

Department of Defense National Defense Industrial Strategy (NDIS) 2024



FOREWORD

MESSAGE FROM THE DEPUTY SECRETARY OF DEFENSE

With the publication of the 2022 National Defense Strategy (NDS), Secretary Austin charted the Defense Department's way forward through this decisive decade. Increasingly coercive actions by the People's Republic of China to reshape the Indo-Pacific region and broader international system to fit its authoritarian preferences, the Russian Federation's invasion of Ukraine, and transboundary challenges like COVID-19 all demonstrate the imperative for increased and improved defense capabilities for both the United States and our allies and partners.

While the implications of geopolitical turmoil, adversarial threats, and techno-economic challenges are far reaching, these events have afforded opportunities to observe, learn, and address critical weaknesses within our defense industrial base. We have become acutely aware of significant challenges that we must address, including the importance of production capacity underpinned by strong, secure supply chains.

Indeed, the NDS identifies risk to the industrial base—but it also guides us to solutions. As it states, “we will prioritize coordinated efforts with the full range of domestic and international partners in the defense ecosystem to fortify the defense industrial base, our logistical systems, and relevant global supply chains against subversion, compromise, and theft.”¹

Taking its lead from the NDS, this National Defense Industrial Strategy (NDIS) will catalyze generational change to a more robust, resilient, and dynamic defense industrial ecosystem. As a critical component of the Department's focus on building enduring advantages, developing and empowering this modern defense industrial ecosystem is foundational to integrated deterrence. By aligning policies, investments, and activities inside and outside the Department in a manner that is tailored to specific competitors, our industrial ecosystem can strengthen deterrence to maximum effect. Should deterrence fail, our industrial ecosystem must be postured to provide our Warfighters the necessary capabilities—at speed and scale—to defeat any nation that attempts to harm the security of the United States or our allies and partners.

This NDIS offers a strategic vision to coordinate and prioritize actions to build a modern defense industrial ecosystem. This proposed pathway recognizes that these efforts are not, and cannot be, isolated to the Department of Defense. Rather, they will require great collaboration and cooperation between the entire U.S. government, private industry, and our allies and partners abroad. The current and future strategic environment requires immediate, comprehensive, and

¹ 2022 National Defense Strategy of the United States, October 27, 2022 (Page 20)

decisive action in strengthening and modernizing our defense industrial base ecosystem to ensure the security of the United States and our allies and partners. We must act now.

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1 INTRODUCTION

A robust and resilient industrial base provides the enduring foundation for military advantage. While America continues to generate the world's most capable weapons systems, that technological acumen is not matched by our capacity to produce those capabilities at speed and scale. This mismatch presents a growing strategic risk as the United States confronts the imperatives of supporting active combat operations – by U.S. forces or by key allies under attack – while deterring the larger and more technically advanced pacing threat looming in the Indo-Pacific.

To mitigate and ultimately remedy the drivers of this risk, the 2022 National Defense Strategy (NDS) prioritizes strengthening the industrial base to “ensure that we produce and sustain the full range of capabilities needed to give U.S., allied, and partner forces a competitive advantage,” building on the lessons over the last several decades and the enduring advantage of the global international economic order which has proven a major strength for the US and our allies.²

Over the past century, U.S. industrial might overwhelmed the Axis powers in World War II and effectively deterred the Soviet Union during the Cold War. The “peace dividend” and “procurement holiday” that followed saw dramatic cuts in military force structure, weapons production, and corresponding stockpiles of munitions and materials. Most notably, the traditional Defense Industrial Base (DIB) – consolidated in the wake of the Secretary of Defense meeting with the major prime contractors and their suppliers in 1993 at what became known as the “Last Supper.”³

Significantly, this post-Cold War period saw the wider contraction of America's overall production capacity across many industries. Commercial manufacturing and related supply chains migrated overseas, including materials and components relevant to military needs. Over three decades the People's Republic of China became the global industrial powerhouse in many key areas – from shipbuilding to critical minerals to microelectronics – that vastly exceeds the capacity of not just the United States, but the combined output of our key European and Asian allies as well.

The events of recent years dramatically exposed serious shortfalls in both domestic manufacturing and international supply chains. The COVID-19 crises demonstrated America's near wholesale dependency on other nations for many products and materials crucial to modern life.⁴ Long-standing mobilization authorities, such as the Defense Production Act, were needed in the first months of the crisis to prevent expected shortages in medical equipment and other crucial items.

² 2022 National Defense Strategy of the United States, October 27, 2022 (Page 20)

³ The “Last Supper” refers to an announcement to industry by then Deputy Secretary of Defense, William J. Perry, announcing a shift in DoD policy to encourage consolidation among defense contractors.

⁴ Active-Duty Support to COVID-19 Response: DoD Support to Date, August 2023, U.S. Northern Command

The Russian Federation's full-scale invasion of Ukraine in 2022, followed the next year by attacks by Hamas on Israel, uncovered a different set of industrial demands and corresponding risks. The U.S. defense industry has been called on to surge production of military equipment in large quantities, especially munitions – from 155 mm military artillery shells, a staple of armies since the First World War, to the most sophisticated missile defense systems.

It has become clear that insufficient production and supply capacity are now deeply entrenched problems throughout all tiers of production supply chains. This includes dependencies on raw materials and components which often trace to single sources or suppliers vulnerable to control or exploitation by adversaries. Today's DIB does not possess the capacity, capability, responsiveness, or resilience required to satisfy the full range of military production needs at speed and scale. Just as significantly, the traditional Defense contractors in the DIB would be challenged to respond to modern conflict at the velocity, scale, and flexibility necessary to meet the dynamic requirements of a major modern conflict.

Moreover, the definition of a defense company has expanded and transformed, due to rapid technological change in the commercial sector. Tensions exist between innovating and modernizing using newer technologies (and non-traditional vendors) versus maintaining or, in some cases, increasing production of existing defense platforms and munitions needed to defeat or deter aggression over the near- to mid-term.

The transition from old to new systems is costly. Standing down existing business units impacts the economic vibrancy of local communities, while establishing entirely new production lines entails large startup costs. These costs and associated decisions can undermine the quality and speed of innovation, as short-term concerns reduce long-term investments in research and development and capital expenditures.

The National Defense Industrial Strategy (NDIS) – the first to be produced by the Department of Defense – provides a path that builds on recent progress while remedying remaining gaps and potential shortfalls. The NDIS recognizes that America's economic security and national security are mutually reinforcing and, ultimately the nation's military strength cannot be untethered from our overall industrial strength. This comprehensive NDIS aims to answer the question: How do we prioritize and optimize defense needs in a competitive landscape undergirded by geopolitical, economic, and technological tensions? Tradeoffs typically occur between cost, speed, and scale. However, the lessons learned since the "Last Supper" and highlighted by current acute threats illustrate that the DoD needs to move aggressively towards innovative, next-generation capabilities while continuing to upgrade and produce, in significant volumes, of conventional weapons systems already in the force.

As such, the DoD seeks to be more adaptable to changes in the competitive landscape. We must optimize for dynamic production and capabilities. And in addition to the traditional defense industrial base, we will accelerate the growth of a more diverse, dynamic, and resilient modern defense industrial ecosystem.

To date, the federal government has enacted industrial policies that guide the NDIS. This includes a range of Executive Branch policy actions. For instance, Executive Order (EO) 13806 called for policies that promote a vibrant domestic manufacturing center, a vibrant DIB, and a resilient domestic supply chain, and the more recent EO 14017 called for action to strengthen America's supply chains. Additionally, EO 14028 emphasized the need for the private sector must recognize and continuously adapt to the constantly evolving cyber-threat to ensure products are built and operate effectively, while ensuring that critical information and technologies are protected. In the international capital and trade arena, the Administration released EO 14083 that elaborates and expands on the existing list of factors that the Committee on Foreign Investment in the United States (CFIUS) considers when reviewing transactions for national security risks. Complementing this CFIUS reform, EO 14105 regulates outbound investments in which United States capital is being invested in certain entities within certain countries of concern, and provides a mechanism to limit U.S. investment in adversarial defense economies, limiting those adversaries' ability to compete with the U.S. DIB.

The DoD has taken action to support these executive orders. Since the Supply Chain focused executive order (EO 14017) was issued in February 2021, the DoD has obligated over \$893 million using the Defense Production Act for investments in five critical sectors (kinetic capabilities, microelectronics, energy storage and batteries, strategic and critical materials, and castings and forgings). The DoD will address technological challenges with forward-looking initiatives such as the Industrial Base Analysis and Sustainment (IBAS) program aimed at maintaining the health of vulnerable DoD suppliers and capabilities. Additionally, the DoD maintains the Manufacturing Technology program (ManTech), a DoD investment portfolio that seeks to develop advanced manufacturing processes, techniques, and equipment to develop, produce, and sustain weapon systems, and Additive Manufacturing (AM) Forward, a voluntary compact among large manufacturers to help small suppliers increase use of additive manufacturing. Increased investment in artificial intelligence-powered predictive capability will help the DoD accomplish these technological challenges.

Guided by this first-of-its-kind strategy, the DoD will develop more resilient and innovative supply chains, invest in small- and medium-sized businesses, and strengthen and grow American innovation and manufacturing ecosystems across both the private sector and the government-owned organic industrial base (OIB). DPA, IBAS, ManTech, AM Forward, and similar efforts will bolster and expand America's ability to innovate and produce the warfighting capabilities at a speed and scale that will help guarantee the ability to fight and win in any conflict. We need to shift from policies rooted in the 20th century that supported a narrow defense industrial base, capitalized on the DoD as the monopsony power, and promoted an either/or tradeoffs between cost, speed, and scale. We need to build a modern industrial ecosystem that includes the traditional defense contractors – the DIB –defense primes and sub-tier defense contractors who provide equipment and services, and also includes innovative new technology developers, academia, research labs, technical centers, manufacturing centers of excellence, service providers, government-owned, contractor-operated (GOCO) facilities, and finance streams, especially private equity and venture capital. As we build a modern industrial ecosystem, we remain mindful

of the environment which private industry operates in and look to work with them to tackle adverse impacts which can manifest during change and modernization.

The DoD seeks to catalyze generational rather than incremental change in order to address the critical vulnerabilities in the current industrial base. The contraction of the traditional DIB (both commercial and organic) was a generation-long process and it will require another generation to modernize the DIB. The DoD cannot address the current challenges alone. Defense production and services are part of a vast, diverse, and global ecosystem that draws from technology and manufacturing sectors. Accordingly, building a robust, modern defense industrial ecosystem will require a dynamic effort across the U.S. government to create the legal and policy conditions that allow new entrants into the defense production and services community. We must solicit entrants of all types: large and small, domestic, and foreign, and those with no previous relationship to the DoD or defense production. This will require reinvigoration and the development of new dialogues and relationships. The DoD must consider the impact of government policies and decisions on industry, just as its adherents must appreciate their critical role in providing for the defense of the nation and consider the impact of their business practices on national security.

1.1 STRATEGIC FRAMEWORK

1.1.1 Priorities

The NDS showed that building enduring industrial advantages through a resilient defense ecosystem is imperative, to include supporting our allies and partners with key capabilities to strengthen integrated deterrence. However, today's DIB would be challenged to provide the required capabilities at the speed and scale necessary for the U.S. military and our allies and partners to engage and prevail in a major conflict. Some of this simply reflects total demand. Between 1985 and 2021 — even with the Afghanistan and Iraq conflicts — the Department's budget as a percentage of U.S. GDP shrank from 5.8 percent to 3.2 percent⁵ with corresponding contractions of defense-oriented companies and a reduction of nearly two-thirds of the associated workforce.⁶ Building enduring advantages through a resilient defense industrial ecosystem requires that the DoD optimize for dynamic production and capabilities the nation needs in a cost-constrained environment.

This National Defense Industrial Strategy (NDIS) lays out four long-term priorities to serve as guiding beacons for industrial action and resource prioritization in support of the development of a modern industrial ecosystem that supports the nation's defense. The overarching goal is to make the industrial ecosystem dynamic, responsive, state-of-the-art,

⁵ Under Secretary of Defense (Comptroller). National Defense Budget Estimates for 2023, July 2022. (Table 7-7, Pages 294-296)

⁶ Congressional Research Service. The U.S. Defense Industrial Base: Background and Issues for Congress, October 13, 2023 (Page 5)

resilient, and a deterrent to our adversaries. This NDIS seeks to achieve in four critical areas:

- Resilient Supply Chains
- Workforce Readiness
- Flexible Acquisition
- Economic Deterrence

1.1.2 Challenges

Achieving our priorities depends on the numerous stakeholders in national security and the defense industry – executive branch departments and agencies, government owned facilities, traditional defense contractors, non-traditional companies, and our global allies and partners—and requires effective collaboration to surmount formidable sets of often complex technical, manufacturing, and logistical hurdles. To realize these 21st century industrial priorities, the Department will need to address systemic challenges:

- **Underutilization of Multi-Use Technologies:** DoD currently underutilizes innovations and advancements originally developed for non-military purposes that could be quickly and cost-effectively adapted for military use.
- **Inadequate Workforce:** The labor market is falling short of the number of workers with the right skills to meet defense demand and drive innovation at all levels as baby boomers retire, and younger generations show less interest in manufacturing and engineering careers and less preparation for modern manufacturing jobs.

- **Inadequate Domestic Production:** DoD's overreliance on single or adversarial foreign sources for key materials and production capacity is the result of prolonged cost-driven offshoring that has been pervasive across the U.S manufacturing sector, uncertain DoD funding, and disincentives to modernize manufacturing processes or maintain excess capacity.

AUKUS: An Industrial Base Opportunity Brings Challenges

On September 15, 2021, the leaders of Australia, the United Kingdom, and the United States announced AUKUS, a new trilateral security partnership. AUKUS is a generational opportunity for all three nations to enhance capabilities, improve interoperability, and strengthen Integrated Deterrence to promote a free and open Indo-Pacific region and support an international order that respects the rule of law, human rights, and the peaceful resolution of disputes free from coercion.

AUKUS is organized according to two "Pillars." Pillar I centers on Australia's acquisition of a sovereign conventionally armed, nuclear-powered attack submarine capability. Under Pillar II, Australia, the United Kingdom, and the United States will develop and field joint advanced military capabilities to promote security and stability in the Indo-Pacific region.

