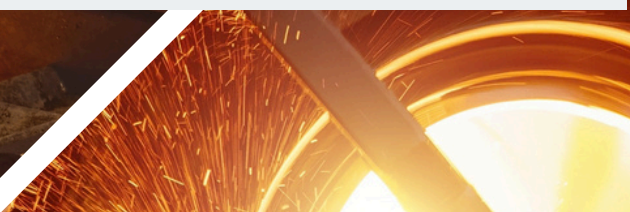
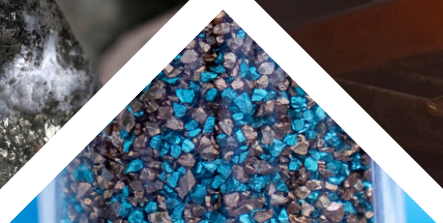


STRENGTHENING CRITICAL MINERALS SUPPLY CHAINS

**Aerospace and Defense (A&D)
Industry Assessment and
Recommendations**

September 2026





Executive Summary

The **Aerospace Industries Association (AIA)** represents nearly 300 American companies spanning the full spectrum of the aerospace and defense (A&D) industry, from large manufacturers to small suppliers, employing more than 2.1 million highly skilled American workers in every state. AIA members strongly support the policy objectives of strengthening domestic critical minerals sourcing and disentangling the U.S. supply chains from adversarial sources. However, statutory restrictions under 10 U.S.C. § 4872 and new restrictions imposed by Executive Order (EO) 14415 on the sourcing of critical minerals will create unintended consequences for the very defense industrial base (DIB) these policies are intended to strengthen.

AIA member companies have invested substantial resources to prepare for sourcing restrictions under 10 U.S.C. § 4872 and have taken extensive efforts to identify, develop and qualify alternative domestic and allied sources of supply by the statute's January 1, 2027, deadline. Despite these efforts, significant challenges remain, including limited availability of compliant materials, A&D-specific market realities, geological processing constraints, lengthy certification and qualification timelines, and concentrated global supply chains. EO 14415, "Securing America's Defense Supply Chains and Ensuring Domestic Acquisition of Critical Materials," issued on July 20, 2026, layers additional obligations on top of 10 U.S.C. § 4872 that will compound these challenges. Meanwhile, China has tightened its control over the critical minerals value chain through export bans, licensing requirements, end-use restrictions on rare earths and magnets, particularly limiting access to key materials for U.S. defense and dual-use applications and exacerbating supply constraints across already concentrated global markets.

Taken together, these regulatory and market dynamics risk creating misalignment between compliance requirements and the availability of qualified aerospace-grade supply. Without sufficient implementation flexibility and a realistic transition strategy,

defense programs could face production disruptions, cost increases, and schedule delays that undermine the policy objectives these measures are intended to achieve.

AIA surveyed its member companies to assess industry preparedness for 10 U.S.C. § 4872, evaluate the impact of EO 14415, and identify recommendations to strengthen supply chain security while preserving industrial base capacity and production readiness.¹ Across companies, sectors, and tiers of the A&D supply chain, several themes and findings emerged:

Industry is making significant investments to strengthen supply chain resilience and reduce reliance on adversarial sources.

Companies have conducted extensive supply chain mapping; established enterprise-wide critical minerals teams; reviewed product specifications; engaged with domestic and allied suppliers to develop alternative sources; paid significant premiums to secure available material; and are actively increasing buffer stocks and inventories of critical minerals.

Compliant aerospace-grade supply remains unavailable for some covered materials.

For certain covered materials, compliant sources cannot yet meet A&D requirements for the quantity, quality, and performance specifications. In many cases, the primary constraint is limited availability of processing, refining, and manufacturing capacity of aerospace-grade material, rather than access to the raw material itself, leaving A&D with less purchasing power and making it vulnerable to supply disruptions.

Supply chain transition timelines exceed statutory and regulatory implementation deadlines.

Significant domestic processing, refining, and magnet production capacity for aerospace-grade materials is not expected to be available until 2028 or later. Even after material becomes commercially available, qualification and certification activities typically require an additional 12 to 24 months before materials can enter defense production, leaving many companies unable to meet compliance deadlines with compliant and qualified sources.

Waivers remain necessary beyond January 1, 2027.

Since compliant sources for several covered materials are unlikely to be available and qualified before January 1, 2027, many companies expect to require nonavailability determinations or other statutory relief. Feedback indicates that these requests will often be driven by market-wide realities rather than company-specific issues, underscoring the need for efficient and predictable waiver processes.

Achieving secure, resilient, and compliant critical minerals supply chains requires a pragmatic, risk-based approach that reflects A&D market realities, sustains industrial base capacity and defense readiness, and focuses compliance efforts where supply chain risks are greatest. To that end, AIA recommends the following priority actions for the Administration and Congress:

Recommendations

Align compliance timelines with supply chain readiness.

Compliance requirements should be phased based on demonstrated availability of qualified aerospace-grade supply rather than fixed statutory or regulatory deadlines that do not account for market realities. Investments should continue to expand domestic processing and production capacity and address manufacturing constraints across the A&D supply chain.

Preserve and operationalize statutory waiver authorities during transition.

Where qualified compliant sources are unavailable at the quantity, quality, or specifications A&D applications require, the Department of War (DOW) should utilize existing national security waiver authorities and issue class nonavailability determinations under 10 U.S.C. 4872. DOW should also establish clear mitigation-plan requirements and decision timelines under EO 14415, expand waiver processing capacity, and improve information sharing on approved, emerging, and qualified sources of supply.

Focus compliance requirements on the highest value supply chain risks.

The supply chain mapping and reporting requirements in EO 14415 should be appropriately scoped, targeted to materials covered by 10 U.S.C. 4872, and implemented in a practical and achievable manner that advances broader supply chain resilience objectives. The Administration should clarify treatment of recycled materials and provide industry with adequate transition time before expanding the list of covered nations under EO 14415.

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Introduction

The **Aerospace Industries Association (AIA)** represents nearly 300 companies across the aerospace and defense (A&D) industry, including prime manufacturers, original equipment manufacturers, raw material producers, and suppliers supporting both commercial aerospace and defense production throughout the value chain. AIA strongly supports the development of secure, resilient domestic and allied supply chains for critical minerals and materials.

