essential for efficient and effective acquisition program execution that is key to fielding the new space capabilities and force structure. To increase efficiency and compress timelines, the national security space enterprise must enhance acquisition planning. Establishment of long-run technology plans for development/production roadmaps will focus innovation. Planned on-ramps for technology insertion in conjunction with a hot supply chain will enable programs to efficiently utilize the available state of the art. Open systems architectures with defined interfaces and common products will facilitate execution, including the accommodation of changing operational requirements. Similarly, effective transition planning is essential to enable a pivot from the present to the future. Evolutionary development to meet changing requirements is generally less risky and more affordable than starting programs from scratch. It also allows for flexibility as requirements and threats change. In the 1990s, the simultaneous initiation of many new starts seriously stressed the abilities of government and industry. A prudent course would be to enhance the resilience of existing systems while introducing new capabilities through technology demonstrations that may ultimately mature into operational systems. Rigorous, low risk, transition plans thus are needed to avoid repeating past mistakes.

Clarify and maintain "lanes in the road" for acquiring national security space systems. Numerous DoD and IC organizations are currently involved in developing and procuring defense and intelligence space systems. Space acquisition programs also involve FFRDCs, SETAs, and industry teams of prime and subcontractors. Clear lanes in the road within the various elements of the combined government-industry team is essential for efficient and effective management of the operational requirements process and development and procurement programs. In particular, the roles and responsibilities of FFRDCs and SETAs should be re-evaluated to ensure they do not blur the lines and leverage their trusted positions for unfair competitive advantage. Authority, responsibility, and accountability must be aligned.

Encourage innovation at all levels of the enterprise. Innovative ideas come from people, not organizations. Consequently, innovation can occur in both the public and private sectors as well as organizations of all types and sizes. It is essential to embrace diversity and inclusion to leverage the breadth of talent and innovative thinking throughout the national security space enterprise. The U.S. government should incentivize and seek to harness the innovation within its space organizations as well as with its traditional, non-traditional, and new private sector partners.

Empower program managers and align authority, responsibility, and accountability. The national security space enterprise must alter its decision-making processes for acquisition programs to go faster. Decision speed can be greatly accelerated if government officials delegate decisions to lower levels. Program managers, in coordination with the user community, should be empowered with the authority and responsibility by acquisition executives to enable rapid decision making and held accountable to deliver on their commitments. Contracts officers should be aligned in program offices as part of the mission team, with reachback to the central contracting organization for expert assistance, to support program managers in the same chain of command**.** Similarly, program security officers should be aligned under program directors with incentives for both compliance and program cost, schedule, and performance. Clear commander's intent, transparent communications up and down the chain of command to ensure proper insight, and tailored, focused, or streamlined oversight by the federal government and FFRDCs will enable prompt issue resolution and faster execution.

Establish and align security governance to enable execution of national security space missions. A myriad of threats necessitates security protection of national security space programs and activities in accordance with Title 10 and Title 50. The USSF should establish a Special Programs Oversight Committee and Special Programs Review Group to enable informed governance, centralize security policy, and oversee decentralized security execution. Consistent classification guidance should be promulgated to enable efficient and effective execution and oversight. Programs should be properly classified; over-classification unnecessary impedes engineering efficiency and effectiveness. Moreover, security reciprocity should be established among the DoD Components and IC agencies for DoD-, National Intelligence Program-**,** and Military Intelligence Program-funded space programs.

Leverage industry's investment in advanced technology and processes. The national security space enterprise should take full advantage of industry's immense investment in modern technology for the design, development, test, evaluation, and manufacture of space systems. The digital revolution continues to transform private enterprises with everything from computer assisted design and virtual reality to cognitive computing and additive manufacturing. Continuous funding of basic and applied research and technology development to apply such technology developments will reduce the time between authority to proceed and critical design review. Similarly, prototyping will reduce vehicle-level test failures and technology demonstrations will space qualify new capabilities for future operational systems.

Increase intersector and international cooperation to help deliver mission solutions. The national security space enterprise should take full advantage of the private sector's resources, talent, technology, and know-how. Long standing U.S. space policy directs the government to use commercial space goods and services to the maximum extent practicable, except for reasons of national security, foreign policy, or public safety. Scarce national security resources should be focused on development and acquisition of unique defense and intelligence space capabilities for which there is no commercial market. Leveraging the capabilities of the rapidly evolving commercial space and electronics industries presents special challenges with current acquisition and financial regulations. DoD's current budget cycle, for example, all but precludes the ability to take advantage of new and innovative commercial products and services. Indeed, the current production model that locks in specialized spacecraft at the critical design review is not conducive with capitalizing on constant evolution of commercial technology. Since the federal government acts concurrently as a consumer, investor, and regulator of commercial space activities, it must align these roles to leverage the commercial space sector more fully. Similarly,

the government can enhance the international competitiveness of U.S. industry and facilitate industry's efforts to support allies and partners pursuing space programs for collective or mutual defense.

Use competition properly to save money and drive innovation. Competition is a powerful instrument for incentivizing cost savings and innovation. It is only one of the tools that should be used to ensure acquisition value. The presumption that running a new competition for a follow-on system or system upgrade will save money and drive innovation has often failed to deliver on its promise. Competition is warranted when an incumbent team cannot deliver on its contractual commitment or provide the needed innovation. It typically is most effectively implemented at the subsystem level when managed by an established and proven government-industry team. In the 1990s, the U.S. government departed from the time-tested practice of incremental system upgrades with a highly experienced industry partner. Rather than saving money and driving innovation, this "competition for the sake of competition" introduced significant technical, budgetary, and schedule risk into new development programs. The joint DSB-AFSAB study team observed that when an incumbent contractor loses, there is a substantial loss of government investment that must be accounted for in the program budget of the non-incumbent. Consequently, they recommended that when non-incumbents win new programs, the U.S. government should reflect the sunk cost of the legacy contractor (and inevitable cost of reinvestment) in the program budget and implementation plan as well as maintain operational overlap between legacy systems and new programs to assure continuity of support to the user community.