Delivering on the promise of AUKUS illustrates the myriad issues facing our national systems and industrial bases:

- Workforce issues in all three nations
- Mechanisms to share CUI and classified information with industry and foreign partners
- Interoperability with allies and partners
- Navigating national exportability regulations
- Build-in flexibility to expand partnership to other nations in future
- Lengthy national acquisition processes and timelines
- Challenges coordinating joint requirements without scope creep

Addressing these challenges is crucial, not just for the success of AUKUS, but to meet the United States' pacing challenge more broadly.

- **Non-Competitive Practices:** Since the Cold War, international trade liberalization combined with non-competitive policies by our adversaries (e.g., unfair subsidies, dominance-driven acquisitions, hidden ownership, flouting trade agreements) have harmed U.S. and allied defense-related industry. This has included the inadvertent transfer of critical technologies to our competitors and adversaries.
- **Long Lead Times and Sub-Par Readiness:** Many elements of the traditional DIB have yet to adopt advanced manufacturing technologies, as they struggle to develop business cases for needed capital investment. This directly impacts DoD's ability to reduce manufacturing lead times and lifecycle costs, and to increase readiness.
- **Fragility of Sub-Tier Suppliers:** Sub-tier suppliers can sometimes operate on narrow profit margins, making them susceptible to cyclic demand and shifts in defense budgets. This affects the ability of sub-tier suppliers to remain in the defense market, with potentially outsized downstream consequences for defense industrial capacity and production lead-times.
- **Lack of Market Share, Over Customization, and Obsolescence:** DoD is not a large player in most industrial markets. DoD's low volume buying patterns, lengthy periods between modernization, and often unnecessarily over-customized design specifications have combined to make DoD an unattractive customer, especially for smaller businesses.

- **Instability of Procurement:** Several factors, including changing priorities, program cancellations, compliance burdens, funding challenges, and technology obsolescence, have disincentivized the traditional DIB to maintain production capacity beyond short-term projections of defense demand.
- **Funding Uncertainty and Constraints:** DoD budget uncertainty, fiscal year spending constraints, and political factors have adversely impacted DoD's ability to ramp up traditional DIB capabilities (the overwhelming majority of which are private sector suppliers) to provide an extra margin of production capacity, to modernize, and to replenish inventories in a timely manner. Lapses in appropriations exacerbate these challenges, increasing budget uncertainty, impacting operational planning and coordination as well as morale, and dampening ally and partner confidence in the United States. Continuing resolutions also compound funding challenges: they do not allow new starts for contracts or programs, cause havoc on recruiting, retention, and personnel moves, and severely impact military readiness.
- **Limited Visibility of International Ally and Partner Requirements:** As we seek to improve planning for delivery of military capabilities to international partners and to stabilize critical supply chains, it is imperative that visibility of partner requirements – with a view to operational use rates – and DoD contracting timelines be improved to gain maximum leverage in the global market.

1.1.3 Approach

The purpose of this National Defense Industrial Strategy is to identify how to develop an industrial ecosystem that provides a sustained competitive advantage to the United States over its adversaries. This strategy outlines why the modern, 21st century defense industrial ecosystem contributes to the NDS objective of Integrated Deterrence by organizing, establishing, and building the foundational elements of military capability. In building these foundational elements, the United States sends a message of reassurance to our international allies and partners and of warning to our adversaries.

Building on the strategic framework, this NDIS outlines four priorities that will catalyze the changes needed to build a modern defense industrial ecosystem. Each of the four priorities has associated actions. This strategy will describe the priorities, organized around the long-term actions that optimize flexibility and dynamic capabilities as we build this ecosystem, and the risks of not achieving these actions.

2 PRIORITIES

2.1 RESILIENT SUPPLY CHAINS

2.1.1 Summary

Priority Defined: The DIB can securely produce the products, services, and technologies needed now and in the future at speed, scale, and cost.

Resilience, as defined in the 2022 National Defense Strategy, is the ability to withstand, fight through, and recover quickly from disruption⁷. Dynamic production is primarily concerned with managing production processes and capacities to meet changing war fighter and ally and partner demands at speed and at scale. The relationship between resilient supply chains and dynamic production lies in their shared goals of adaptability, responsiveness, and scalability. The near-term efforts of the interagency Supply Chain Disruptions Task Force (SCDTF) have helped to break down silos and achieve new forms of collaboration between Federal departments and agencies and with allies and partners,

The War in Ukraine and Its Implications for Stockpiling and Production

The Russian Federation's war in Ukraine revealed that current U.S. and allied weapons stockpiles are insufficient. Further, our defense industrial capacity to rapidly replace weapons lacks the speed, depth, and agility to replace spent stocks in a suitable timeframe. Prior to the Russian Federation's invasion of Ukraine, weapon stockpiles and production were only sufficient to meet scripted training allocations and limited, periodic increased expenditures for combat operations. This modest demand, along with recent market dynamics, drove companies to divest excess capacity due to cost. This meant that any increased production requirements would require an increase in workforce hours in existing facilities—commonly referred to as “surge” capacity. These, in turn were limited further by similar down-stream considerations of workforce, facility, and supply chain limitations.

As the United States supplied Ukraine with weapons our domestic stockpiles were quickly drawn down to a concerning level. This drove calls for increased production, calls that quickly exceeded and exposed the limitations of the industrial base's production capacity as well as its inability to scale production quickly.

enabling timely action to address supply chain disruptions. Long-term efforts, however, require further steps to institutionalize supply chain resilience throughout the DIB, DoD, and extend through the USG and allies and partners.

The DoD must balance needs for speed and scale with cost and requires a resilient, healthy, diverse, dynamic, and secure supply chain to ensure the development and sustainment of capabilities critical to national security. Currently, the health of sub-tier suppliers, manufacturing capacity, and lack of visibility into our critical supply chains create unique challenges that must be addressed to meet national security objectives. This is a particularly acute issue for small businesses who face various obstacles in helping DoD meet its challenges. Unreliable cash flow to small businesses makes the DIB more fragile and less secure and this is driven by a range of issues from appropriation delays to commonly used contracting practices. Regulations and business practices can be difficult to understand, costly to implement, and in a myriad of ways often create barriers to doing business with DoD. Some of these barriers include confusing points of entry into defense markets, improper bundling and consolidation of contracts, and convoluted regulations. These barriers strain the relationship between the DoD and small businesses. By working

⁷ 2022 National Defense Strategy of the United States, October 27, 2022 (Page 8)

with both large and small businesses and more strategically utilizing the Organic Industrial Base (OIB), the DoD will achieve a more resilient, modern industrial ecosystem that is economically and environmentally sustainable, receives predictable demand signals, and does not depend on adversarial foreign sources of capital, technology, raw materials, and critical inputs.

Ensuring the health of sub-tier suppliers is crucial to a healthy, diverse, and modernized DIB. The DoD must explore ways to better assess the health of the subcontractor industrial base, while at the same time applying the full range of authorities and opportunities available to develop innovative acquisition techniques that strengthen mechanisms to ensure prime contractors are accountable for meeting their small business subcontracting plans. The DoD will continue accelerating payments to small businesses and seek ways to incentivize large prime contractors to do the same with small business subcontractors, to include assessment of ways to address slow cash flow through existing accounting practices and business systems.

In addition to enabling integration of small businesses, the DOD must leverage the USG-owned OIB⁸ which complements the commercial DIB by providing a ready and controlled source of technical competence to support the force structure and requirements identified by strategic and contingency plans. These core logistics capabilities are those necessary to support reconstitution in a national emergency or contingency requirement. The OIB acts in several important roles from manufacturing items such as gun-tubes, to producing explosives, propellants, and munitions, to providing depot-level maintenance for complete rebuilds on such items as aircraft, ground vehicles, and engines, to major overhauls on nuclear-powered submarines and aircraft carriers. The OIB also sustains older platforms that are not profitable to the private sector. The OIB further provides rapid surge capability and capacity to support contingencies, and it is revitalized and enlarged when greater sustained commitment is called for, as in the present threat environment. OIB infrastructure has gradually degraded over time, with many critical facilities dating to World War II or before, and depot equipment often becoming obsolete. This lack of modernization has impacted cycle times, depot efficiency, and capacity. While the Military Services are modernizing OIB facilities and tools, these efforts will require substantial resources to meet the demands of future warfighter needs. For example, the Army is preparing to invest \$4.5 billion over the next 15 years to modernize its OIB capabilities. This will be similar and complementary to the substantial investments required to modernize commercial DIB facilities and capabilities.

Actions to Achieve Resilient Supply Chains:

- Incentivize industry to improve resiliency by investing in extra capacity
- Manage inventory and stockpile planning to decrease near-term risk
- Continue and where needed expand support for domestic production

⁸ The Organic Industrial Base (OIB) includes a network of maintenance depots, shipyards, fleet readiness centers, air logistics complexes, manufacturing arsenals, munitions plants, and software engineering activities.

- Diversify supplier base and invest in new production methods
- Leverage data analytics to improve sub-tier visibility to identify and minimize strategic supply chain risks and to manage disruptions proactively
- Engage allies and partners to expand global defense production and increase supply chain resilience
- Improve the Foreign Military Sales (FMS) process
- Enhance industrial cybersecurity

2.1.2 Actions

2.1.2.1 Incentivize Industry to Improve Resiliency by Investing in Extra Capacity

Spare production capacity refers to the excess capacity a company or organization maintains beyond its current production needs. This capacity can be essential for accommodating increased demand, including demand from allies and partners, handling unexpected disruptions, or supporting growth. The key components of spare production capacity are physical infrastructure (production facilities, machinery, storage space to support increased production), workforce (available and flexible pool of skilled labor), input materials (inventory, stockpiles, supply), cyber defense and protection, and management systems (demand, supply chain, production, quality assurance, risk/scenario, optimization, financial). Technological modernization can confer production flexibility, allowing rapid conversion from one production item or type to another; and bring greater production output and logistics throughput. Developing spare production capacity can include diversifying suppliers.

Encouraging defense suppliers to build substantial spare production capacity requires a coordinated effort by industry, Congress, DoD, and other federal departments and agencies; a public recognition of the associated burden to the taxpayer and the economy itself; and a broad acceptance of the defense industry, including our global industrial partners, as vital for national defense. Congress can explore allocating additional funding for contracts and other incentives (tax incentives, regulatory relief, long-term contracts) aimed specifically at building and maintaining spare production capacity. Such funding can be used to modernize and expand facilities and develop flexible production. The DoD will seek to establish risk-sharing mechanisms and technology-sharing structures to jointly fund, develop, and secure spare production capacity. The DoD will also plan for spare production capacity needed and to provide oversight authority to ensure successful development and sustainment follow-through.

2.1.2.2 Manage Inventory and Stockpile Planning to Decrease Near-Term Risk

Increase Stockpiles of Strategic and Critical Materials: The DoD maintains stockpiles of some strategic minerals, critical chemicals, medical supplies, critical parts, and essential technology. These inventories and stockpiles act as shock absorbers for the supply chain and help to mitigate near-term risks, including from unanticipated demand spikes or supply chain disruptions. However, recent geopolitical events have spotlighted gaps in national stockpiles and challenges in replenishing existing ones. To ensure that we can achieve our national security objectives, the Department will embrace an expanded approach to

stockpile and inventory planning. Working with industry, the DoD will identify and establish stockpiles of the critical parts, finished goods, and commodities needed to meet production requirements for conducting sustained campaigns against adversaries. In addition, the DoD will identify stockpiling requirements for critical minerals and critical components necessary to continue production in cases where international conflict or crisis may inhibit normal functioning of the supply chain. The essential role of these stockpiles will be to mitigate supply chain vulnerabilities and ensure the military's operational freedom and effectiveness.

Ensure Effectiveness of Ad Hoc Working Groups Tasked with Rapidly Expanding Production and Building Inventories: DoD production- and capability-focused working groups bring leaders and subject matter experts from across the DoD, other agencies, and industry together to play a crucial role in mitigating critical near-term defense production and supply chain risks. The DoD and other organizations have done critical work with ad-hoc committees to coordinate supply chains through a network of symbiotic relationships with commercial and government-owned suppliers and manufacturers. DoD will regularly evaluate the efforts of these working groups to ensure their utility. These evaluations will aid in providing a comprehensive view of the relevant supply chains to confirm whether producers are making appropriate prioritization decisions and acting to avoid production bottlenecks and disruptions. They will also aid in identifying inventory shortfalls whether due to shortages of source materials, production capacity or capability constraints, acquisition issues, or logistics management mechanisms. Additionally, the DoD will establish a top-down common methodology to calculate source material availability and upstream production requirements, including capacity requirements. This will support effective and timely stockpile and inventory replenishment and downstream production goals, particularly as material requirements cross multiple production efforts or require prioritization of critical and limited materials.

Joint Production Accelerator Cell (JPAC)

JPAC spearheads efforts to increase munitions, weapons platforms, and other materials production rapidly by coordinating across the Department and with other agencies and production partners. JPAC is the successor to the Munitions Industrial Deep Dive (MIDD) organization that was formed to respond to the Ukraine crisis. One of JPAC's major innovations has been to systematically extend Multi-Year Procurement (MYP) acquisition to non-traditional items, and to utilize MYP in conjunction with Large Lot Procurement (LLP) methods. MYP and LLP combine to speed up production with existing infrastructure immediately to increase manufacturing capacity over longer windows, all while retaining flexibility.

2.1.2.3 Continued Support for Domestic Production

Promote Accelerator Programs to Foster Innovation: DoD accelerator programs like the Defense Innovation Unit (DIU) and the Rapid Innovation Scalable Enterprise (RISE)⁹ speed the development and production of emerging technologies and products, such as autonomous systems, quantum technology, artificial intelligence, and advanced materials that can serve the needs of both the military and the civilian economy. They do so by fostering collaboration between these typically nontraditional companies and established

⁹ RISE is the new name for the Rapid Innovation Fund (RIF) established in the FY2011 NDAA under section 1073.

contractors, research institutions, and government agencies for focused problem solving with clearly defined objectives and address painpoints that can limit integration and scale. The Department will seek opportunities to expand these programs.¹⁰ Since many defense technologies require extended research, development, and testing timelines, the DoD will also consider longer program durations to accommodate the unique, lengthy, and costly challenges of defense innovation and post-program support, such as access to follow-up funding, business development opportunities, and continued mentorship. DoD will continue to facilitate non-programs of record as part of the FMS program to provide allies and partners with relevant priority capabilities to support their own national security needs.