Effective January 1, 2027, 10 U.S.C. § 4872 will prohibit the Department of War (DOW) from procuring or selling certain covered materials — or products containing them — mined, refined, separated, processed or produced in North Korea, Russia, Iran and China. The statute covers several materials essential to A&D applications, including samarium-cobalt magnets, neodymium-iron-boron magnets, tungsten metals and alloys, tantalum metals and alloys, molybdenum, gallium, and germanium.²

EO 14415, “Securing America’s Defense Supply Chains and Ensuring Domestic Acquisition of Critical Materials,” issued on July 20, 2026, builds on these restrictions. It imposes comprehensive supply chain mapping requirements, constraining nonavailability and national security waiver authorities, and establishing new requirements for the qualification and certification of alternative suppliers that go beyond 10 U.S.C. § 4872.

Compounding these challenges, China continues to dominate critical minerals processing, refining, and magnet manufacturing and has expanded export bans, licensing requirements, and end-use controls on rare earths, magnets, and other strategic materials, particularly limiting exports of materials used in U.S. defense and dual-use applications. As the A&D industry prepares for implementation of 10 U.S.C. § 4872, these policy, market, and geopolitical pressures are increasing demand for a limited pool of compliant aerospace-grade supply.

A&D systems require highly specialized aerospace-grade materials produced to stringent purity, performance, quality, and certification standards, frequently at low production volumes. As a result, material may be commercially available in the broader market while remaining unavailable in the quantity, quality, or specifications required for A&D use. Even where alternative sources exist, they often require extensive qualification and certification before they can be incorporated into flight-critical or mission-critical systems.

AIA member companies anticipate challenges in securing compliant sources for several covered materials before statutory deadlines. While the nature and severity

of those challenges vary by company, specification, application, and position in the supply chain, they are shaped by common market realities. The table on the following page summarizes representative A&D applications, market conditions, and sourcing challenges associated with each covered material. This context informs the analysis that follows, which draws on AIA member company survey data and industry feedback regarding ongoing compliance efforts, barriers to implementation, the impacts of EO 14415, and actions needed to strengthen supply chain resilience while sustaining A&D production.

10 U.S.C. § 4872 Covered Materials

Selected A&D Applications and Market Conditions³

Neodymium-iron-boron (NdFeB) magnets

Used in weapon targeting systems, turret control systems, and suspensions. U.S. net import reliance is ~70% for the light rare earths Nd and Praseodymium (Pr) used in Nd magnet production and >90% for heavy rare earth dopants used in production of certain grades of NdFeB magnets. **Covered by China's April 2025 dual use export controls.**

Samarium-cobalt (SmCo) magnets

Used in actuators, high-temperature motors and engines, and radars. U.S. net import reliance is >90% for samarium oxide, alloys, metals and compounds. **Covered by China's April 2025 dual use export controls.**

Tantalum (Ta) metals and alloys

Used in jet engine turbine blades and components, rocket nozzles, munition penetrating projectiles and parts. U.S. net import reliance is 100%, with imports of refined Ta metal and powder products primarily from China (47%), Germany (25%), Kazakhstan (16%), Thailand (4%), and other (8%). Top producers of global raw Ta supply include Democratic Republic of Congo (52%), Rwanda (16%) and Nigeria (16%).

Tungsten (W) metal powder and heavy alloy

Used in superalloys for engine parts, hypersonic systems, kinetic energy penetrators, and other munitions components. U.S. net import reliance is >50%, with imports primarily from China (26%) and Germany (14%). China accounts for ~80% of current mine production and 85% of ammonium paratungstate (APT) production globally. **Covered by China's February 2025 dual use export controls.**

Molybdenum (Mo)

Used in rocket nozzles, turbine blades, jet engine components, additive for metal hardening. The U.S. is a net exporter of Mo ores and concentrates and is increasing domestic mining and refining production. **Molybdenum powders covered by China's February 2025 dual use export controls.** By controlling refined Mo powders and related processing technologies, versus the unrefined material, China aims to restrict availability for U.S. end-use even though the overall supply of Mo is more balanced.

Germanium (Ge)

Used in thermal tracking and infrared guidance systems, brazing alloys, most transistors, integrated circuits, and fiber optics. U.S. net import reliance is >50%, with imports primarily from Belgium (41%), China (23%), Canada (17%), Germany (14%), and other (5%). China supplies over 60% of the world's low-purity germanium. **In November 2025, China banned Ge exports to U.S. military end users but suspended the ban until November 27, 2026. Germanium remains covered by China's December 2024 dual use export controls imposed.**

Gallium (Ga)

Used in cockpit displays, night vision systems, radar systems, electronic devices, transistors, and integrated circuits. U.S. net import reliance is 100%, with imports of high-purity Ga metal primarily from Canada (28%) Japan (22%), China (18%), Germany (16%), and other (16%). For low-purity Ga, China is the main producer controlling over 90% of new supply, though recycling plays a significant role worldwide. **In November 2025, China banned Ga exports to U.S. military end users but suspended the ban until November 27, 2026. Gallium remains covered by China's December 2024 dual use export controls.**



A&D Industry Efforts to Comply with 10 U.S.C. § 4872

AIA member companies have undertaken extensive efforts to comply with 10 U.S.C. § 4872, investing significant resources to identify, qualify, and secure compliant sources of supply. These efforts span supplier development, supply chain mapping, supplier engagement, risk mitigation, and qualification activities across every tier of the A&D supply chain.

Companies Are Working to Develop and Qualify Alternative Sources

A&D companies are actively developing and qualifying long-term domestic and allied sources of covered materials through supplier outreach, vendor qualification, strategic sourcing agreements, and direct investments in emerging production capacity.

AIA companies are negotiating longer-term supplier agreements, securing material in advance of demand, building material buffers and stockpiles, incorporating high-quality, non-contaminated scrap into products and materials, and leveraging third-party aggregators and distributors to increase purchasing power with domestic sources. AIA companies are also analyzing aerospace component and part redesigns and the viability of material substitutions to reduce reliance on covered materials without jeopardizing safety and quality, as well as working with the DOW to identify compliant producers that are prioritizing material for defense needs or that have contacted DOW about existing compliant supply.

