



WHITE PAPER

BUILDING AND MAINTAINING VALUE IN THE NATIONAL SECURITY SPACE INDUSTRIAL BASE

AIA's recent report, *Tipping Point: Maintaining the Health of the National Security Space Industrial Base*, highlighted some of the current challenges facing the national security space industry as well as recommendations for the path forward. In addition, AIA's recent paper, *What is Best for the Warfighter and Taxpayer*, lays out the broader steps the Defense Department should take to achieve efficiencies. As the focus grows on efforts to better manage America's fiscal situation, AIA hopes that this paper will help policymakers improve acquisition and efficiency.

AIA provides additional analysis of the sectors of the national security space industrial base to demonstrate that sustained investment in national security space systems remains critical to our defense. This paper provides specific recommendations that are intended to not only maintain space industrial base health, but also help build value in the national security space sector.

AIA believes that with a more competitive, contested and congested space environment, our country can ill-afford to trade off our leadership in space simply for cost savings. Rather, we must strengthen the partnership between industry and government to ensure that national security space systems are built with maximum value to government and the warfighter, with the idea that increasing efficiency will help make our nation's space programs both cost-effective and innovative. Our security, future workforce and economic vitality all depend on both industry and government getting it right when it comes to sustaining our partnership in this new and complex era.

THE NATIONAL SECURITY SPACE INDUSTRIAL BASE:

AIA has identified the following technologies that provide skills and capabilities within the national security space industrial base that are vital to both our national security and economic security: application-specific integrated circuit technologies, critical supply chain components, liquid rocket propulsion, military satellite communications, missile warning, overhead non-imaging/persistent infrared, positioning, navigation, timing, selected space optics and solid rocket motors and their components.

When surveyed, AIA members expressed concern with the following areas of the national security space industrial base:

- **Protected Communications:** The Air Force has spent decades developing protected communications capability. With the cancellation of the Transformational Communications Satellite System, the successor to the Advanced Extremely High Frequency (AEHF) satellite system, our nation's protected communications engineering capability and workforce is in jeopardy due to the lack of a clear path forward. The current AEHF Capabilities Insertion Program is the only means to continue risk reduction activity until government decisions are made and resourced. AIA is concerned about a significant loss of skilled workforce in the protected communications sector, which puts at risk future U.S. capabilities.
- **Liquid Propulsion:** The current condition of the U.S. liquid rocket engine propulsion industry is the result of significant consolidation of production programs, the general lack of new opportunities for engine development and a variety of starts and stops on liquid engine programs.

AIA is encouraged that authorization bills for both NASA and the Defense Department budgets have required a comprehensive study of the U.S. liquid propulsion industry and a plan to sustain U.S. industrial capability. Such a plan is only beneficial to industry if it addresses current conditions, develops the requirements for future U.S. propulsion needs and is committed to the long term. It is critical that the sustainment plan exercise both the production and design capabilities of the industrial base.

We must restore and sustain the supplier base, leverage the common requirements of the Air Force and NASA and, where possible, the commercial launch customers. The current very restrictive export control regulations on the launch and propulsion industry should be reviewed, especially in light of growth in the commercial spaceflight sector.

- **Missile Warning:** The U.S. has spent 40 years developing space based infrared missile warning capabilities that detect and track enemy missiles. Yet the Missile Defense Agency's acquisition approach for the Precision

Tracking and Surveillance System, the successor to the Space Tracking & Surveillance System, resets the program to the technology development phase. The technology development phase is expected to be carried out by U.S. universities, and full industry competition in the development has not been provided even though a 2008 Institute for Defense Analysis study cited lack of competition in this area as a significant concern.

AIA is concerned that, with an operational system expected to be developed during the middle of the next decade, the government risks losing the workforce skills required to develop a cost effective operational future missile warning system. Adding prototype development only delays fielding the needed capability, increases risk and expends unnecessary resources.

- **National Systems:** In addition to missile warning there are other national systems at risk of atrophying, which could result in second and third tier suppliers leaving the business. Industrial base and critical skills that have been preserved and improved through U.S. government strategic and sustained acquisition methodology will be lost. Capability areas like sensors; optics; radiation hardened trusted microelectronics; trusted application specific integrated circuit design; specialized materials and structures; assembly, integration and test; and data management systems – areas in which the U.S. has consistently excelled – are in jeopardy. Maintaining the current level of national systems work will be a very real challenge. It is important for government to work closely with industry to ensure capabilities are maintained to meet current and future national security needs.
- **Solid Rocket Motors:** Solid rocket motors (SRMs) are utilized for launch of large defense and scientific satellites and the Space Shuttle, as well as for small satellites and missile defense. According to the 2009 Defense Department Solid Rocket Motor Industrial Capabilities Report, “Inadequate investments are being made in large and small SRM research and development (R&D), reducing the reliability and cost-effectiveness of the SRM industrial base.” The report goes on to say that, “If there are no new development programs, the SRM industry will continue to lose its ability to design and produce new-generation SRMs.” AIA believes a plan to sustain a healthy and competitive SRM industry base is critical to national security. In addition, commercially-produced small launch systems are needed to ensure continued investment in the propulsion and SRM industrial base.
- **Supply Chain:** National security space systems rely on electronics, microelectronics, advanced chemicals, materials and other components that must endure extended operations in difficult conditions with high performance requirements. Title III of the Defense Production Act (DPA) of

1950 plays an important role in the maintenance of domestic supply chain and component parts used for military space systems. The government should investigate ways to ensure that the DPA and other tools provide effective, quick response to at-risk production capabilities essential for the national security space sector. In addition, continuous programs for adding stability and predictability in the supply chain could benefit the supplier base and reduce space program risk.