Deploy Innovative Funding Mechanisms to Revitalize the OIB: The OIB is the network of U.S. government-owned defense industrial facilities including both government-owned, government-operated (GOGO) and government-owned, contractor-operated (GOCO) facilities. The OIB serves two primary purposes: (1) production of items such as missiles, munitions, and gun tubes, that are not economical for private enterprise to manufacture; and (2) depot-level maintenance, typically requiring complete overhaul, including armored ground systems, sea-going ships, and aircraft.¹¹ Congress is funding the recapitalization and modernization of Army and Navy OIB missiles and munitions production plants, all the Services' maintenance depots, and the Navy's shipyards using innovative funding solutions.¹² The strategy to improve OIB infrastructure is in its early phases and is regenerating required capacity and capability and will guide the Department as it works with Congress to fund the full modernization and resourcing of OIB infrastructure, process improvements, and workforce. DoD will work to establish a better understanding of the conditions that cause long-term modernization programs to encounter unexpected increases in cost estimates and schedule delays and exercise patience accordingly.

2.1.2.4 Diversify Supplier Base and Invest in New Production Methods

Expand Relationships with Companies and Industries not Traditionally in the DIB:

Today America's has unique economic and technological advantage in information technology, advanced analytics, materials science, and advanced fabrication technologies, as compared to the manufacturing capabilities of the Machine Age that led to our victory in

¹⁰ While not a complete list, at the Department-wide level some of these programs include the Defense Innovation Board, the Defense Innovation Unit (DIU), the Office of Strategic Capital (OSC), the Services application laboratory programs, mentor programs pairing start-ups and established contractors, and the Rapid Scalable Enterprise (RISE). Each of the Military Departments have additional programs aimed at addressing this gap as well.

¹¹ In addition to these two primary functions, the OIB fields capabilities that blur into prototyping, testing, and pilot production (small scale production which is then licensed to commercial manufacturers for large-scale production). Further, it is increasingly involved with the production, stockpiling, and management of critical chemicals, particularly as it relates to energetics used in propellant and explosives. OIB facilities also safely dispose of conventional munitions that are beyond their useful life and, historically, of chemical weapons that were banned by convention.

¹² Certain OIB capabilities and capacities are presently being rapidly restored. These rapid recapitalization and modernization efforts have employed innovative "hybrid model" funding, involving substantial multi-year direct appropriation commitments to pave the way forward to meet the current and anticipated threat environment.

World War II. An important aspect of this change in where our advantage lies is that the era where technological breakthroughs were primarily dependent on government research and development funding is in the past. Some of the advanced capabilities that the Department would like to leverage to support warfighters can come from the commercial sector. Commercial entities now make significant investments in advancing capabilities in critical technology areas such as artificial intelligence, cloud computing, and biomanufacturing. Many of the companies or organizations engaged in these areas are not traditionally considered part of the defense industrial base. Additionally, there are businesses from socio-economic categories that are underutilized in the DIB.¹³ Data from the Small Business Administration (SBA) shows that federal contracting to small businesses owned by underrepresented socio-economic groups accounts for less than 10% of all federal contracting dollars. These suppliers come from diverse industries and can bring technological, production, and process advancements to the defense sector. Expanding services and industrial capabilities carries significant investments and requires access to materials and market development. To leverage these nascent relationships and the opportunity for capability and capacity growth, DoD will build and deepen relationships with commercial industries not traditionally involved in defense work. Not only will working with these nontraditional suppliers broaden the DIB, but it will also foster competition within the defense market.

Mitigate Cybersecurity Costs of Entry to Work in the Defense Industrial Ecosystem:

High barriers to entry disincentivize the types of smaller and/or sub-tier suppliers which help to diversify and make the industrial base more resilient from doing business with the DoD. Contracting with DoD also requires small businesses to incur additional costs, such as maintaining appropriate cybersecurity measures. These costs, which can more easily be borne by larger firms, can dissuade smaller companies from participating in the DIB. The DoD will seek to improve communications and outreach through public-private partnerships so that small businesses are aware of not only DIB cybersecurity regulations, policies, and requirements but also available DoD and industry cybersecurity services and support. The Department is committed to reducing barriers to entry for small and medium-sized businesses to include impediments associated with implementing and maintaining cybersecurity. The DoD, in collaboration with the DIB, will seek to identify opportunities so that commercial cybersecurity services and solutions can better address the needs of small businesses.

The Department will explore opportunities to expand programs that mitigate costs of entry for promising, small and non-traditional businesses that improve DoD's technology edge and capabilities. Examples of these programs and offices include the Defense Production Act (DPA) loan and loan guarantee programs; the Office of Strategic Capital; Readiness and Environmental Protection Integration Program (REPI); DoD DIB Cybersecurity Program; Resilience Project Funding; Mentor Protégé Program (MPP) and APEX

¹³ Such as business in HUBZone areas, Small Disadvantaged Businesses (SDB), Service-Disabled Veteran Owned Small Businesses (SDVOSB), Women Owned Small Businesses (WOSB), etc.

Accelerators to help small businesses with technical and business developmental assistance, and programs to help DoD-focused small business with design and production such as RISE. Additionally, the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs invest more than \$1 billion annually in small business technology.¹⁴ These programs can, in connection with mentor programs, help small business to navigate qualification and be worthwhile barrier reduction programs.

Promote Investment in Advanced Manufacturing Automation: Advanced manufacturing automation streamlines and compresses development and production processes, reduces human intervention, lowers unexpected downtime, and improves overall manufacturing performance. Today's advanced manufacturing automation is the result of decades of symbiotic interactions between the public and private sectors and separate independent private sector-driven advances. Some elements of the DIB, however, have yet to adopt advanced manufacturing technologies, whether due to the so-called post-Cold War "peace dividend" industry atrophy, offshoring, or redirection of available investment capital. Through new initiatives like Advanced Manufacturing (AM) Forward as well as continued work in advanced manufacturing applications in production and sustainment of key components, the DoD seeks to produce more advanced technologies in the U.S. through investments in regional manufacturing ecosystems. DoD will expand efforts to incentivize, invest in, and otherwise promote the use of advanced automation technologies by defense suppliers to reduce total life cycle costs and increase readiness, and, as appropriate, to fill workforce gaps.

2.1.2.5 Leverage Data Analytics to Improve Sub-Tier Visibility to Identify and Minimize Strategic Supply Chain Risks and to Manage Disruptions Proactively

Supply chain visibility is the ability to track parts, materials, and services from prime contractors back to sub-tier level suppliers, and ultimately sources—effectively from raw materials to the end-product. This includes the associated transportation and warehousing logistics chain for the prime contractor and their suppliers. The goal of supply chain visibility is to better manage the DoD's supplier base by reducing the effect of disruptions on the DoD supply chain and ultimately, military readiness. In a 2022 report, the DoD acknowledged that as its supply chain became more global, prime contractors lost sight of their own sub-tier supply chains and faced the risk of sourcing resources from potential adversaries. Furthermore, the pandemic demonstrated that seemingly minor disruptions in the DoD's supply chain can cause massive ripple-effect bottlenecks owing to limited supply sources. In recognition of this limited visibility into its sub-tier supply chains,¹⁵ the

¹⁴ SBIR and the STTR are coordinated by the United States Small Business Administration, an independent agency of the United States government that provides support to entrepreneurs and small businesses. The main difference between the SBIR and STTR programs is that the STTR program requires the company to have a partnering research institution which must be awarded a minimum of 30% of the total grant funds.

¹⁵ Securing Defense-Critical Supply Chains; An action plan developed in response to President Biden's Executive Order 14017, February 2022. Page 18

DoD initiated efforts to ensure supply chain visibility, particularly in sub-tiers, and intends to further this capability throughout all tiers of the supply. DoD will leverage this greatly expanded supply chain visibility to mitigate risks and to manage disruptions proactively, aggressively, and systematically. Additionally, DoD recognizes the critical role played by defense primes in bringing sub-tier suppliers into the defense production fold and will work collaboratively with them to achieve enhanced supply chain visibility and function. Complementing greater supply chain visibility, the DoD will also improve the sharing of supply chain risk indicators across the DoD and the interagency where appropriate. This can help establish methods for the Department and the whole of government to better share identified supply chain risk indicators with industry.

2.1.2.6 Engage Allies and Partners to Expand Global Defense Production and Increase Supply Chain Resilience

The global activity of pacing threats increasingly requires a global approach to defense industrial relationships, concerns, and competition. International allies and partners have their own robust defense industries and will continue to be a cornerstone of the DoD's concept of Integrated Deterrence. Indeed, the global system of alliances and partnerships is central to the NDS, which calls to incorporate allies and partners at every stage of defense planning. Such linkages and relationships will continue to be a cornerstone of Integrated Deterrence in resisting and, if necessary, defeating known and emerging threats. However, since February 2022, we have uncovered material gaps in the ability of this international DIB to rapidly scale production. Our global supply chains are critical components of our defense industrial ecosystem, yet they are vulnerable, particularly in their sub-tiers. Developing secure alternative sources can involve years-long lead times to reach production scale. Proactively developing, growing, and sustaining multiple, redundant, production lines across a consortium of like-minded nations is imperative for the U.S. to ensure adequate production capability and capacity while mitigating exposure to supply disruptions or changing production requirements. The DoD must develop a networked cooperative framework that enhances defense industrial output by working with allies and partners to de-risk supply chains and advance our ability to engage in co-sustainment, maintenance, repair, and overhaul.

Strengthen International Defense Production Relationships: The DoD must work with allies and partners to enhance security and defense production relationships, through both multilateral and bilateral agreements, to boost defense production, innovation, and overall capability. With these priorities in mind, the United States is collaborating with our allies and partners to develop policies and arrangements that strengthen our respective DIBs and improve supply chain resilience. These mechanisms include Security of Supply Arrangements (SOSAs), which allow the Department and our foreign partners to request priority delivery of defense critical components from each other's respective industrial

“Production Diplomacy”: Multilateral Collaboration Lessons from the Ukraine Response

In the wake of the Russian Federation's unprovoked aggression towards Ukraine, the U.S. led the international community to rally to their defense, organizing recurring engagements of the heads of Ministries of Defense and National Armaments Directors to coordinate support efforts. This body has jump started initiatives to expand ammunition production, establish an international support fund, and organize the delivery and sustainment of critical capabilities.

Building off the global experience of the Ukraine conflict, there may be opportunities to similarly convene the leadership of allied and partner nations within the Indo Pacific, to deepen multilateral collaboration on regional industrial base and manufacturing production challenges. Rather than wait for emergency circumstances, investing in these relationships now will yield fruit, should we collectively face a crisis in coming years. This is the power of production-oriented diplomacy.

Some of the multilateral alliances that have thus far made the greatest impact include the North Atlantic Treaty Organization (NATO), the Ukraine Defense Contract Group National Armaments Directors forum, the National Technology and Industrial Base (NTIB, which consists of Australia, Canada, New Zealand, and the United Kingdom), and AUKUS (Australia and the United Kingdom). It is worth noting that NATO has long recognized that a strong defense industry across the NATO alliance, including greater defense industrial cooperation with Europe and across the Atlantic, is essential to delivering required capabilities. Incorporating allies/partners into a more networked or web-like production chain would enable expansion in production, additional capacity for a longer contest, and incentives among regional partners to cooperate in resisting coercion from adversaries.

bases – promoting government-to-government and international industrial cooperation and collaboration. The Department will continue to engage allies and partners globally to increase the number of such enabling arrangements in effect. Moving forward, DoD is committed to strengthening and expanding existing alliances and to forging new partnerships to enable the Joint Force and the forces of our allies and partners to increase capabilities and ensure redundant and secure sources of supplies for future needs.

Build Production Strengths Via Multiple International Collaboration Mechanisms: The DoD must also work with allies and partners to strengthen global supply chains through the multiple mechanisms at their disposal. These include exploring means to aggregate and amplify U.S. ally and partner demand signals for common munitions and weapon systems; minimizing customized solutions where appropriate and standardizing exportability; investing in materiel solutions ahead of foreign demand and beyond Military Service requirements; licensing production of U.S. systems; and expanding foreign defense company production within the United States. Further, the DoD will work with partners and allies to commit to a renewed emphasis on interoperability, interchangeability, and materiel standardization to ensure not only that our forces are interoperable but also that our respective DIBs can be mutually reinforcing.

2.1.2.7 Improve the Foreign Military Sales (FMS) Process

The FMS program is a critical tool used to achieve U.S. foreign policy objectives, as well as strategic outcomes identified in the NDS. As noted above, a central premise of the NDS is that the United States operates by, with, and through its unmatched network of allies and partners. Integrated Deterrence requires close collaboration with allies and partners and deepens interoperability across the full spectrum of capabilities to enable ally and partner militaries to address shared security concerns. FMS has the ancillary benefit of helping to achieve economies of scale by sharing some of the burden of acquisition and sustainment across the lifecycle of defense platforms, which in turn strengthens the global DIB. In an era of increased strategic threats, the Department is committed to improving planning for and the timely delivery of military capability to allies and partners.

To this end, the Department is accelerating the responsiveness of the FMS system, in cooperation with interagency partners, to better meet the global capability requirements of our allies and partners. These measures include: improving the Department's understanding of ally and partner requirements; enabling efficient reviews for release of technology; providing allies and partners relevant priority capabilities; accelerating acquisition and contracting support; expanding DIB capacity; and ensuring broad USG support to improve the FMS process.

The FMS Continuous Process Improvement Board will provide guidance and oversight to identify and implement opportunities for improved FMS planning and processes. To reduce production timelines, the Department will incorporate ally and partner requirements into acquisition and contracting guidance and into ongoing efforts to expand DIB production capacity. The aim is to incentivize DIB investment in production capacity and building surge capability of high-demand, low-supply platforms, systems, munitions, and services informed by total US and allied partner demand levels.

2.1.2.8 Enhance Industrial Cybersecurity

The Department, working with industry, will build upon and improve current regulations, policies, requirements, programs, services, pilots, communities of interest, public-private partnerships, and interagency efforts to address challenges and evolving cyber threats. This effort will be specifically guided by the forthcoming DoD DIB Cybersecurity Strategy.

2.1.3 Illustrative Metrics

Figure AA presents the actions and corresponding illustrative metrics to measure progress against the Resilient Supply Chains priority. Formal metrics will be included in the forthcoming NDIS implementation plan.