In parallel, many companies are working directly with prospective domestic suppliers to expand aerospace-grade production capacity, often through supplier investment, technical assistance, and qualification support. For example, one company is supporting a domestic supplier's efforts to establish tungsten bar

production, a capability that currently has limited U.S. availability. Despite industry investment and support, the supplier must still acquire equipment, develop aerospace-grade capabilities, and complete lengthy qualification processes, making full production unlikely to be fully operational before the January 1, 2027, deadline.

Recent experience by companies responding to China's 2025 export restrictions illustrates both the effectiveness and cost of an all-of-the-above sourcing strategy. One AIA company executed multiple, parallel solution paths to mitigate potential shortages of a key material and now reports that it has secured supply through 2029 and beyond. These risk mitigation efforts involved stockpiling material at prices exceeding 30 times historic market rates, executing supply agreements with multiple domestic and allied sources, many of which backed by DOW investment, that will ramp up production over the next 18 months.

Companies Are Employing Supply Chain Mapping, Traceability, and Illumination Efforts

Many AIA companies identified extensive supply chain mapping as a principal activity already underway to identify lower-tier supplier dependencies and areas of compliance risk. Common activities include supplier outreach and engagement, material mapping and traceability to deliverable part numbers, data mining and heat mapping to isolate the greatest areas of impact, deployment of third-party supply chain visibility platforms, enhanced bill of materials (BOM) analysis, and sourcing BOM information from third-party vendors.

Examples provided by companies underscore the significant scale and complexity of the work required to obtain meaningful BOM transparency and visibility throughout the sub-tier supply chain, from the mine to end item. Many companies have also established enterprise-wide critical minerals and supply chain risk teams to identify dependencies, engage prospective domestic and allied suppliers, and coordinate compliance activities across business units and programs.

“We have manually reviewed thousands of drawings to identify critical minerals, deployed AI-enabled tools to scrape the material information, deployed [tools] to pivot to help with critical minerals, sourced BOM information through third-party vendors to gain visibility, and surveyed suppliers to request this information.”

— AIA Member Company

Companies Are Engaging Suppliers and Flowing Down Contractual Requirements

Because 10 U.S.C. § 4872 covered materials typically enter the supply chain several tiers below prime contractors, many companies do not procure them directly. To address this challenge, companies have flowed down applicable Defense Federal

Acquisition Regulation Supplement (DFARS) clauses implementing 10 U.S.C. 4872, educated and assisted sub-tier suppliers in understanding their statutory compliance obligations, and conducted outreach to existing and prospective domestic suppliers to evaluate capability and qualify vendors. Companies are also conducting ongoing supplier capability, capacity, and risk assessments and reinforcing suppliers' obligations to meet applicable sourcing requirements.

Collectively, these efforts demonstrate industry's commitment to compliance with 10 U.S.C. § 4872. However, despite substantial investments in supplier development, sourcing diversification, supply chain visibility, and qualification activities, many companies continue to face structural market constraints that cannot be resolved through company action alone.



Market and Structural Roadblocks Impacting Compliance with 10 U.S.C. § 4872



Despite substantial compliance efforts, companies report widely varying readiness across programs and portfolios. Some expect to achieve compliance for certain applications by January 1, 2027, while others lack a viable path to compliance until 2028 or later. These challenges are driven largely by market conditions, supplier capacity, qualification timelines, and structural supply chain constraints that exist independent of EO 14415.

Compliant Aerospace-Grade Supply Does Not Exist at the Required Scale

The most consistent finding across companies' responses to the survey is the most fundamental: for several covered materials, compliant aerospace-grade material is not commercially available today from domestic or allied sources. Companies consistently reported that the primary bottlenecks exist deep within lower-tier processing, refining, and manufacturing segments of the supply chain.

For tungsten, the global market challenges are particularly clear. The A&D industry is a comparatively smaller consumer of tungsten relative to other industrial sectors, and the combination of lower purchasing power, a large structural supply gap, and increasing prices and global demand for tungsten has made it difficult for A&D companies to obtain fully compliant material across their commercial and military portfolios.

“Until compliant neodymium-iron-boron magnets and germanium become commercially available in the required specifications, purity, and volumes, [our company] cannot begin the qualification and testing process.” — AIA Member Company

Several respondents noted that suppliers receiving government support through equity stakes and subsidies remain years away from producing compliant aerospace-grade material at commercial scale. One company reported that “suppliers are currently unable to source upstream, compliant materials...as well as do not have the infrastructure and production facilities needed to produce DFARS-compliant magnets until 2028”, while another noted that many domestic supply projects are not projected to come online until 2029 or 2030.

Companies that have identified possible compliant domestic suppliers report that some have little to no capacity for new orders, or do not want to produce more expensive and less profitable aerospace-grade material. Companies reported significant concern regarding volatility in market pricing and availability as demand for compliant sources accelerates. Volatility in material and vendor pricing also makes long-term agreements difficult to put in place, which in turn slows the very capacity of investments the restrictions are intended to induce.⁴

Additionally, the number of suppliers possessing the scale, technical expertise, certification pedigree, and security requirements necessary to support defense production remains limited. As a result, many companies believe domestic supply is unlikely to match projected demand in the near term and, for some critical minerals and covered materials, may remain constrained for years.

“Both neodymium-iron-boron magnets and germanium have highly concentrated global supply, with compliant domestic or allied production capacity that is either nascent, capacity-constrained, or not yet able to meet aerospace-grade specifications. Germanium in particular faces significant supply concentration risk, and compliant domestic sourcing at the required purity and volume is limited.”

— AIA Member Company

Source and Supplier Qualification Timelines Exceed Statutory Deadlines

Even where compliant sources are emerging, qualification remains a significant barrier to implementation. Qualification activities cannot begin until material becomes available at the required specification, purity, and production scale. Once available, most A&D applications require extensive testing, validation, documentation, and customer approval before material can be incorporated into flight-critical or mission-critical systems.