The industries that provide these components often employ an extensive global supply chain and are subject to regional and global regulations and policies related to environmental management. These regulations and policies can restrict production, availability and usage of chemicals, materials and components critical to the manufacture of national security space systems. This calls for a strategy to address the potential impacts of such chemical and material regulations on national security space systems. Where substitutes and alternatives for regulated chemicals exist, specifications and performance requirements should allow for their use. Where substitutes and alternatives are not known, exemptions should be granted until replacements can be found.

The implications of lost space capability are even more severe today, so it is vitally important to match policy goals with strong leadership, integrated strategy and the long-term funding and stability needed to maintain our nation's preeminence in space.

STEPS NEEDED TO BUILD AND MAINTAIN VALUE IN THE NATIONAL SECURITY SPACE SECTOR:

The challenges associated with constrained budgets and a push for greater efficiency demand a closer look at the way we buy our space systems. As government makes decisions to cut costs and purchase more efficiently, these decisions should not be to the detriment of our critical capabilities in national security space. We must maintain our core space capabilities while also achieving the best value for both the warfighter and taxpayer.

In addition to AIA's recommendations in its reports *Tipping Point* and *What is Best for the Warfighter and Taxpayer*, the following steps can be taken to build value in the national security space sector:

- **Ensure national security space capabilities are modernized and maintained:** The weakening or loss of key national security space skills and capabilities to foreign competitors may result in higher long-term costs to government and could jeopardize security. Balanced and stable budgets and funding are absolutely vital to ensure a healthy industrial base. However, it is imperative that government also take a leadership role in assessing which specific national security space capabilities –

down through the supply chain – are at risk of being lost and make the necessary plans for deliberate sustainment and modernization of those capabilities.

- **Block buys of satellites:** AIA believes that targeted block buys of major satellites could help reduce costs and the length of time to complete major satellite systems. This would inject critical stability and predictability into fragile sectors of the space industry, which has often been plagued by program cancellations and changes. Increased capabilities could be added incrementally to ensure our satellite programs adapt to changing technology. Adding predictability and stability to our major satellite acquisitions would also potentially assist in promoting international sales.
- **Flexibility on firm fixed price contracts:** While firm fixed price contracts may work in some sectors, the space sector is often characterized by high risk, long lead times and budget instability. Fixed price contracts can create high risk for contractors and may not be appropriate for complex, large scale satellite acquisitions. If costs do increase under such contracts, those increases are often most damaging to the industry's supplier base. AIA believes that the Defense Department should consider the complexity and scale of a project when developing its associated contract mechanism.
- **Sourcing Wisely:** Competition and long-term performance-based outcomes stimulate the greatest level of innovation, productivity, effectiveness, and efficiency. As cited in AIA's paper, *What is Best for the Warfighter and Taxpayer*, this requires a well trained, appropriately staffed and empowered government acquisition workforce. To help meet DOD's efficiency goals, a more narrow interpretation of "inherently governmental" will help maximize these success factors when evaluating organic versus industry solutions for product support and business services.

While government laboratories have an important role to play in our nation's cutting-edge research, AIA is concerned about efforts to in-source the manufacture of space systems to laboratories without allowing industry to compete. As cited in this report, the acquisition effort for the Missile Defense Agency's Precision Tracking and Surveillance System utilizes universities and laboratories even though industry has already worked in this area and may be able to provide cost savings to the government.

- **Modernize the export control system for satellites and related components:** There is a need to re-evaluate ITAR controls on space technologies and sharpen the provisions of the 1998 law, P.L. 105-261, to keep our country safe and industry strong. Commercial communications satellite technology restrictions are particularly in need of review. Actions to modernize the export control system and enhance space trade among

our allies will help build a stronger, more efficient space industry and supplier base that is able to meet challenges associated with budget-constrained government customers. AIA will continue to work with and encourage the U.S. government to take the necessary action to reform our export control system.

- **Utilize responsive space and small satellites to augment space capabilities:** While not a replacement for major national security space constellations, Operationally Responsive Space (ORS) and other science and technology (S&T) efforts seek to deploy satellite capability quickly and at relatively low cost to the taxpayer. ORS capability is intended to help replenish, augment and reconstitute space assets – especially in a time of attack or to meet the urgent needs of our military.

In addition to making our space capabilities more robust, ORS and other S&T missions could play an important role in keeping the industrial base healthy. Satellites designed within short timelines help provide additional programs to challenge our engineers and design teams. These types of small R&D projects also provide the workforce with expertise and personal satisfaction. A targeted number of smaller, more frequent space system acquisitions could help keep industry and its workforce active, support the development of new cutting-edge technologies and make our satellite architectures more robust.

- **Leverage commercial and commercial off-the-shelf (COTS) technology:** The U.S. military spends hundreds of millions of dollars on software to visualize and track our satellites even though COTS software is available. Utilization of COTS software for space situational awareness could potentially result in substantial savings to the U.S. government. In addition, commercial space launch technology developed by industry could also be used to launch small military satellites. AIA believes this would produce savings when compared to the cost of maintaining excess ICBM assets for space launch. Opportunities for ride-sharing and secondary payloads in commercial launch systems could also support government needs for cost-effective launch.

CONCLUSION:

As our nation faces multiple overseas conflicts, continued economic challenges and a burgeoning debt, we must take the steps needed to maintain our national security space industrial base while also building value to meet government and warfighter needs.

AIA hopes its recommendations will provide national leaders with useful ideas on how to acquire and manage our space efforts more efficiently while also supporting the warfighter, a strong workforce and industrial base.