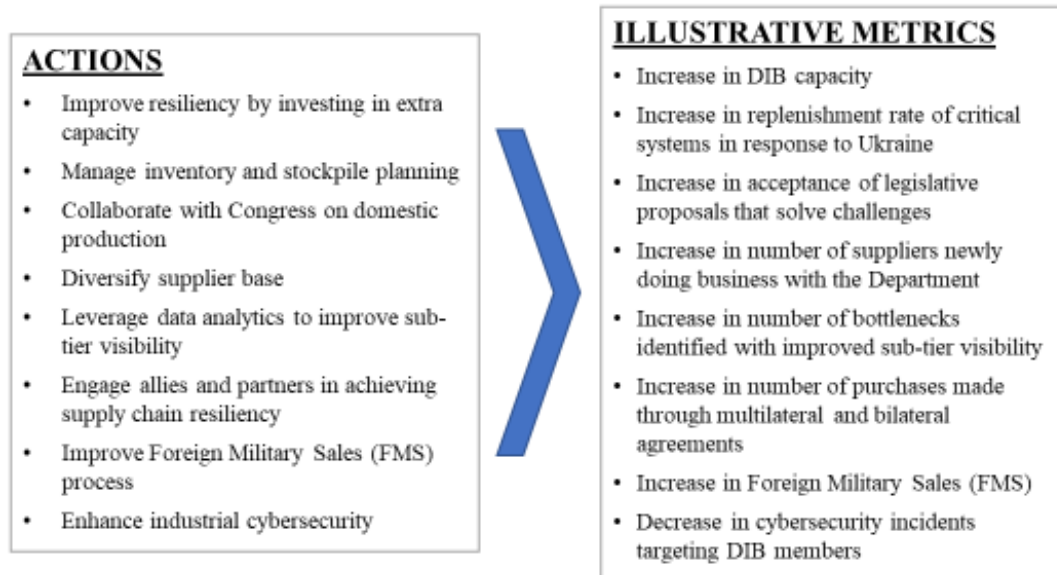


Figure AA: Illustrative metrics aligned to the actions associated with promoting resilient supply chains

2.1.4 Risks of Not Achieving

Inability to Meet the Pacing Challenge: Continuing with the status quo supplier base creates risks for the United States and its ability to adapt to new and emerging threat environments. The supplier base largely consolidated after the Cold War and catered to the unique needs of the Global War on Terror. If the industrial base does not modernize, including through acquisition reform, the defense base and downstream suppliers will struggle to match pacing threats.

Continued Supply and Materiel Shortfalls: If the Department fails to reach its upgraded industrial base goals, the United States and allies and partners will risk greater shortfalls in supply and materiel in future conflicts. These risks will manifest as the inability to produce at scale; to produce needed defense articles within relevant timeframes; and reduced defense industrial effects supporting Integrated Deterrence. The combination of these risks will have a direct adverse impact on the ability of the United States to guarantee our own security and that of our treaty partners and on the ability of partners to sustain or contribute.

Limited Spare Capacity: The risks of not investing in spare production capacity include being underprepared for future materiel requirements and continued loss of existing capacity as private companies are incentivized to seek optimal return on capital.

Fragile Supply Lines: In addition to greater economic costs, sub-tier suppliers can face additional challenges not always present for prime suppliers. “Just-in-time” delivery has created fragility in the production capabilities of many end items, making sub-tier suppliers especially vulnerable.

2.2 WORKFORCE READINESS

2.2.1 Summary

Priority Defined: A skilled and sufficiently staffed workforce that is diverse and representative of America.

Labor continues to be a major challenge for industry as baby boomers retire and younger generations generally show less interest in pursuing manufacturing careers or lack the science, technology, engineering, and math (STEM) skills needed for industrial work. The labor market is falling short of the number of workers with the right skills to meet domestic production demand. This directly affects military readiness. For example, ship maintenance timelines routinely exceed their schedules in part because of labor shortages. These shortages extend from skilled laborers to engineers and other STEM fields needed to drive innovation and capacity development. This will be a challenge as the United States invests in onshoring domestic production through initiatives such as the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act, the Bipartisan Infrastructure Law, and the Inflation Reduction Act.

By fostering workforce development programs, both academic and occupational, the DoD aims to work aggressively to renew interest in industrial jobs and maintain a well-trained and sufficiently staffed workforce to achieve our national defense goals.

To improve forecasting, trend analysis, and the capture of best practices, the Department will engage our international partners to share workforce training and management lessons learned and identify opportunities for enhanced partnerships to meet the industrial demand of a dynamic threat environment. Over the coming months, the Department will also develop a framework that integrates the acquisition and sustainment workforce strategies, building a community of practice that delivers a ready and capable workforce needed to meet and address the challenges identified in this strategy. This will complement and enable the DIB workforce to ensure there are pathways and partnerships between these critical communities to implement the NDIS objectives.

Actions to achieve workforce readiness:

- Prepare workforce for future technological innovation
- Continue targeting critical skill sets in manufacturing and STEM
- Increase access to apprenticeship and internship programs
- Destigmatize industrial careers
- Expand recruitment of non-traditional communities

2.2.2 Actions

2.2.2.1 Prepare Workforce for Future Technological Innovation

Invest in Upskilling and Reskilling Programs: Upskilling or reskilling workers is especially important as manufacturing becomes more dynamic and technologically advanced. With domestic manufacturing retention already low, providing employees with

training opportunities helps boost workplace productivity. In surveys, most CEOs who introduced workforce upskilling reported increased productivity and overall improvement in retention.¹⁶

The Department will look for opportunities to assist companies with upskilling or reskilling workers. By providing incentives to companies that do so, the Department can increase the number of enterprises that invest in employee education and thereby prepare them for and help to ease the way forward with future technological innovation.

Invest in Workforce Pipelines: The DoD's Manufacturing Innovation Institutes (MIIs) connect organizations and activities to better enable affordable, rapid transition and delivery of defense-essential technologies. The institutes' programs provide guidance, workforce development content, and education activities that increase workforce preparedness for advanced manufacturing occupations such as highly skilled technicians, skilled production workers, technical engineers, scientists, and laboratory personnel. In 2021, DoD MIIs benefited over 80,000 participants, including students, educators, and professionals across the nation.¹⁷

DoD will explore expanding investment in MIIs, including supporting public-private partnerships with colleges and universities, high schools, and large and small enterprises.

Submarine Industrial Base (SIB)

The unique characteristics of navy shipbuilding and sustainment levy difficult workforce requirements upon the shipbuilding industry. The shipbuilding and refitting yards have suffered from the same defense spending contraction as other defense producers. However, in the case of the shipbuilding community, there are unique skill sets that require extensive training—such as nuclear welding—that are difficult to acquire outside of U.S. Navy procurement. Furthermore, the overall decline of U.S.-based shipbuilding has reduced the overall market need for shipbuilding expertise.* The combination of these factors has resulted in the domestic shipbuilding industry struggling to maintain an adequately skilled workforce. In 2022, the Navy ended the fiscal year short 1,200 workers across its four shipyards. Notably, there are only two shipyards capable of servicing nuclear systems—which have no civil counterpart—putting additional pressure on the workforce as they require rare but niche skills in its labor pool. The Executive Director for a Program Executive Office noted that over the next ten years, the SIB alone will need to hire 100,000 people at both construction yards and 17,000 people at vendors supporting across the SIB supply chain. These numbers do not take into consideration delivery requirements related to AUKUS, which introduces additional pressure for submarine production and delivery. This shortfall, although an extreme case, is representative of the wider production challenges both the DoD and the 21st century DIB.**

*Shipbuilding History. The Decline of U.S. Shipbuilding. January 21, 2016. Accessed 28 August 2023.

**Defense News. Megan Eckstein. Workforce Woes are Top 'Strategic Challenge' for Navy, Admiral Says. January 31, 2023. Accessed on May 24, 2023.

¹⁶ Upskilling for Shared Prosperity – Insight Report. World Economic Forum and Price Waterhouse Coopers, January 2021. Page 11.

¹⁷ Department of Defense Manufacturing Technology Program. About the DoD Manufacturing Innovation Institutes. Accessed 10 October 2023.

These investments will ensure DoD has the workforce it needs in the future as continued investment will also allow programs to reach more people.

2.2.2.2 Continue Targeting Critical Skill Sets in Manufacturing and STEM

The Department will continue to invest in institutions and programs that support workforce development to address skills gaps in defense-related manufacturing and STEM jobs. As manufacturing innovations such as advanced fabrication and internet-of-things take root and grow in importance and prevalence, they will change the way we work. This places even greater—and accelerating—demand for employees with high-tech skills. Relatedly, workforce training pipelines have decreased as manufacturing has advanced, resulting in a self-perpetuating cycle of atrophy in workforce skill development.

Invest in Industrial Skills: The Department acknowledges that targeting critical skills in manufacturing and STEM cannot be a one-off approach. As a response to this, the National Imperative for Industrial Skills (NIIS) was created. The goals of this initiative are to:

- Promote prestige of manufacturing and related careers while inspiring the next generation;
- Accelerate workers into and through training/development pipelines, at appropriate scale and velocity; and
- Elevate U.S. manufacturing to world-leading status.

By continuing to invest in NIIS and identifying opportunities to replicate successes, the DoD will continue to support worker development programs to meet the needs of the U.S. manufacturing sector.

Build on the Success of Manufacturing USA Network (MFG USA): The Manufacturing USA Network is leading the way in developing the STEM workforce needed to grow the advanced manufacturing sector. The MFG USA institutes collaborate not only with major universities and private sector companies but also with community colleges, local nonprofits, education groups, state governments, and youth groups such as the Girl Scouts. DoD programs such as Project MFG, photonics certificate, IDREAM4D, MEST Center (Microelectronics Security Training Center), and SCALE (Scalable Asymmetric Lifecycle Engagement) were also created to support the talent needed for defense-related manufacturing and STEM jobs.

2.2.2.3 Increase Access to Apprenticeship and Internship Programs

Apprenticeship programs, including those that collaborate with federal facilities (e.g., Oak Ridge National Laboratory), ensure that workers learn in-demand skills utilizing hands-on experience and training. Currently, the DoD has a variety of apprenticeships tailored towards naval warfare, army engineering, and fleet readiness. For example, the Naval Fleet Readiness Center Southwest Apprenticeship program provides on-the-job training combined with related instruction to develop highly skilled, Department of the Navy-oriented, U.S. Department of Labor-certified workers. Apprenticeships are offered from a

high school level to a recent graduate level and represent an opportunity to gain the experience of working for the DoD.

The DoD will prioritize continued investment in critical skill sets through apprenticeships. By expanding engagement with industry, academia, and other private/public relationships, the DoD can boost workforce exposure to the DIB and ensure the workforce pipeline has the critical skill sets that are needed for today and the future. DoD will also work with key interagency partners to identify and collaborate on existing and emerging programs, including with Department of Veterans Affairs, Department of Education, and Department of Commerce.

2.2.2.4 Destigmatize Industrial Careers

The DoD will continue to support programs to showcase opportunities in manufacturing and technology fields with local high schools, colleges, and universities, as we work to change the present stigma associated with being an industrial worker. Too often people believe that these jobs are low-wage, low-skilled, and dangerous, and a poor alternative to non-industrial jobs. In actuality, industrial jobs contribute directly to the national security mission while being interesting and providing stability and competitive wages. Promoting industrial careers early is important to confront negative stereotypes and increase visibility. Educational institutions can address the stigma by showing youth what manufacturing looks like today. For example, AIM Photonics partners with Stonehill College and Bridgewater State University on the Advanced Manufacturing & Integrated Photonics Technician Certificate program. Recent classes placed 100 percent of their students in professional internships and jobs at top manufacturing and photonics companies.

In collaboration with other Federal departments and agencies, the DoD will continue to promote and invest in partnerships with educational institutions to increase awareness of the value of manufacturing and industrial careers.

2.2.2.5 Expand Recruitment of Non-Traditional Communities

Broaden Industrial Workforce through Diversity and Inclusion Efforts: Although industrial base participation among women and minorities has improved, these groups are still underrepresented in the ranks of both ownership and the broader workforce.¹⁸ Lack of diversity indicates that companies may not be targeting diverse groups for employment, which in turn limits the available pool of talent that the industrial base can draw from. Lack of diversity leads to a lack of new ideas and innovation. Diversity, Equity, and Inclusion (DEI) is important to ensure that we have an industrial base that reflects the nation itself. According to a 2022 Department of Labor survey, the overall manufacturing workforce is 29.3 percent female, 78.7 percent White/Caucasian, 10.8 percent

¹⁸ Kwasi Mitchell, Carey Miller, Joe Mariani, and Adam Routh. To be more innovative the DIB needs to be more diverse, Deloitte Center for Government Insights, Deloitte Consulting LLP., 2021.

Black/African American, 7.4 percent Hispanic, and 17.4 percent Asian.¹⁹ In addition to gender and racial gaps in the industrial base, reentry groups also lack representation.

By supporting efforts to expanding representation, the DoD can assist companies in expanding the industrial workforce and creating a workplace that is representative of the United States.

Invest Consistently in DoD Research and Education Program (REP) for Historically Black Colleges and Universities and Minority Serving Institutions (HBCUs/Mis): The untapped potential of underrepresented groups can be crucial, especially as the worker shortage increases. To combat this, the Department recently allocated \$61.7 million to HBCUs and Mis under the REP HBCU/Mis program. Secretary Austin stated that “to sharpen America’s technological edge and to strengthen America’s outstanding military, the Department is committed to investing even more in HBCUs and minority-serving institutions.” The REP aims to:

- Enhance research programs and capabilities in scientific and engineering disciplines critical to the national security functions of DoD;
- Enhance HBCU/MI participation in DoD research programs and activities; and
- Increase the number of graduates, including underrepresented minorities, in science, technology, engineering, and mathematics fields important to the defense mission.

By increasing investments in HBCUs and Mis, the DoD can help expand recruitment for DIB jobs and skillsets to underrepresented groups.

2.2.3 Illustrative Metrics

Figure AB presents the actions and corresponding illustrative metrics to measure progress against the Workforce Readiness priority. Formal metrics will be included in the forthcoming NDIS implementation plan.

¹⁹ Bureau of Labor Statistics. HOUSEHOLD DATA ANNUAL AVERAGES: Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity. 2022. Accessed June 18, 2023.