A&D industry qualification activities frequently occur several tiers below the prime contractor, requiring validation of repeatable production quality, traceability, technical documentation, process controls, and customer acceptance testing. This robust process applies to both domestic sources still building capability and to allied foreign sources that may be compliant but not yet qualified for specific A&D applications. Companies anticipate qualification timelines of least 12 months for ma-

ny critical applications once compliant material becomes available, and 12 to 24 months where an existing processing source must be qualified to meet aerospace-grade specifications. In some cases, companies reported source-transition costs exceeding \$10 million.

Following the addition of molybdenum, germanium, and gallium to the covered materials list in 10 U.S.C. § 4872, one company began efforts to qualify an alternative producer of one of these materials. After an initial engagement where the member company provided material specifications, the producer stated it could not meet said specifications and requested a deviation. The company's quality organization reviewed the request and agreed to accept, and this producer has sent several trials for laboratory evaluation which have yet to meet specification. The company continues to work with the producer, but these efforts have not yet produced a qualified source and will not on the schedule the statute requires.

Further, purity and material specifications remain a critical and frequently overlooked constraint. One company reported that it has agreements with several refiners to produce to the company's specification for certain rare earth elements (REEs) and REE magnets. However, the company noted that no refiners, allied or domestic, have met their specifications so far for some specific elements, including any with applications requiring 4N+ (99.99% or higher) purity.

Companies also emphasized that qualification decisions are generally conducted in close partnership with government program offices and customers, making successful implementation dependent on coordinated efforts between government and industry to accelerate approval processes where appropriate. Where companies pursue alternative designs that reduce reliance on covered materials, they encounter equally lengthy qualification timelines and government customer preferences to avoid design modifications that would require retesting, recertification, or disruption to established production and sustainment plans. These dynamics create competing pressures between operational performance requirements, program stability, and supply chain compliance objectives. Companies reported being placed in an impossible position when the government customer is unwilling to pay market prices for compliant material and asks for an expedited process for contract renegotiation alongside expedited qualification of domestic sources.

Qualification challenges are further complicated by differing customer specifications for the same material. A supplier may successfully qualify a source for one customer while still needing to complete additional testing and qualification activities to satisfy another customer's requirements, increasing cost, time, and complexity across the supply chain.

“Ultimately sources of domestic supply are unlikely to match demand for at least the next decade.”
— AIA Member Company

A&D Companies Lack the Market Leverage to Secure Limited Compliant Supply

Due to specialized aerospace-grade requirements, low volume, high mix products are less attractive as a business to suppliers and material availability volatility makes it difficult to retain domestic producers who receive higher offers from commercial buyers or other industries. This leaves the A&D industry with less purchasing power and greater vulnerability to supply disruption than larger, less regulated sectors such as automotive or consumer electronics.

One member company described competing for supply of material needed by the DIB "at a time when everybody is hunting down the same sources," as demand rises in commercial aviation, defense, industrial gas turbines for power generation, space and semiconductors, and as governments and industry plan or carry out stockpiling. Because those markets are much larger and aerospace material is often produced to a more demanding specification, the company said, "we don't command the same buying power," and commercial suppliers "can also drop us if we're too much of a pain."

Market transparency presents an additional challenge. For example, the London Metal Exchange or Chicago Mercantile Exchange, which give sellers and buyers a transparent, external price verification mechanism, rarely include trades on critical materials suitable for the A&D industry. Instead, these niche markets feature limited public price reporting or benchmark pricing, so A&D buyers rely on third-party price assessments based on regional and product-grade survey data and negotiate with sellers to procure relatively small quantities of niche material, with little to no power to move the supply-side market.

Even when companies can identify compliant suppliers producing materials at the requisite aerospace-grade specifications, the price for the material is often significantly higher than in prior years. For example, recent Rotterdam tungsten prices roughly doubled in 2025 following U.S. tariffs and Chinese export controls, from \$266 to \$551 per metric ton unit for concentrate and from \$331 to \$675 for APT.

Rising prices, combined with constrained availability, create challenges for defense contractors operating under firm-fixed-price contracts and discourage the long-term agreements necessary to support supplier investment and capacity expansion. Raw material suppliers may also prefer shorter duration contracts with their own subcontractors given price fluctuations in their input materials. This is also true for prime contractors with firm-fixed-price contracts with DOW.

Increased demand combined with decreasing supply further exacerbates the price volatility issue. This is exacerbated by country-led or regional stockpiling schemes in which governments are competing with private industry.

Capital and Capacity Constraints in Sub-tiers of the Supply Chain

Covered materials and critical minerals typically enter A&D supply chains deep within lower supplier tiers — often six or more levels below the prime contractor — and often pass through traders, miners, refiners, processors, and other intermediaries that have no mandate to track provenance and no duty to provide the detail that a prime would need to establish it. Many of these upstream suppliers are predominantly commercial companies.

Companies highlight that establishing complete visibility and confirming compliance across all sub-tiers require cooperation from suppliers who may lack the systems, resources, incentives, or willingness to provide this level of data. For example, as one company described it, “mapping existing supply chains can be difficult since it relies on disclosures from suppliers who may have proprietary or competition concerns with sharing sourcing and composition information or can simply refuse the flow-down terms from the prime [contractor], especially in the case of a commercial business where the prime is a nominal portion of their overall business.”

As noted in Section I, some suppliers are unwilling to share sourcing and composition information for build-to-specification and commercial parts or decline the prime contractor’s flow-down terms outright. For some items, sub-tier sources of supply can change every time an order is placed. The result is chronic data gaps outside of the prime contractor’s control. Companies also cautioned that imposing these requirements in the absence of an industry-wide traceability standard or a government-mandated framework could reduce competition across the value chain by increasing switching costs and discouraging suppliers from providing the necessary information. The added requirements could drive commercial companies away from the defense sector, further constricting the market and competition in the DIB.

Companies report that it may take up to ten years to identify, build, transition, and certify a new mine or refining source, depending on the material.⁵ Consistent with AIA companies’ previous estimates, timelines from raw material extraction — assuming existence of a compliant mine of qualified covered material — to delivery of a finished end item to DOW can span four years or more. This means items delivered to DOW in 2027 rest on sourcing decisions made years earlier — a time when alternatives outside covered nations were not available.

The sub-tiers of the A&D supply chain that are the principal production bottlenecks are also the least capitalized. In AIA’s July 2026 production readiness survey with PwC, raw materials providers reported no capacity to scale beyond twice current

volumes on any predictable timeline, and specialty metals ranked as the dominant forward inflation concern, cited by 77% of respondents among their top three drivers.⁶ Raw materials respondents reported capital gaps or constraints at 43% while reporting no adoption of federal industrial base capital vehicles, and Tier 2 and 3 suppliers reported markedly lower adoption of Defense Production Act Title III, Small Business Innovation Research, and Office of Strategic Capital funding than their prime and Tier 1 counterparts.⁷

Restricting Recycled Material Eliminates a Critical Source of Compliant Supply

AIA companies emphasized that recycled covered materials should be treated as compliant where recovery, reprocessing, and repurification occur domestically or in allied nations. Recycled material is already embedded throughout aerospace supply chains and, in many cases, represents one of the few immediately available sources of compliant material. Because the recycled material is already circulating within domestic and allied industrial ecosystems, companies argue that it should not be treated more restrictively than newly mined and processed material, which would eliminate a vital supply of otherwise compliant material.

Recycled content plays a particularly important role in aerospace-grade metals and superalloys, which routinely incorporate qualified revert, alloy scrap, and recycled tungsten, tantalum, and other covered materials. AIA companies emphasized that maintaining access to these recycled streams will be essential to meeting demand as industry transitions away from covered nations. One company identified preservation of the recycled-material exemption as its principal concern, noting that recycled and virgin material are often functionally interchangeable and serve as "one-to-one drop-in replacements." According to the company, industry "will frankly need all non-China sources to comply with 4872."

AIA companies also identified gaps in the recently published deviation clause DFARS 252.225-7961 issued in July 2026 that warrant correction. For example, molybdenum was added to 10 U.S.C. § 4872 as a covered material but is not reflected as a covered material in the clause. Companies also observed that statutory recycling exceptions are not consistently incorporated, including the omission of certain exceptions applicable to samarium-cobalt magnets, tungsten, tantalum, and molybdenum produced from recycled material.

Collectively, these challenges demonstrate that compliance with 10 U.S.C. § 4872 is constrained not by a lack of industry effort, but by market realities that cannot be resolved through company action alone. For many covered materials, the limiting factors are the availability of compliant aerospace-grade supply, the time required to qualify new sources, and structural constraints in the lower tiers of the supply chain that will take years to address.



Impact and Key Concerns with EO 14415



AIA and its member companies recognize the challenges EO 14415 seeks to address and support the broader goal of strengthening resilient domestic and allied supply chains. Nevertheless, respondents expressed concern that aspects of the EO's implementation could exacerbate existing market constraints, increase price and availability volatility, and make compliance with 10 U.S.C. § 4872 more difficult to achieve.

“We cannot overstate the impact of market-wide price and availability volatility caused by these actions, making it difficult to retain domestic producers who receive offers for higher purchase prices from commercial or competitor offers or to acquire suppliers due to the shortage of suppliers that have the scale, expertise, and security needed for defense production.”

— AIA Member Company

Limiting Statutory Nonavailability and National Security Waivers Threatens Readiness

The EO's effective elimination of 10 U.S.C. § 4872 nonavailability waivers and national security waivers after January 1, 2027, absent an accepted formal mitigation plan, significantly constrains sourcing flexibility at precisely the moment companies reported they will need it. DOW's ability to grant appropriate waivers is what keeps critical acquisition programs on schedule while industry transitions to new sources. Reducing that ability before sufficient compliant supply exists will create disruptions and delays that decrease readiness for the warfighter.

The EO also raises the evidentiary bar for relief. Mitigation plans must document "exhaustive" efforts to obtain compliant material, and a contractor's failure to qualify a domestic source does not by itself establish nonavailability. Companies noted that as written, the prime contractor bears the burden of demonstrating that no viable alternative exists, which requires proving a negative across a global field of potential suppliers where visibility is limited. Suppliers outside the defense ecosys-

tem may not respond to inquiries or provide the traceability data needed to substantiate a waiver request, supplier certifications cannot substantiate the level of detail required, and data held by intermediate processors is often unstandardized, incomplete, or non-disclosable. As one company noted, the standard of evidence is "significantly higher than current practice and not one we can directly control."

As of September 2026, there is no published mitigation plan template, format, acceptance standard, or processing timeline, and no clarity on whether class or group waivers may be granted. Furthermore, requiring detailed mitigation plans for market realities that DOW is already aware of is inefficient and should not be required for those critical materials for which industry and government have universally identified that there are no known qualified domestic sources that will be available in the quality and quantity required by January 1, 2027. Industry is being asked to meet an evidentiary standard that has not been published, through a process whose throughput is unknown, against a deadline that is fixed.

Supplier Risk Vetting and Reporting Obligations Create a Continuous Compliance Burden

The EO requires contractors to establish written procedures for vetting sub-tier suppliers for financial risk, foreign ownership, control, or influence (FOCI), and manufacturing and supply constraints; to notify DOW of significant risks within 15 days; to submit corrective action plans within 45 days; and to provide closeout reports. Several AIA companies described these obligations as a continuous, resource-intensive burden rather than a one-time compliance activity. One company characterized the requirement to assess financial, foreign ownership, and production risk as "enormous – a larger burden and concern than the mapping itself."

These assessments depend on information that sub-tier suppliers may lack the systems, resources, or willingness to provide, and that suppliers often consider proprietary. Because supplier conditions change continuously, vetting requires sustained manual review. Any misalignment between reported data and actual supplier behavior could place a prime contractor in a noncompliant position despite significant investment. AIA companies noted that the U.S. government is better positioned than individual contractors to assess FOCI risk and recommended government-provided risk assessments and shared vetting mechanisms.

Differential Treatment of Small Business and Non-Traditional Entities Is Incompatible with Integrated Supply Chains

The EO directs that implementing regulations not unduly burden small businesses, non-traditional defense companies, and new entrant firms. Supply chain mapping is not technically different for these entities, and an acknowledgment that the requirements are burdensome for them is itself a recognition that the scale of compliance is extraordinary. More practically, higher tiers cannot meet the require-

ments if they are unable to flowdown uniform terms and conditions to small businesses, non-traditional companies, and new entrants in the lower tiers.