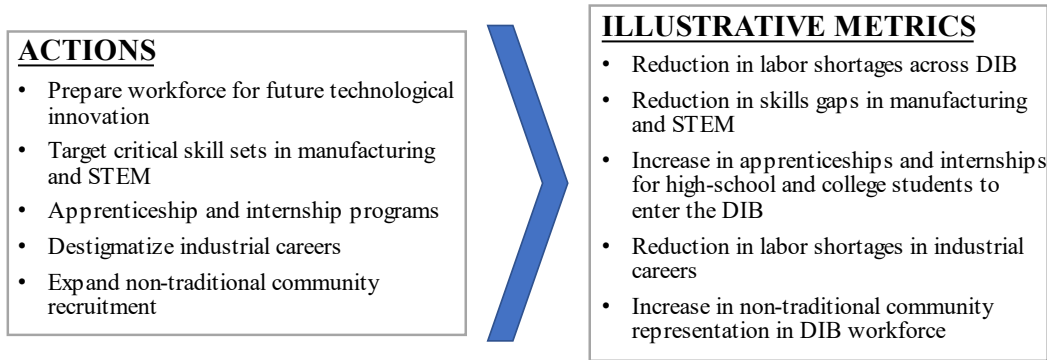


Figure AB: Illustrative metrics aligned to the actions associated with promoting workforce readiness

2.2.4 Risks of Not Achieving

There are several risks associated with failing to achieve workforce readiness:

Inability to Successfully Onshore Critical Manufacturing: One of the biggest challenges for onshoring manufacturing is the existing labor shortage. Without the necessary laborers, companies that return to the United States will not have the workforce needed to be sustainable. Workforce issues can also deter companies from coming back to the United States.

Inability to Compete Globally: Without a skilled and sufficiently staffed workforce, the Department will not be able to compete globally. Our defense capabilities require a skilled workforce to produce goods, build and sustain systems, and conduct research and development.

Reduced Productivity throughout full Supply Chain: Without the necessary number of workers, companies will have trouble meeting their production goals. The inability to meet production goals, especially those important to the DIB, directly affects systems and products that are important to our national security.

Limited Innovation: A diverse workforce ensures a diverse set of ideas. Studies have shown that diversity increases innovation. Inclusive hiring practices and a diverse work culture are important for building workforce readiness.

2.3 FLEXIBLE ACQUISITION

2.3.1 Summary

Priority Definition: Acquisition strategies that strive for dynamic capabilities while balancing efficiency, maintainability, customization and standardization in defense platforms and support systems. Flexible acquisition strategies would result in reduced development times, reduced costs, and increased scalability.

The Russian Federation's full-scale invasion of the Ukraine highlights how protracted attritional conflicts can rapidly deplete military resources. Accordingly, existing U.S. and

allied defense production capacity are insufficient to meet future operational requirements. These concerns are amplified by the prospect of major competition and conflict. Furthermore, the choice of weaponry and supporting systems for such conflicts can vary.

The DoD seeks to use a flexible acquisition approach to industrial planning where the DoD will strive to balance customization, production efficiency, and timing. Properly executed, flexible acquisition is crucial for scaling production swiftly and adjusting the production mix to achieve and maintain enduring advantage. A shift to flexibility will allow the DoD to optimize for dynamic production and capabilities that strengthen defense supply chains and bolster a modern industrial ecosystem.

Prioritizing flexible acquisition strategies addresses inappropriate customization, which occurs when product acquisition requirements are insufficiently defined. This is often associated with design changes that increase capability or overcome perceived design flaws. Other causes can include mission or technology creep during protracted development cycle times and underestimating difficulty of change requests.

Delivering effective capabilities to the warfighter requires the development and maintenance of customized systems and platforms maintained by both the commercial sector and DoD's organic industrial base (OIB). Inappropriately customized systems have lower battlefield and operational utility and are more expensive and difficult to maintain. Therefore, the DoD seeks an appropriate level of customization that can balance efficiencies and speed of fielding from commercial off-the shelf (COTS) capabilities with the resilience, scale, , and effectiveness through the life cycle of platforms. It also could contribute to better adaptation to emerging threats, protection against obsolescence of specific systems or parts, along with better logistics and maintenance capabilities.

Flexible Acquisition relates *strictly* to DoD aiming to acquire an intelligent, balanced mix of platforms and systems, together with the benefits that accrue. It is vital to establish that the term Flexible Acquisition does not directly call for broad-based acquisition reform, which, while there is a periodic need for it based on shifting exigencies, is beyond the scope of this strategy.

Actions to Achieve Flexible Acquisition:

- Broaden platform standards and interoperability
- Strengthen requirements process to curb scope creep
- Prioritize off-the-shelf acquisition where applicable and reasonable
- Seek appropriate access to Intellectual Property (IP) and data rights to enhance acquisition and sustainment
- Continue to support acquisition reform
- Update industrial mobilization authorities and planning to ensure preparedness

2.3.2 Actions

To mitigate the risks of unnecessary customization, the DoD seeks an intelligent balance between customization and standardization. Standardization is the process of developing and agreeing on (by consensus or decision) uniform engineering criteria for products,

processes, practices, and methods for achieving compatibility, interoperability, interchangeability, or commonality of materiel.²⁰ Increasing standardization allows for economies of scale, streamlined production processes, and greater interoperability. It allows the DoD to use solutions and innovations being developed in commercial industry. Carefully managed customization addresses specific mission needs without compromising the broader efficiency and effectiveness of the defense sector. Striking this balance is essential for maintaining a strong, adaptable, and cost-effective defense industrial ecosystem that can supply the warfighter with mission-customized systems while mitigating downstream reliability, availability, and maintainability problems.

2.3.2.1 Broaden Platform Standards and Interoperability

Promote Open Architecture: The Department will encourage the adoption of open architecture principles in the design and development of platforms. Open architecture allows components to be modular and interchangeable, making it easier to integrate new technologies and updates across different systems.

Deploy and Adopt Industry Standards: The Department will leverage existing industry standards where applicable, rather than operating in isolation and inventing new standards. Utilizing widely accepted industrial standards will facilitate and simplify integration and production efforts.

Incentivizes Requirement for Interoperability and Exportability: The Department will provide incentives for defense contractors to develop and produce interoperable and exportable systems. For future acquisitions and projects, it will recommend that concise interoperability and exportability requirements be explicitly stated through the acquisition process. DoD will work with defense contractors to communicate the importance of interoperability requirements which could increase the breadth of systems that a contractor could work on, thereby opening more lines of business for individual contractors.

Invest in Research and Development: The Department will invest in research and development efforts that focus on enhancing interoperability among different platforms. This may involve advancements in communication technologies, data analytics, and artificial intelligence to improve coordination and decision-making.

Global Partners and Allies in Context: Standards, modularity, and interoperability are crucial elements that enable mutual support and collaboration within the global defense industrial ecosystem. These benefits include resource sharing, research, manufacturing, expertise exchange, technology transfer, and the development of common platforms. By working together effectively, we and our allies and partners can address capacity and

²⁰ Department of Defense. Manual 4120.24: Defense Standardization Program (DSP) Procedures. 15 October 2018.

capability gaps, enhance production capacity and capabilities, boost economic advantages, and reinforce alliances.²¹

Small Business and Non-Traditional Suppliers in Context: Standards, modularity, and interoperability, as well as multi-year contracts, can also factor in helping small businesses and non-traditional suppliers work with DoD. They reduce barriers to entry by simplifying product development and integration, making it functionally easier and less expensive for these suppliers to participate and compete, and focus on niche areas of expertise and contributing innovations to the broader defense ecosystem. This benefits DoD by reducing the risk of lock-in to a single supplier by allowing small businesses to offer components or systems that can be integrated into larger defense systems, which by extension, and together with multi-year contracts, mitigate business execution risk.²²

Exportable by Design: The Department will encourage the inclusion of exportability features during system design, rather than post-production. The war in Ukraine highlighted the need, not just for interoperability with allies and partners in conflict, but also the technical challenges, increased costs, and protracted timelines when considering exportability after the conclusion of the system development process.

2.3.2.2 Strengthen Requirements Process to Curb Scope Creep

Implement policies aimed at advancing adaptive acquisition reforms: The Department will rigorously implement DoD Instruction 5000.02: Operation of the Adaptive Acquisition Framework.²³ DoD Instruction 5000.02 was issued in June 2022 to ensure that requirements were defined and understood before a program is approved to start system development. It emphasizes the importance of well-defined and properly articulated requirements and the setting of clear milestones throughout the development process. This ensures that sufficient systems engineering analysis is conducted and resource trade-offs are made before the program enters the engineering and manufacturing phases of the Defense Acquisition System. DoD's current policy requires that appropriate trade-offs be made among cost, schedule, technical feasibility, and performance throughout the life of a program. These directives help ensure that the program stays focused and prevents unnecessary changes or additions that could lead to expanded capability requirements.

²¹ See also NDIS Section 2.1.2.6 “Engage Allies and Partners to Expand Global Defense Production and Increase Supply Chain Resilience” of NDIS 2.1 “Resilient Supply Chains”; and NDIS Section 2.4.2.2 “Participate in International Interoperability Standards-Setting Bodies”; and Section 2.4.2.3 “Fortify Alliances to Share Science and Technology” both of NDIS 2.4 “Economic Deterrence”.

²² See also NDIS Section 2.1.2.3 “Continue Collaboration with Congress to Draft Legislation Supporting Domestic Production” subsections “Expand Relationships with Companies and Industries not Traditionally in the DIB” and “Employ Innovative Funding and Procurement Mechanisms” and NDIS Section 2.1.2.4 “Diversify Supplier Base and Invest in New Production Methods” both of NDIS 2.1 “Resilient Supply Chains”.

²³ DoD Instruction 5000.02 Operation of the Adaptive Acquisition Framework. June 8, 2022.

This also covers appropriate change control processes, risk management, continuous review, and stakeholder engagement.

Incremental Development and Advanced Virtual Modeling Methodologies: The DoD will aggressively implement policies aimed at preventing “scope creep” — the gradual additions to capability requirements that change the scope of work in systems development which result in cost over-runs and delayed delivery timelines. Adopting agile and advanced virtual development methodologies can help manage scope creep by breaking development into smaller, more manageable increments or with fewer physical prototypes and greater optimization. This allows for regular review and adaptation to changing requirements without affecting the overall project significantly.

Ultimately, success in preventing undesirable scope creep depends on the implementation of, and adherence to, guidance such as DoD Instruction 5000.02, as well as the ability of program managers and stakeholders to effectively manage changes while maintaining the project focus and objectives.

2.3.2.3 Prioritize Off-the-Shelf Acquisition Where Applicable and Reasonable

The DoD must find the best capabilities to support the warfighter, including commercially available solutions. Commercial off-the-shelf (COTS) procurement brings significant benefit to DoD, including creation and integration of new technology; greater product availability and reliability; reduced acquisition cycle times; lower life cycle costs; increased competition, and an expanded pool of innovative and non-traditional contractors who seek to do business with DoD. While certain DoD requirements cannot be fulfilled by commercial item procurement, commercial solutions are a vital tool to achieve our national objectives.

The United States must seek commercial solutions and technologies from international allies and partners as well. Market research activities should include consideration of the global defense and commercial industry more broadly, factoring in solutions resident in ally and partner nations. The United States does not have a monopoly on innovation and new technologies. Many other national industrial bases have their own strengths and core competencies.

Positive Impact on Innovation and Cost-Effectiveness: The DoD will leverage the advantages of COTS solutions by carefully evaluating how COTS systems may be used on their own, or to augment current capabilities. Embracing COTS solutions can drive faster procurement cycles, as the products are already developed and tested for commercial use. This can translate to quicker access to new technologies and innovations. Additionally, COTS products are often more cost-effective compared to custom-built solutions, potentially reducing overall acquisition costs for the DoD. COTS products also tend to have fewer reliability, availability, and maintainability challenges as there is a market incentive to develop and maintain these products.

Expanded Supplier Base: Encouraging the use of COTS products can encourage new suppliers from the commercial sector to participate in defense procurement. This broadens the DIB by bringing in expertise and capabilities from various non-traditional industries,

thereby fostering competition and reducing reliance on a limited set of traditional defense contractors. The DoD will review the potential for stand-alone utilization of COTS systems or augmentation of other bespoke capabilities using COTS systems. This will make maintenance easier and develop the modern industrial ecosystem by introducing manufacturers and maintainers of COTS systems. The use of COTS systems ensures that new industrial partners have customers apart from the DoD for their commercial viability and can mitigate monopsony-like dynamics between the DoD and the traditional DIB.

2.3.2.4 Seek Appropriate Access to Intellectual Property (IP) and Data Rights to Enhance Acquisition and Sustainment

The DoD will integrate IP planning fully into acquisition strategies and product support strategies to protect core DoD interests over the entire lifecycle and seek to acquire only those IP deliverables and license rights necessary to accomplish these strategies, bearing in mind the long-term effect on cost, competition, and affordability.

To proactively mitigate against IP-based restrictions on competition, DoD will look to use a modular open systems approach (MOSA) to manage proprietary components. MOSA combines system engineering open architecture techniques with open licensing and related legal and business considerations to isolate proprietary technology and prevent overleveraging of limited private investments from undermining return on government investment. MOSA enables the DoD to limit the impact of restrictions on privately developed components by treating those components as technology as proprietary “black boxes” that are described with releasable “form, fit, or function” data and well-defined and described interfaces to the remainder of the system components. This allows other vendors to identify suitable alternatives for the proprietary black boxes, or, if necessary to contract with the OEM for support for those black boxes, limit such sole-source efforts to the black box itself.

Alternatively, or in conjunction with MOSA, DoD will mitigate IP restrictions on proprietary components by negotiating specialized license agreements that better balance the Department’s and vendors’ interests. The Defense Federal Acquisition Regulation Supplement (DFARS) standard license rights or the vendor’s customary commercial license allows and encourages the parties to negotiate specialized license agreements for all data rights scenarios, including technical data and computer software for commercial and noncommercial products, for developmental and non-developmental technologies, or any combination of such characteristics. In all cases, the negotiation of any specialized license must occur through voluntary, mutual agreement of the parties.

Accordingly, the DoD has a compelling interest in entering into such negotiations in a competitive environment to the maximum extent possible, to leverage its market power and incentivize the vendors to enter into agreements that encourage the competitor to develop business models and provide corresponding offers that better balance both parties’ interests in ensuring return on their technology investments, while promoting and enhancing DoD options for increased competition throughout the lifecycle of the program.