Companies are also concerned that numerous suppliers may choose to sell only to non-traditional entities to avoid flowdown compliance burdens, providing an unintended competitive advantage to a sector of the DIB. Differential treatment within shared supply chains without a uniform flowdown mechanism creates gaps for which the prime contractor remains liable, and for which non-traditional competitors would have a competitive advantage.

Undefined Supplier Designations and Expansion of Covered Nations

The EO introduces the terms "unreliable foreign supplier" and "high-risk" foreign supplier without defining either, and it authorizes the Secretary to designate countries beyond the four covered nations listed in 10 U.S.C. § 4872. Without clear definitions and criteria, companies cannot determine which sources may become noncompliant or plan their qualification efforts accordingly. AIA companies reported that, if additional countries were designated, they would have very little time to adapt supply chains and requalify compliant sources, particularly because allied producers are playing, and will continue to play, a key role in meeting A&D specifications with the reliability, quality, and capacity required.

Project Vault Offers Potential Benefits but Raises Unresolved Market Questions

AIA companies had several questions regarding the scope and nature of the Export-Import Bank's "Project Vault" initiative. One of the primary threads among companies was the presence of Project Vault in the commercial marketplace as a new buyer of critical minerals and the potential impact the initiative would have on market dynamics. Companies indicated the Export-Import Bank should proceed with caution given the potential volatility in market-wide price and availability of minerals due to Project Vault's market entry and seek broader industry input to address these concerns prior to initiating any purchases. For example, companies expressed concerns about Project Vault competing with A&D companies to secure compliant materials and critical minerals amid an already-constrained global supply, which could result in increased market prices and volatility for companies seeking to secure their own supply chains without U.S. government intervention.

Overall, companies continue to seek more information about Project Vault and its implementation in determining its role as part of their compliance strategies. Key questions remain about Project Vault's waiver availability, critical material and mineral specifications, A&D sub-tier companies' eligibility to participate in Vault beyond original equipment manufacturers, and treatment non-compliant material procured by Vault post-January 1, 2027. These and other outstanding questions

must be addressed to realize the full benefit of Project Vault in securing the critical minerals supply chain and complying with 10 U.S.C. § 4872.

Proposed Indentured Bill of Materials (iBOM) Requirements Exceed Current Supply Chain Capabilities

The EO also levies new requirements on industry for more comprehensive supply chain mapping and new responsibilities to qualify and certify alternative suppliers that go well beyond 10 U.S.C. § 4872. The requirement to trace every component, part, equipment item, software element, and material back to the origin of raw materials across all supplier tiers was identified by multiple companies as the single most difficult EO provision to satisfy. Companies raised five distinct problems:

- **Lack of Defined Scope.** The EO does not clarify whether the iBOM requirement applies only to covered materials or to full end-item BOMs. If limited to covered materials, companies reported the timeline would be materially shorter; if full end-item BOMs are required, the effort becomes too extensive to reliably estimate cost or a path to compliance. One company noted that a requirement to trace all components, parts, equipment, software, and materials back to raw material origin would have a broad range from germanium in an optical assembly to office supplies — a breadth that companies characterized as approaching unenforceability.
- **Applicability to commercial products and upstream suppliers.** The EO directs the Secretary to develop policy and implementation guidance to require all prime contractors and subcontractors at any tier to map and illuminate critical supply chains and does not provide an express exemption for commercial products, commercial services, or commercially available off-the-shelf (COTS) products. Upstream traders, refiners, processors, and commercial suppliers have no mandate to provide provenance data and typically do not provide such data to downstream customers as part of their commercial industry practices.
- **Proprietary data security and information protection.** As defined in the EO, a fully indentured BOM often contains highly proprietary detailed manufacturing and process data across multiple tiers, and companies interpret the requirement to submit an iBOM to the DOW as effectively requiring delivery of such data with data rights that suppliers would otherwise not deliver. This requirement would significantly increase program costs and raise program security, cybersecurity, and information protection concerns. Section 7(b) of the EO permits disclosure to support contractors, which companies identified as a significant confidentiality concern for their key proprietary data.

- **Feasibility and sustainment.** Full sub-tier mapping of critical materials across all DOW programs is not achievable without further bounds. As described in Section II, covered materials enter A&D supply chains six or more tiers below the prime, through intermediaries that have no mandate to track provenance and no duty to supply the detail a prime would need — and those lower-tier sources can change with every order. For some items, the lower-tier sources could easily change every time an order is placed. Maintaining compliance requires ongoing support to repeatedly update iBOMs, product information, and sourcing as systems and suppliers change. This is an entirely new support ecosystem, not a one-time build.
- **Liability exposure.** Companies identified a heightened risk where statutory or regulatory obligations impose strict liability standards, or where errors surface only after a sourcing decision has been made. Misalignment between system outputs and actual supplier behavior could place a prime in a noncompliant position despite significant investment and good-faith effort.

“The combined effect is a compliance framework that places mission critical programs at risk, not due to lack of effort, but because the sourcing constraints, data requirements, and waiver standards set forth in the EO exceed what today’s supply chains, technologies, and suppliers can deliver.” — AIA Member Company

IV

Conclusion

Nonavailability of these covered materials is not the product of insufficient industry effort or commitment to compliance with the requirements and policy goals of 10 U.S.C. § 4872. It is the product of a market in which the necessary refining, purity, and qualified production capacity does not yet exist, which is precisely the condition the statutory nonavailability authority was written to address.



Given the limited availability of domestic or otherwise compliant sources of covered materials, AIA strongly advocates that the Administration and Congress consider implementation of the following recommendations to ensure the U.S. A&D industry continues progress towards the mutual goal of increased domestic production capacity and reducing reliance on adversarial sources of material needed by the DIB. Enacting these changes will minimize disruption to the delivery of capabilities while ensuring the long-term establishment of friendly sources of critical resources.

AIA and its member companies appreciate the U.S. government's continued collaboration toward the mutual goal of establishing sources of supply for covered materials outside of covered countries and stand ready to work together to achieve these important goals.

Recommendations

The following recommendations are intended to support the U.S. government and industry's shared objectives of securing domestic and allied supply chains while preserving acquisition continuity and allowing time for qualified capacity to emerge.

1. Align Implementation Timelines with Supply Readiness.

The most significant issue is the misalignment between the commercial availability of critical minerals and covered materials and what statute and the EO require. Compliance deadlines should account for the realities of commercial availability and the multi-year lead times required to establish qualified production. Implementation timelines should be phased and tied to demonstrated availability of compliant, qualified material rather than fixed calendar dates that do not reflect market realities. Even after a compliant source becomes commercially available, the implementation should also account for the extended qualification and testing timelines, which can take 12 months or more for flight-critical materials, and should not treat the mere existence of a source as equivalent to a usable, qualified source especially for magnets when different grades are unlikely to become available at the same time.

Variations in purity, performance, consistency, and specification mean that a nominally compliant source may still require extensive qualification before it can be used in flight-critical applications. This reality is not adequately reflected in the compliance deadlines established by statute or the EO. Companies recommended a defined glide path in which compliance percentages increase annually rather than a single hard deadline — one company proposed 40 percent by 2027, 70 percent by 2028, and 100 percent by 2029 — observing that a phased schedule “may reduce rushed buying of inferior domestic materials just to hit a date.”

2. Support Qualification and Source Development Efforts.

The strategy for accelerating testing and qualification required by Section 4(c) of

the EO should name and address specific barriers, including first-article testing requirements, program-specific qualifications, specification-level constraints, and redundant service-level requirements. Expanding use of the Defense Production Act will accelerate timeframes for improving domestic, compliant sources, and ensuring that Security of Supply Agreements with allied nations include provisions prioritizing support to the DIB. Government funding or incentives will help accelerate supplier adoption of traceability systems, particularly for small or upstream suppliers outside the defense ecosystem.

3. Clarify and Expand the Treatment of Recycled Materials.

Recycled covered material should be treated as compliant where recovery, reprocessing, and repurification occur outside countries of concern and the standard applied to recycled material should be no higher than the standard applied to virgin mined and processed material. Recycled content is a material portion of Western supply for several covered materials, and a stricter test for recycled material would remove supply that the restrictions themselves make necessary. DOW should also update DFARS 252.225-7961 to reflect molybdenum as a covered material, to incorporate the statutory exception for samarium-cobalt magnets produced from recycled material, and to incorporate the statutory exception for tantalum, tungsten, and molybdenum produced from recycled material.

4. Improve Government Transparency and Information Sharing.

The A&D industry has maintained the largest trade surplus across all American manufacturing industries for over 70 years. Partners continue to prefer U.S. A&D products over foreign competitors due to the technological innovation of our products and their long lifecycles of use. Our industry is committed to supporting the U.S. government by providing practical knowledge and expertise to assist in policy development that will support domestic industry and mitigate risks to export competitiveness. Collaboration with agencies such as the U.S. Geological Survey Minerals Information Center or Defense Logistics Agency Strategic Materials is crucial given their deep understanding of processed critical minerals, domestic supply, and national security objectives.

5. Incorporate Price Adjustment Mechanisms for Critical Materials.

DOW should expand the use of contractual mechanisms that mitigate the impact of significant and unforeseen fluctuations in the cost of critical materials. Fixed-price contracts are often an effective tool for controlling costs and incentivizing performance; however, they can expose contractors to substantial financial risk when commodity prices for critical inputs experience unexpected volatility. This risk is particularly acute for strategically important materials, including specialty metals, rare earth elements, energetic materials, and other inputs that are subject to global

global supply chain disruptions, geopolitical pressures, or constrained domestic production capacity. To address this challenge, DOW should leverage existing contractual safeguards, such as the Federal Acquisition Regulation's Economic Price Adjustment (EPA) clause, when procuring systems or components that rely heavily on critical materials.

6. Preserve and Operationalize the Statutory Nonavailability and National Security Waiver Authorities.

10 U.S.C. § 4872 provides waiver authority from sourcing restrictions in cases where the sourcing restriction would jeopardize national security or when DOW determines a covered material cannot be procured in sufficient quantity or quality. Before enforcing sourcing restrictions or limiting legitimate statutorily authorized waiver requests, DOW should be required to certify that the “covered materials” addressed by statute and the EO exist in the quality and quantity needed for A&D producers. The first step is to consult industry directly so that DOW, industry, and suppliers understand the full context surrounding current sourcing capacity for aerospace-grade critical minerals.

DOW should also publish the mitigation plan template, format, acceptance standard, and expected processing timelines before the January 1, 2027, restriction takes effect, and state clearly whether class and group waivers remain available. DOW should also adopt a tiered review model based on risk rather than treating each request as equal. Companies also recommended allowing conditional or temporary waivers where an alternative source exists but is not yet qualified to the required standard and grandfathering existing critical materials used in items already in production.

Lastly, Congress should amend 10 U.S.C. § 4872 to provide timeline and elevation requirements for waiver decisions, as well as reporting requirements for waiver decisions. This would ensure that waiver requests are considered and adjudicated in a timely fashion and provide increased transparency to ensure that the U.S. government and industry are on the same page when a waiver is requested, approved, or denied.

7. Issue a Class Nonavailability Determination for Covered Materials Lacking Qualified Compliant Sources.

Rather than adjudicating a large volume of materially identical individual requests, DOW should issue a class nonavailability determination covering those materials for which no qualified compliant source exists in the quantity and quality A&D applications require. As set out in Section IV, companies identified samarium-cobalt magnets, neodymium-iron-boron magnets, germanium, and tungsten as the materials for which compliant-supply chokepoints are not projected to resolve by

January 1, 2027, and for which waivers of approximately two years' duration would be needed. In shaping that determination, DOW should draw on the U.S. Geological Survey Minerals Information Center, Defense Logistics Agency Strategic Materials, and its own Industrial Base Resilience analyses, informed by industry feedback.

AIA first requested a class determination of nonavailability in February 2025.⁸ Where a determination has already been issued, DOW should publish it, together with its covered program list and supporting findings, so that companies can plan against it rather than duplicate the underlying analysis.