2.3.2.5 Consider Greater Use and Policy Reform of Contract Strategies

A flexible requirements process permits changes to allow for technological advances on multiyear development and procurement programs. However, this flexibility must be balanced against other risks such as complexity, transparency and accountability, cost overruns (if poorly managed), limited competition, and administrative overhead. In the current, evolving threat environment, priorities often shift somewhat and traditional contract policies and regulations often involve funding adjustments, competitive procurement principles, compliance, reporting, and oversight. These can and should be applied to mitigate risks but can be adapted to meet speed and agility priorities. For instance, the software acquisition pathway enables DOD to execute rapid and iterative delivery of software capabilities by using modern software development practices combined with existing contracting authorities. The DoD will look to use greater both FAR and non-FAR-based contract types, as appropriate, and work with Congress to modify contracting authorities to align with present defense production priorities.

2.3.2.6 Continued Support for Acquisition Reform

Advance Acquisition Strategies That Elevate the Health of the Industry to High Priority:

The Department will seek to ensure that acquisition approaches consider the health, capacity, and capability of the domestic manufacturing base. Therefore, the Department will pursue acquisition strategies that streamline the process and communicate a sustained and transparent “demand signal” to both domestic and international suppliers. A streamlined and clear acquisition process will enable more businesses to navigate their way into and through the DIB to promote competition and increase diversity. A strong and stable demand signal will allow defense contractors and sub-tier suppliers to make longer-term production and resource allocation commitments—including for capital investment and operating budgets, research and development, manufacturing capacity, procurement of materials, and workforce hiring. Predictable demand will also help mitigate the effects of regulations compliance, security clearances, and other administrative barriers.

DoD will broaden outreach to strengthen public-private partnerships,²⁴ dedicated funding or set-asides, risk-sharing mechanisms (such as “secure by design”) and expanded use of flexible contracting approaches. This will include providing greater support in navigating DoD’s acquisition processes and expanding the use of existing small business programs in non-traditional industry sectors, especially those programs with a history of success working with non-traditional suppliers and new entrants into the DIB²⁵.

Employ Flexible Funding and Procurement Mechanisms: The DoD will seek to expand the use of multiyear procurement (MYP) to create sustained demand signals that will

²⁴ Such as centers of excellence in manufacturing and innovation clusters or hubs in regions with a high concentration of non-traditional suppliers and research institutions.

²⁵ Such as the Mentor Protégé Program (MPP) and APEX Accelerators, which provide guidance to non-traditional entities and new entrants through mentorship and technical assistance, respectively.

promote investment into the capacity of the industrial base, which have typically been reserved for only the most expensive acquisition types, such as procurement of large sea-going Navy ships. MYPs are a step in building a consistent and predictable demand signal that creates more transparency and less risk for both prime contractors as well as more fragile sub-tier suppliers. For example, the FY23 National Defense Authorization Act (NDAA) extended MYPs to support the greatly increased demand for munitions and now includes many low-cost weapons.²⁶ OSD will also work with the Services to identify opportunities to propose MYPs in future budgets.

Orient Acquisition Policy for Aggressive Expansion of Production Capacity: The DoD's acquisition process is a structured series of steps and activities used to acquire goods and services for the U.S. military. Typical peace-time acquisition reform tends to place more emphasis on greater efficiency, cost effectiveness, transparency, and accountability. Today's threat environment, however, necessitates acquisition reform that includes efforts to revitalize the defense industrial base, and potentially, rapid expansion to prepare for pacing security challenges. This will require substantial changes to existing acquisition mechanisms. Correspondingly, there will need to be a change of acquisition mindset that includes increased flexibility and risk tolerances and embracing "fail fast" and similar concepts. Risk aversion must be replaced by aggressive and learning mindsets in both developing and fielding systems underpinned by strong commitments of accountability and responsibility. Crisis period acquisition policy reform tends to favor better resourced defense companies. As such, DoD will work to stimulate industry diversification through focused policy directives to help small businesses navigate the complex defense acquisition process. DoD will work seek to reform acquisition policies that unnecessarily burden or restrain the nation from rapidly attaining a proper, robust defense production posture while simultaneously fostering supplier diversification with a slate of programs referenced elsewhere in this strategy.²⁷ The contemplated acquisition reform also aims to enhance the effectiveness of accelerator programs, described below.

2.3.2.7 Update Industrial Mobilization Authorities and Planning to Ensure Preparedness

To be prepared for future crises, the DoD must have all available tools at hand. Mobilization authorities refer to the legal and regulatory mechanisms that enable the United States government to rapidly expand, reconfigure, and draw on the defense industrial ecosystem in times of national emergency or war. Mobilization planning outlines how the government will work with the defense private sector and how the

²⁶ Pub L. 117:263. James M. Inhofe National Defense Authorization Act for Fiscal Year 2023. Signed into law on 12/23/2022. See sections 125, 811, and 815 for multiyear procurement authorities.

²⁷ Many of the areas ripe for acquisition reform come from the Section 809 Panel, formally known as the Section 809 Panel on Streamlining and Codifying Acquisition Regulations, which was a congressionally mandated advisory panel established in 2016 to review and provide recommendations for reforming DoD's acquisition regulations. The panel touched on policy and process improvements in streamlining and simplifying regulations, modernizing acquisition methods (e.g., category management), reducing acquisition process costs, and advancing professional development for acquisition personnel.

government will operate the OIB during times of crisis to ensure the timely production and distribution of essential materials, equipment, and services to support national security objectives. However, there is nothing rapid about mobilization; it is time and resource intensive. To best posture the government, industry, the Armed Services, and our allies and partners, we need to think now about the steps we can take today to set the conditions for potential mobilization in the future. The DoD needs to act now to set those conditions and consider mobilization requirements, and the associated authorities and plans, to successfully address the threats we face in the 21st Century.

2.3.3 Illustrative Metrics

Figure AC presents the actions and corresponding illustrative metrics to measure progress against the Flexible Acquisition priority. Formal metrics will be included in the forthcoming NDIS implementation plan.

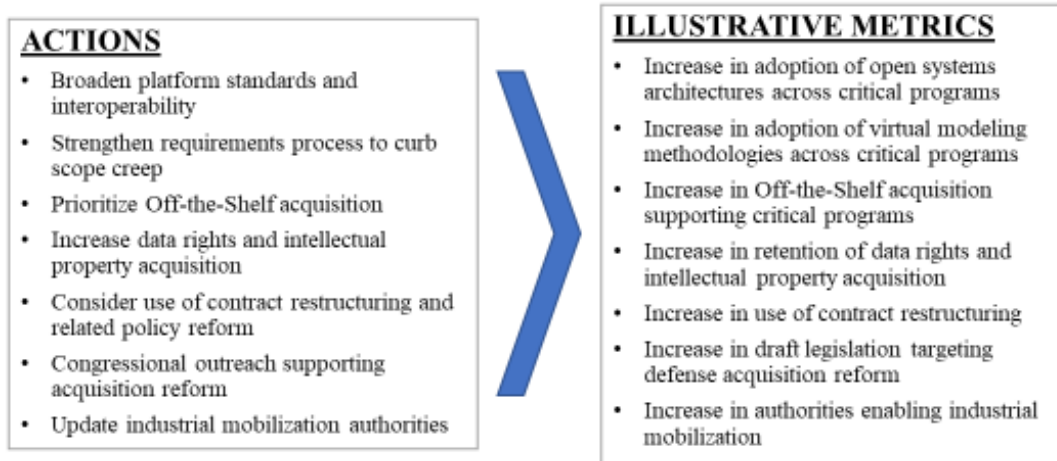


Figure AC: Illustrative metrics aligned to the actions associated with promoting flexible acquisition

2.3.4 Risks of Not Achieving

Flexible acquisition planning will allow the DoD to work with a broader set of industry and balance the tension between the need for customization and adopting, where appropriate, industry standards. While some level of customization is necessary to meet specific mission requirements and stay ahead of potential adversaries, there are risks associated with excessive customization that hinder the development of a modern industrial ecosystem. Thus COTS approaches versus customized systems must be balanced to meet warfighter requirements at speed and scale. Failure to balance these risks strategically can significantly hinder the delivery of critical capabilities.

Limited Scale: Customized systems are often challenging to produce in large quantities. This limitation can hinder rapid production and deployment during times of conflict or crisis, making it difficult to scale up the production of critical equipment quickly.

High Costs and Lengthy Development Times: Complex warfighting requirements may drive highly customized material solutions. However, utilizing extensive customization to design tailored systems may have certain drawbacks. Extensive customization could lead to certain projects experiencing cost overruns and extended development times, which make it more challenging to respond to current warfighter requirements. Additionally, extensively customized systems require additional engineering, testing, and production efforts, along with building additional maintenance capacity through the lifetime of the system within both U.S. and allied defense industries. Therefore, in some cases, extensive customization may lead to protracted engineering, testing, and production efforts and timelines, significantly increased costs of platform and associated sustainment, strained defense budgets (in the aggregate), sub-optimal unit production, and reduced industrial and military readiness. These issues can hamper the military's ability to efficiently deploy cutting-edge equipment to the services.

Technology Obsolescence: Owing to rapid technological advancements, long development times associated with extensive customization can also lead to systems becoming outdated and obsolete before they are deployed at scale. This is particularly true in emerging technologies and software enabled capabilities.

Diminished Industrial Base Resilience: Overly customized programs can also lead to a narrow industrial base with limited diversification in production capabilities. This vulnerability can become a strategic risk if a supplier faces difficulties or disruptions, impacting the entire supply chain and readiness. Dissimilarity with non-defense commercial projects also leads to business incentives for suppliers to divest customized capabilities – leading to reliability, availability, and maintainability challenges for the military departments and the organic industrial base.

Sustainment and Logistics Challenges: Each customized system may require unique maintenance procedures, spare parts, and training for operators and maintenance personnel. This complexity can strain the logistics chain and increase the risk of operational disruptions due to supply chain problems.

Reduced Operational Effectiveness: Excessive customization can reduce interoperability. Crucially, a lack of interoperability can limit joint operations and reduce overall effectiveness. It can also restrict opportunities for the U.S. defense industry to access international markets and collaborate with allied nations, and vice versa.

Increased Technological Risk: Commercial off-the-shelf information technology (COTS IT) provides rapid access to relatively low-cost emerging technologies, particularly compared with some military solutions. However, COTS IT solutions may expose DoD systems and applications to increased risk due to insufficient integration-tested updates and modifications. The velocity of technological innovation requires vigilant monitoring, evaluation, and management across the spectrum of DoD applications.

2.4 ECONOMIC DETERRENCE

2.4.1 Summary

Priority Definition: Fair and effective market mechanisms that support a resilient defense industrial ecosystem among the U.S. and close international allies and partners and contribute to economic security and Integrated Deterrence. Fear of materially reduced access to U.S. markets, technologies, and innovations sows doubt in the minds of potential aggressors.

After World War II, the United States and its allies adopted a global order based on fair trade and free markets enshrined in the General Agreement on Tariffs and Trade (GATT), the precursor to the World Trade Organization and European Union. The PRC, the Russian Federation, and others are challenging this system, flouting international legal and trade standards.

Starting at least in the 1990s, the PRC has run massive trade surpluses against the U.S. and our allies and partners, initially because of differences in labor costs, exchange rates, trade policies, and relative consumer demand, but increasingly because the PRC engages in a host of market distorting activities.²⁸ For the U.S. and our allies and partners, the sustained imbalance in trade has meant weakened domestic industries, displaced workers, and hollowed out heavy industry, helping balloon US national debt levels.

Vitally concerning to the DoD are domination of critical markets, allowing the PRC to control commodity pricing and materials access in strategically critical areas, and to erode the health of U.S. and our allies and partners' heavy industries that the defense industry historically leveraged. During much of the same period, the traditional DIB contracted and consolidated due to cuts in post-Cold War defense budgets²⁹. This contraction reflects the relatively reduced threat levels, with much of the civilian manufacturing sector and some of the defense sub-tier supply chain moving offshore into a range of foreign producers, some of whom have become adversarial states. Additionally, the DoD is concerned that predatory investment and acquisition strategies, oftentimes focused on critical or innovative technologies, further weaken U.S. industrial supply chains and the defense industrial ecosystem's ability to provide capabilities and secure sensitive technologies.

The compounding effects of unfair trade practices, combined with consolidation of certain defense supply chain markets and predatory investment strategies, have now significantly

²⁸ Such means include currency manipulation (e.g., manipulative central bank intervention), export subsidies (e.g., tax incentives, grants, low-interest loans), state-owned enterprises (e.g., preferential treatment), intellectual property practices (lax enforcement), non-tariff barriers (e.g., restrictive standards, licensing requirements, complex customs procedures), export quotas (e.g., on rare earth minerals to manipulate markets and supply chains), protectionist industrial policies (e.g., government dominance directives), and exclusionary trade agreements (e.g., Belt and Road Initiative).

²⁹ Congressional Research Service: The U.S. Defense Industrial Base: Background and Issues for Congress, October 13, 2023 (Pages 9-10)

increased the risk and cost to U.S. and allied defense supply chains. The United States and our allies and partners now recognize that in continuing to adhere to the flawed trade system in dealing with unfair practices of adversary states without implementing appropriate safeguards, *we put ourselves at a disadvantage*.

The goal of the United States is to maintain the rule-based system that allows for the free flow of goods and materials and assures access to advanced technologies, expertise, and materials vital to our national defense. The DoD will seek to advance policies aimed at deterring and countering adversaries from using economic means to weaken U.S. national security. The DoD policy will catalyze a modern defense industrial ecosystem, both domestic and international, to be capable of meeting those objectives, including vibrant defense-related supply chains and systems to guard against unfair trading practices, pilfering by adversaries, and generally heightened global competition.

Actions to restore and achieve economic deterrence:

- Strengthen economic security agreements
- Enable international interoperability standards through active participation in the standards setting bodies
- Fortify alliances to share science and technology
- Strengthen enforcement against adversarial ownership and protect against cyber attacks
- Strengthen prohibited sources policy

2.4.2 Actions

Optimizing for dynamic production and capabilities requires intentional actions aimed at promoting economic security and bolstering economic deterrence. To mitigate the impacts of trade and predatory investment practices in defense supply chains and innovative technologies, the DoD will also seek to partner more closely with allied nations with complementary resources and capabilities. These actions will contribute to building more dynamic production and capabilities and bolster a modern defense industrial ecosystem.

2.4.2.1 Strengthen Economic Security Agreements

The DoD should focus on leveraging existing bilateral and multilateral relationships, such as NATO, the EU, and NTIB, and “friend-shoring.” Friend-shoring is the act of sourcing from countries that are geopolitical allies to reduce reliance on potentially adversarial or unstable nations for critical defense and strategic materials, mitigating the risk of supply chain disruption due to trade disputes, embargoes, or political tensions. It also strengthens international security, economic collaboration, and soft power.

The United States has a complex web of friend-shoring-suitable alliances and partnerships around the world; a partial list includes (in no specific order) Canada, Mexico, the United Kingdom, the European Union, Japan, South Korea, Australia, Taiwan, Israel, and India. The choice of which nations to continue friend-shoring with or to expand such defense-related sourcing from is predicated on both soft factors like history, shared values, public and political support, etc. and harder factors like national security (e.g., strong efforts to

protect against cyber attacks), supply-chain resilience, risk diversification, industrial capabilities, technological capabilities, and not least strategic goals, economic impact, and cost considerations.

The DoD must work with other federal executive departments to ensure the maintenance of economic and national security alliances and to ensure continued access to key markets and source materials while reducing geopolitical risks.

Enable international interoperability standards through active participation in the standards setting bodies. The DoD, in collaboration with other federal executive departments, including the Departments of State and Commerce, will implement standards and interoperability programs as a form of economic and collective security-based systems integration. This emphasizes systems interoperability between U.S. forces and those of our allies and partners. This integration will make systems modular, upgradable, and maintainable by vendors and entities other than the original manufacturer.

Interoperability across allies and partners also increases FMS opportunities, which further supports the defense industrial ecosystem. As part of this effort, the DoD will participate in standards setting bodies, leading the development of international standards that facilitate interoperability. Standards and interoperability programs will also enable fair and effective market practices with trading partners. Additionally, standardization practices will support rapid industrial mobilization by enabling surge, expansion, or conversion at times of need. NATO standards provide an excellent example of international standards and interoperability programs, which have proven their value in shifting munitions inventories to support Ukraine in resisting the Russian Federation's aggression.

2.4.2.2 Fortify Alliances to Share Science and Technology

The DoD will work with other federal executive departments, including the Departments of State and Commerce, to enhance existing alliances and generate new and emphasize existing mechanisms for sharing technologies and applications of scientific knowledge with other partners and allies. Science- and technology-sharing agreements are necessary to build the trade and security alliances that are critical for achieving economic security. For that reason, the Department has developed an extensive structure with a variety of agreements and mechanisms to enable Research, Development, Test, and Evaluation (RDT&E) with international partners, from basic information sharing to complex cooperative activities. These alliances include programs to work jointly with allies and partners to nurture and retain technological superiority. These alliances are a form of institutional integration, a deeper form of Integrated Deterrence cooperation that requires higher levels of trust, as it involves incorporating allies and partners into DoD decision-making processes. However, the DoD cannot form these alliances without the cooperation of other executive departments and Congress. Working collaboratively, the DoD can ensure the controlled dissemination of scientific knowledge and technological products and promote interoperability and exportability. This controlled dissemination would work to strengthen the United States, its allies and partners, provide a tool for integrated deterrence of aggression by adversarial entities, and support the dynamic capabilities needed for a modern defense industrial ecosystem.

2.4.2.3 Strengthen Enforcement Against Adversarial Ownership and Protect Against Cyber Attacks

Mitigating threats to national defense arising from foreign transactions must be balanced with the openness of the U.S. economy to foreign ideas, talent, and capital. The DoD must work with other federal executive departments to protect U.S. assets from ownership by commercial entities controlled or influenced by adversarial nations, and from cyber-attacks against entities involved in the maintenance of our national defense. The United States has five authorities/agencies for monitoring potential adversarial ownership and control: Export Administration Regulations (EAR), International Traffic in Arms Regulations (ITAR), Team Telecom, the Committee on Foreign Investment in the United States (CFIUS), and the Office of Information and Communications Technology and Services (OICTS). Close cooperation with domestic federal stakeholders can ensure that the DoD can provide nuanced reviews of foreign transactions while carefully limiting foreign involvement. Moreover, as close allies also work to address the challenge of adversarial ownership and predatory investment practices, the DoD can begin collaboration in support of their efforts to protect their own and shared supply chains.

The DoD must also work to educate industry on the threats posed by foreign capital, adversarial ownership, and cyber-attacks and prepare them to deter and deflect these threats by improving defenses and lowering risk profiles. DoD supports companies, manufacturers, institutions, and organizations with a comprehensive, cost-effective resource for cybersecurity and foreign ownership, control, and influence (FOCI) information³⁰, tools, and training at no-cost to the participant. At present, this is done via DoD's Project Spectrum, whose mission is to improve readiness, resiliency, and compliance for small manufacturers, the traditional DIB, the federal manufacturing supply chain, and the industrial sector. The goal is to provide supply chain visibility and compliance standards assurance while delivering the industrial cybersecurity resources and techniques that small- and medium-sized businesses need. Additionally, the Department will coordinate with interagency partners to support industry in identifying, protecting, detecting, responding, and recovering from cyberattacks.

2.4.2.4 Strengthen Prohibited Sources Policy

Dependence on adversarial sourcing poses a mounting national security challenge and a particular concern to the DIB and the components, systems, platforms, and munitions it produces. Counterfeit or substandard quality items could foster system failures while computing and networking technology "backdoors" may serve as intelligence pathways. Further, even if materials and parts are uncompromised, sole-source dependence on adversary-produced materials and parts present an obvious vulnerability to disruption.

³⁰ Underlying these resources are DOD and collaborating agencies' data aggregation and advanced analytics efforts to expose the magnitude and concentration of adversarial capital targeting critical technologies and defense sector domains, making it possible to track and take measures to mitigate the threat Adversarial Capital and similar threats constitute.

Amid growing concern, various investigations have confirmed substantial adversarial infiltration into defense supply chains. Some critical capabilities remain dependent on prohibited adversarial suppliers.

Over the last decade, DoD has struggled to curtail adversarial sourcing and burnish the integrity of defense supply chains. Despite these efforts, dependence on adversarial sources of supply has grown and DoD continues to lack a comprehensive effort for mitigating supply chain risk. Policy concerning prohibited sources today remains piecemeal, inadequate to address the current complexity of the DoD supply chain, and often difficult to execute and enforce. Predictably, this approach has delivered only marginal results with DoD continuing to procure items from adversarial sources in line with low-cost free market principles but not in line with national security and resilience-oriented principles.

As detailed in the National Security and Defense Strategies, the PRC is the United States' pacing threat of greatest concern. Given this widespread acknowledgement, DoD must work with Congress, other executive departments, and global allies and partners to build and execute a substantially more aggressive approach to eliminating defense industrial dependencies emanating from the PRC. *The defense of the nation must not be held at risk through reliance upon our adversaries* providing the economic and material means for the United States to defend itself.

2.4.3 Illustrative Metrics

Figure AD presents the actions and corresponding illustrative metrics to measure progress against the Economic Deterrence priority. Formal metrics will be included in the forthcoming NDIS implementation plan.

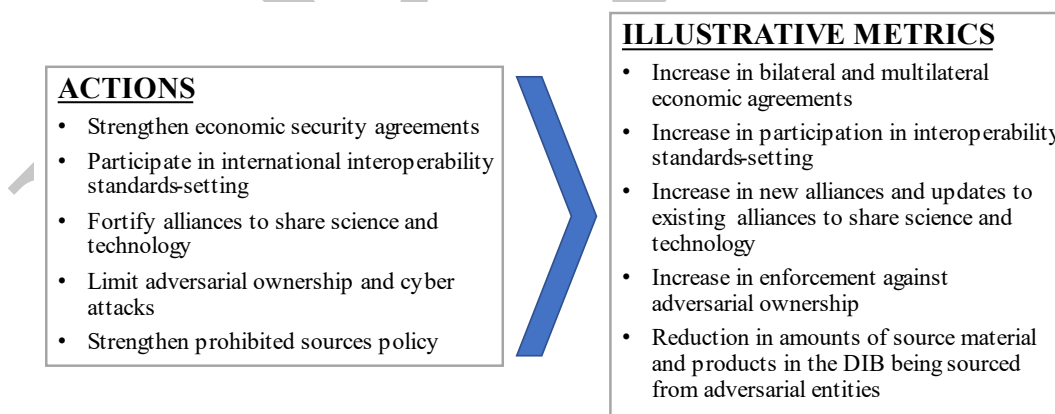


Figure AD: Illustrative metrics aligned to the actions associated with promoting economic deterrence

2.4.4 Risks of Not Achieving

DoD actions that support economic deterrence will bolster dynamic production and capabilities by focusing on national security and resilience-oriented principles where

economic, technological, and defense priorities intersect. While the U.S. remains committed to fair and effective market mechanisms, building safeguards that protect a modern defense industrial ecosystem remain necessary.

Critical Economic, Supply Chain, and Infrastructure Vulnerabilities: Trading practices in violation of international rules by rivals can lead to significant economic imbalances, such as trade deficits, lost business when competing against subsidized products, loss of market access for U.S. companies, and job losses. Disproportionate influence over strategic sectors by adversaries could compromise critical infrastructure or supply chain access to critical defense-related components and technologies.

Increased Costs and Reduced Defense Budgets: Lack of competition can lead to fewer incentives and less pressure for defense contractors to offer fair pricing and to control costs and strive for efficiency. These anti-competitive practices increase the potential for unchecked costs and harm sub-tier suppliers due to market consolidation. They could discourage new entrants into the defense industry and reduce the diversity of talent and expertise available to the DoD. Furthermore, failure to strengthen trade and technology-sharing agreements with allies and partners forces the United States to bear a greater proportion of the research and development cost of bringing cutting-edge defense-related goods to the warfighter. Finally, anti-competitive behavior and market consolidation in large part driven by integration challenges and adversarial actions may weaken the U.S. economy, leading to potential budget constraints for defense spending. This could limit the military's ability to invest in modernization, research, and development while also reducing ally and partner capability.

Weakened Industrial Ecosystem: The overall health and viability of the defense industrial ecosystem could be affected by anti-competitive behavior, market consolidation, and adversarial trading practices. A less diverse and competitive DIB could limit options for the DoD. Without strong trade agreements, U.S. defense companies may face barriers to accessing foreign markets, potentially missing out on significant revenue opportunities, and reducing the economies of scale that come with broader international sales.

Intellectual Property (IP) Theft and Adversarial Capital IP Control: Failure to tighten policies, systems, and enforcement against adversarial capital and other hostile behavior may result in breaching of sensitive information, technology theft, or manipulation of key sectors of the U.S. economy, as foreign entities could use their influence in U.S. companies to gain unauthorized access to valuable trade secrets and technologies. This could harm the competitive edge of the United States in key industries and negatively impact economic growth, job creation, and overall prosperity. If adversaries engage in intellectual property theft and disregard intellectual property rights, the United States may lose its technological edge in key defense areas.

Degraded Technology Edge, Innovation, and Quality: Trade agreements often facilitate the flow of ideas, technologies, and innovations between countries. The United States puts this fertile interchange at risk if it adopts protectionist policies that exclude its allies and partners. Failure to pursue economic deterrence—including collaborating on research, development, and securing the acquisition of cutting-edge military technologies, and leveraging the strengths and expertise of allies—could hinder scientific breakthroughs,

innovation, and technological advancement. Failure to promote competition, particularly domestically, could also lead to slower technological advancements, quality issues, and even the loss of our technological edge in key areas.

Loss of Trust and Reputation: If the United States appears unable or unwilling to protect its critical industries and assets from adversarial influence, it could lose the trust of international partners and investors, impacting foreign direct investment and economic partnerships. Furthermore, if the United States fails to engage in cooperative science- and technology-sharing with its allies and partners, it risks alienating them. This isolation may lead to strained diplomatic relations, decreased trust, loss of foreign defense sales to competitors including potentially to adversaries, and potentially even weakened economic ties making deterrence of aggressive behavior by adversarial nations more challenging.

3 ASSESSMENT AND REPORTING

This NDIS aims to provide a vision and strategic framework for how the DoD will optimize for dynamic production and capabilities and build and support a modern industrial ecosystem over the next 3-5 years. Routine and rigorous assessment of progress toward these priorities will be critical for maintaining focus on them. Each priority is complex and many overlap and have interdependencies with other priorities. Furthermore, our priorities are long-term, perhaps requiring a generation of focus to achieve the desired effects. Because of this, it can be difficult to directly measure the outcomes and given the horizon for achieving our priorities, intermediate measures of success for the near-term actions over the next 3-5 years will be necessary to track progress toward the long-term goals and to inform updates to the NDIS.³¹

The assessment framework for the NDIS is built on the strategic framework beginning with each of the priorities. To track progress for longer-term objectives, intermediate measures will be developed to align with specific actions or objectives within each priority. These intermediate measures will then be linked to the specific means used to meet the objectives and overarching longer-term goal. Illustrative outcome measures are shown in Figures AA, AB, AC, and AD for each of the priorities and align to specific actions to gain insight into progress on meeting strategic goals. Detailed development of this assessment framework will be developed as part of the NDIS implementation plans.

The assessment tools that will be built to measure progress will also provide invaluable data to inform other strategies, such as the National Defense Strategy. This strategy, and its associated metrics in the forthcoming NDIS implementation plan, will also support

³¹ In many cases the data needed to measure this progress is not adequately collected, managed, or analyzed to develop meaningful measures of the industrial base and its resilience. To leverage the necessary data to measure progress toward the priorities—as well as to identify industrial-base vulnerabilities to mitigate and opportunities to pursue—it is critical to establish a data analysis capability devoted to industrial base analysis. This effort has already begun, initially relying upon a data call issued in February 2023 by the Deputy Secretary of Defense. The data call sought specific supply-chain data for 110 weapons systems in production and the data is organized into a network of DIB suppliers to understand critical characteristics of the DIB.

inputs to the various reports on, and related to, the industrial ecosystem. The Department will coordinate across the government to minimize the data calls to industry when developing final metrics and measuring progress against them.