8. Require More Robust Government Feedback to Enable Industry Compliance.

The EO requires industry to provide exhaustive documentation of efforts to obtain critical materials from new sources before a waiver can be obtained from DOW. The Department should establish a feedback mechanism for waiver denials to enable rapid compliance. This process should include DOW identifying the specific insufficiencies in the waiver request to allow industry to rapidly address outstanding issues; DOW directing industry to any approved sources available for the critical materials industry is seeking a waiver for; and, DOW proactively sharing an approved source list for compliant materials with defense contractors. This will enable industry to most expediently address any deficiencies in its waiver request, and channel demand for critical materials to approved sources of supply.

9. Increase Number of Officials Authorized to Approve Nonavailability and National Security Waivers Under 10 U.S.C 4872.

With industry anticipating significant waiver demand beginning January 1, 2027, concentrating approval authority among a small number of officials creates an avoidable administrative bottleneck and risks delaying mission-critical production. The Department should delegate appropriate waiver authority to designated senior acquisition officials across the Military Departments and Defense Agencies, establish uniform adjudication criteria, and set defined processing timelines. Department-level officials should retain oversight of precedent-setting or exceptional cases to maintain consistency across DOW.

10. Scope Supply Chain Illumination Requirements and Adopt a Certificate-Driven Compliance Approach.

The iBOM and supply chain mapping requirements should be expressly limited to covered materials rather than full end-item bills of materials. Companies recommended that the government “define critical materials and only list those that are of utmost concern to the U.S. government” rather than broad-brushing the definition, and that full material declarations be flowed down through industry —

facilitated by a DFARS clause — to provide downstream compliance through a certificate-driven approach modeled on conflict minerals reporting or certificates of conformance, applied only to those items defined as critical materials.

AIA further recommends exempting commercially available off-the-shelf procurements and limiting application to defense articles; permitting industry-wide baseline provenance data for minerals with highly consolidated global sources, in place of repetitive supplier-by-supplier confirmation; and having the U.S. government provide foreign ownership, control, or influence risk assessments on behalf of industry, given its superior position to conduct that due diligence, using a mechanism analogous to the Government-Industry Data Exchange Program used for counterfeit electronic component risk.

11. Exempt Commercially Available Off-the-Shelf Products from the iBOM Requirements.

As discussed in Section III, upstream traders, refiners, processors, and commercial suppliers have no mandate to provide provenance data in the commercial market, and companies cannot compel these entities to do so. COTS suppliers will take exception to any mandatory flow-down requirements. Accordingly, AIA recommends exempting items that meet the definition of a COTS item in FAR 2.101 from the iBOM requirements.⁹ As discussed in Section III, many upstream suppliers may resist high-tier contractors' efforts to flow down the EO's iBOM requirements, which creates an untenable position of such contractors being subject to a requirement they cannot possibly satisfy. As a result, contractors should only be required to use commercially reasonable efforts to seek compliance with the EO's requirements.

12. Establish a “Commercially Reasonable Efforts” Standard for iBOM Compliance.

As discussed in Section III, many upstream suppliers may resist high-tier contractors' efforts to flow down the EO's iBOM requirements, which creates an untenable position of such contractors being subject to a requirement they cannot possibly satisfy. As a result, contractors should only be required to use commercially reasonable efforts to seek compliance with the EO's requirements.

13. Do Not Require iBOMs as Formal Contractual Deliverables.

To encourage companies to share supply chain mapping and provenance data, iBOMs should not be formal contractual deliverables subject to government data rights. Rather, iBOMs should be made accessible and reviewable on a non-deliverable basis to DOW customers and auditors as part of contract surveillance efforts.

14. Defer Contract-by-Contract iBOM Requirements Until Department-Wide Policy Guidance is Issued.

To mitigate disruption to, and inefficiencies within, the defense industrial base, we recommend that the Department advise buying commands and individual program offices against implementing contract-by-contract iBOM requirements ahead of the issuance of Department-wide guidance.

15. Avoid Adding Additional Countries to the “Covered Nations” List Without Assessing Impact.

In accordance with 10 U.S.C. § 4872, a national security or non-availability waiver is only necessary if the source is from one of the covered nations listed in statute. AIA companies have been working to ensure these nations are not included in their supply chains, but the existing critical mineral market is not able to adequately supply our industry. The Administration has recognized this reality in its pursuit of reciprocal trade agreements, critical mineral agreements, and other such agreements containing provisions on critical mineral supply.

However, the EO provides the DOW with the authority to add nations to the “covered nation” outside those listed in statute. The EO therefore risks undermining the Administration’s trade agreements and punishing industry’s progress in turning to allies and partners for compliant sources. The Administration should reconsider these non-statutory conditions to provide certainty for industry and ensure the success of its trade and critical mineral agreements. Should additional countries be designated, DOW should provide advance notice, industry consultation, and a transition period sufficient to identify and qualify alternative sources.

Endnotes

1. AIA member company survey on compliance with 10 U.S.C. 4872 and the implementation of Executive Order 14415, conducted August–September 2026. Companies’ responses are aggregated and anonymized. Unless otherwise noted, member companies’ statements in this paper are drawn from that survey.
2. Public Law 119–60 inserted molybdenum, gallium, and germanium to the list of covered materials, effective December 18, 2027.
3. Sources for market and import data all drawn from U.S. Geological Survey Minerals Commodity Surveys for 2026 chapters for Rare Earths, Tungsten, Gallium, Molybdenum, Germanium and Tantalum; and S&P Global Tungsten Market Report, August 2026.
4. AIA and PwC, State of the Ramp: Key Production Readiness Findings from AIA’s and PwC’s Survey of Aerospace and Defense Executives, July 2026.
5. AIA letter, "Urgent Request for Relief Regarding DFARS 252.225-7052," February 28, 2025.
6. AIA and PwC, *State of the Ramp*, pgs. 3, 5.
7. AIA and PwC, *State of the Ramp*, pgs. 21-22.
8. AIA letter, "Urgent Request for Relief Regarding DFARS 252.225-7052," February 28, 2025.
9. Federal Acquisition Regulations 2.101, Definitions, "Commercially available off-the-shelf (COTS) item: (1) Means any item of supply (including construction material) that is—(i) A commercial product (as defined in paragraph (1) of the definition of “commercial product” in this section); (ii) Sold in substantial quantities in the commercial marketplace; and (iii) Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace; and (2) Does not include bulk cargo, as defined in 46 U.S.C. 40102(4), such as agricultural products and petroleum products."