4 CONCLUSION

The United States is at a significant moment where our enduring advantage- the robust and resilient industrial base - may lack the support required to meet the warfighting needs of the 21st century. The United States and its allies and partners require modern defense industrial capacity that strengthens national defense, and that reassures and supports those countries in the direct path of adversarial influence and aggression. This position of modern industrial strength will contribute substantially to Integrated Deterrence—not just for the Department but across the U.S. government and with allies and partners.

The NDIS addresses that imperative to mitigate and remedy critical vulnerabilities with intentional action guided by a strategic vision and framework for how to revitalize, modernize, and expand the traditional DIB. The actions proposed by this strategy lay out the generational changes needed to catalyze a modern defense industrial ecosystem. This will require real and meaningful cooperation and participation of new domestic and international entrants into the defense industrial fold. We must transform our traditional, overly consolidated, atrophied DIB into a robust, resilient, fully capable 21st century defense industrial ecosystem. To be certain, this is an orders-of-magnitude change; incremental measures will not satisfy our defense needs.

As we execute the provisions of this strategy, we will remain mindful of—and overcome—the real impediments to our success. Within the Department, we will establish the conditions for success by promoting appropriate, consistent, and predictable funding where possible. Additionally, the Department will improve information integration, workforce training and adequacy, and address manufacturing capacity and economic threats to supply chains.

The nation needs to rally to the common defense. This NDIS is a call to both the public and private sectors for focused, dedicated efforts to build and secure the industrial capability and capacity necessary to ensure our military has the materiel available to deter our potential adversaries, and if necessary, defeat them in battle. This call to action may seem a great cost, but the consequences of inaction or failure are far greater.

5 GLOSSARY OF TERMS

Advanced Manufacturing Automation — The integration of advanced technologies, systems, and processes to enhance productivity, reduce unit costs, improve product quality and reproducibility, respond more effectively to market demands, and reduce carbon output (as well as minimizing other environmental impacts). Advanced manufacturing automation stands at the intersection of robotics, additive manufacturing, data analytics (both forensic and predictive), machine learning, sensors, modeling, and simulation (e.g., “digital twins”), and other cutting-edge technologies.

AM Forward — Additive Manufacturing Forward, a program launched by President Biden on May 6, 2022, which is designed to help lower costs for American families by improving the competitiveness of America’s small-and-medium-sized manufacturers, creating, and sustaining high-paying manufacturing jobs, and improving supply chain resilience through adoption of additive manufacturing otherwise known as 3D printing.

APEX Accelerator — A USD(A&S) program that focuses on building strong, sustainable, and resilient U.S. supply chains by assisting a wide range of businesses that pursue and perform under contracts with the DoD, other federal agencies, state and local governments and with government prime contractors. It was formerly known as the Procurement Technical Assistance Program, authorized by Congress in 1985 to expand the number of businesses capable of participating in government contracts.

AUKUS — An enhanced trilateral security partnership created by the leaders of Australia, the United Kingdom, and the United States in September 2021.

Bipartisan Infrastructure Act — The Infrastructure Investment and Jobs Act of 2021

CFIUS — Acronym for Committee for Foreign Investment in the United States, an interagency committee authorized to review certain transactions involving foreign investment in the United States and certain real estate transactions by foreign persons, to determine the effect of such transactions on the national security of the United States. Those transactions are also called CFIUS Covered Transactions.

CHIPS Act — The Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022.

Combatant Command — A unified or specified command with a broad continuing mission under a single commander established and so designated by the President, through the Secretary of Defense and with the advice and assistance of the Chairman and the Joint Chiefs of Staff. Combatant commands typically have geographic or functional responsibilities. The DoD has eleven combatant commands.

Commercial-off-the-Shelf (COTS) — A commercial item sold in substantial quantities in the commercial marketplace and offered to the government under a contract or subcontract at any tier, without modification, in the same form in which it was sold in the marketplace. This definition does not include bulk cargo such as agricultural products or petroleum.

Data Rights — “Data Rights” refers to the Government’s license rights in two major categories of valuable intellectual property (e.g., technical data & computer software). The Federal Acquisition Regulations (FAR) prescribe policies, procedures and clauses pertaining to data rights for civilian agencies and the Defense Federal Acquisition Regulation Supplement (DFARS) for DoD.

Defense Industrial Ecosystem — The traditional DIB, along with other institutions, policies, regulations, and norms outside of the traditional DIB that are critical for the functioning and current state of the DIB. See also **DIB**.

Defense Innovation Board — A body established in 2016 under the Federal Advisory Committee Act that provides independent recommendations to the Secretary of Defense and other senior DoD leaders on emerging technologies and innovative approaches that DoD should adopt to ensure U.S. technological and military dominance.

Defense Innovation Unit — A DoD organization with offices in Silicon Valley, Boston, Austin, Chicago, and the Pentagon focused exclusively on fielding and scaling commercial technology across the U.S. military at commercial speeds.

Defense Production Act — The Defense Production Act of 1950 along with its amendments. Title I of this Act authorizes the President to require acceptance and priority performance of contracts or orders and to allocate materials, services, and facilities to promote the national defense or to maximize domestic energy supplies. Title III of the DPA provides various financial measures, such as loans, loan guarantees, purchases, and purchase commitments, to improve, expand, and maintain commercial domestic production capabilities needed to support national defense and homeland security procurement requirements. Title III also authorizes Federal Government procurement and installation of equipment in plants, factories, and other industrial facilities owned by the Government or private persons. Title VII of the DPA authorizes the President to consult with representatives of industry, business, financing, agriculture, labor, and other interests to provide for development of voluntary agreements and plans of action to help provide for the national defense. A voluntary agreement is an association of private interests, approved by the Government to plan and coordinate actions in support of the national defense.

Defense Standardization Program — A comprehensive, integrated standardization program linking DoD acquisition, operational, sustainment, and related military and civil communities established in on July 1, 1952, through the passage of the Cataloging and Standardization Act of 1952.

DFARS — Acronym for Defense Federal Acquisition Regulation Supplement, a supplement to the FAR specifically tailored for the DoD. It contains additional regulations and policies that apply to defense acquisitions. DFARS addresses unique requirements, such as cybersecurity, defense-specific clauses, and compliance with international agreements. See also **FAR**.

DIB — Acronym for defense industrial base, the domestic DIB includes public-sector (government-owned, government-operated) facilities, academic institutions, and private-sector (commercial) companies located in the United States. The global DIB includes foreign-owned companies and commodities sourced from countries with which the United States maintains formal defense cooperation partnerships, as well as foreign-owned companies and commodities sourced from countries without formal defense cooperation relationships with the United States. Together, the domestic DIB and portions of the global DIB form the National Technology and Industrial Base (NTIB), as established by 10 U.S.C. § 4801.

DoD Defense Industrial Base Cybersecurity Program — A public-private cybersecurity partnership with eligible Defense contractors for sharing unclassified and classified cyber threat information to advance a near real-time picture of the current threat environment and support program participants' capabilities to safeguard DoD information residing on or transiting DIB unclassified information systems.

EAR — Acronym for Export Administration Regulations, issued by the Department of Commerce, control the export of dual-use items (items that have both commercial and military or proliferation applications), less sensitive military items, and purely commercial products or commercial services. These items include commodities, software, and technology. Many items subject to the EAR are set forth by Export Control Classification Number on the Commerce Control List.

FAR — Acronym for Federal Acquisition Regulation, a set of regulations governing federal procurement policies and procedures. It provides guidance on how federal agencies, including the DoD, should acquire goods and services. Compliance with FAR is essential for ensuring transparency, competition, and fairness in the procurement process.

FMS — Acronym for Foreign Military Sales, that portion of United States security assistance for sales programs that require agreements/contracts between the United States Government and an authorized recipient government or international organization for defense articles and services to be provided to the recipient for current stocks or new procurements under Department of Defense-managed contracts, regardless of the source of financing.

Friend-shoring — Similar to the concept of “on-shoring,” friend-shoring is a process that engages allies and partners in production and processing of critical and strategic materials and supplies.

FVEY — Five Eyes, an intelligence alliance comprised of the security entities of Australia, Canada, New Zealand, the United Kingdom, and the United States.

FYDP — Acronym for Future Years Defense Program, it is a five-year budget projection that is derived from the POM. It provides a detailed breakdown of planned defense spending over the next five years. The FYDP is a critical planning tool that helps the DoD and Congress understand the long-term financial commitments required for defense programs.

Global War on Terror — This includes the post-September 11 wars in Afghanistan and Iraq and describes diplomatic, financial, and other actions taken to deny financing or safe harbor to terrorists.

GAO — Acronym for the Government Accountability Office, an organization that provides Congress, the heads of executive agencies, and the public with timely, fact-based, non-partisan information that can be used to improve government and save taxpayer dollars. Their reports are produced at the request of congressional committees or subcommittees or are in response to statutory requirements by public laws or committee reports.

GATT — Acronym for General Agreement on Tariffs and Trade, a legal agreement that aimed “substantial reduction of tariffs and other trade barriers and the elimination of preferences, on a reciprocal and mutually advantageous basis”, so that the economic recovery after World War II can be boosted. It now has been succeeded by the World Trade Organization (WTO), but the original GATT charter signed in 1947 is still remains the basic set of free trade obligations on members of the WTO

GOGO/GOCO — Acronym for Government Owned Government Operated/Government Owned Contractor Operated production facilities which make up the organic industrial base. See also **Organic Industrial Base**.

HBCU — Acronym for Historically Black Colleges and Universities. The Higher Education Act of 1965, as amended, defines an HBCU as: “...any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary [of Education] to be a reliable authority as to the quality of training offered or is, according to such an agency or association, making reasonable progress toward accreditation.”

HIMARS — Acronym for the M142 High Mobility Artillery Rocket System, a full-spectrum, combat-proven, all-weather, 24/7, lethal and responsive, wheeled precision strike weapons system. HIMARS is designed to support joint early and forced entry expeditionary operations with high-volume destructive, suppressive, and counter-battery fires. HIMARS can achieve ranges of 70-plus kilometers, attacking the target with low-collateral damage, enabling danger-close fires (within 200 meters) in support of friendly troops in contact, as well as engaging high-valued point targets in open, urban, and complex environments.

IBAS -- Industrial Base Analysis and Sustainment, A DoD program to seeks to maintain or improve the health of essential parts of the defense industry by addressing critical capability shortfalls in the base, specifically capabilities that are critical to multiple military departments or DOD components and are at risk of being lost. IBAS primarily invested in projects to preserve existing suppliers and capabilities. These projects focused on maintaining workforce capabilities such as engineers at a supplier’s production facility whose specialized skills were at risk of atrophying due to a reduction in DOD’s demand.

IDREAM4D — Acronym for Innovation Driven Research/Education Ecosystem for Advanced Manufacturing for the Defense, a consortium whose focus is through a collaborative effort, to conduct impactful research for defense innovations and to prepare engineers and scientists who lead the U.S. defense manufacturing innovation. The consortium is composed of five higher education institutions (UTRGV, UT Austin, UTSA, Virginia Tech, VSU), national research centers, national labs, defense manufacturers, local high school districts, and community colleges. The goal is to promote advanced additive manufacturing (AM) and smart manufacturing (SM) and to support innovations for the defense industries.

Inflation Act — The Inflation Reduction Act of 2022.

Integrated Deterrence — As defined in the National Defense Strategy, integrated deterrence is the Department's approach to aligning the Department's policies, investments, and activities to sustain and strengthen deterrence – tailored to the specific competitors and coordinated to maximum effect inside and outside the Department.

Internet-of-Things — The set of Internet-capable devices, such as wearable fitness devices and smartphones, which interact with the physical environment and typically contain elements for sensing, communicating, processing, and actuating.

Interoperability — Interoperability is a requirement that a program's system interact with other systems through transport of information, energy, or matter.

ITAR — Acronym for International Traffic in Arms Regulation, a regulation issued by the Department of State to control the export of defense-related articles and services, including technical data, ensuring compliance with the Arms Export Control Act (22 U.S.C. 2751 et seq.). The United States Munitions List (USML) identifies defense articles, services, and related technical data that are inherently military in character and could, if exported, jeopardize national security or foreign policy interests of the United States.

JMC — Acronym for Joint Munitions Command, which provides the conventional ammunition life-cycle functions of logistics sustainment, readiness and acquisition support for all U.S. military services, other government agencies, and allied nations as directed. JMC is the logistics integrator for life-cycle management of ammunition providing a global presence of technical support to frontline units.

JPAC — Acronym for Joint Production Acceleration Cell, established within the Office of the Under Secretary of Defense for Acquisition & Sustainment (OUSD A&S). The JPAC is charged with building enduring industrial production capacity, resiliency, and surge capability for key defense weapon systems and supplies. It is an institutionalization and restructure of the Munitions Industrial Deep Dive from a crisis-management, reactive team to one that proactively and continuously analyzes and identifies opportunities to optimize production capacity, resiliency, and surge ability. See **MIDD**.

Last Supper of 1993 — A dinner hosted by Secretary of Defense in the fall of 1993 attended by executives of major defense contractors in which the Secretary indicated that Pentagon budget cuts would endanger some of the combat jet firms, missile makers,

satellite builders and other contractors. It is considered to have set off market consolidation within the U.S. defense sector.

Just-in-time — A inventory management strategy that aligns raw material orders with production schedules. This “pull” just system is driven by actual demand. The strategy reduces stock inventories but leaves no room for schedule error. As much a managerial philosophy as it is an inventory system.

LLP — Acronym for Large-lot Procurement, a new contract and financing strategy outlined in the FY 2024 President’s Budget. The amount budgeted in the FY 2024 President’s Budget for the LLP throughout the Future Year Defense Program (FYDP) totals approximately \$15.1 billion and represents a commitment by the Department to address munitions requirements and implement decisive acquisition reforms.

ManTech – Manufacturing Tech Office of Secretary of Defense Manufacturing Technology (OSD ManTech) The Defense-wide Manufacturing Science and Technology program consists of manufacturing institutes and a technology investment portfolio.

MEST Center— Acronym for Micro-Electronics Security Training Center, a collaboration between the University of Florida and Ohio State University establishing an ecosystem of training modules to suit the cybersecurity workforce needs of both Government and industry employees with a strong emphasis on hands-on learning.

MFG USA — Acronym for Manufacturing USA, a network of 17 institutes which are public-private partnerships that each have a distinct technology focus but work toward a common goal: to secure the future of U.S. manufacturing through innovation, education, and collaboration.

MI — Acronym for Minority Institutions, defined by § 365(3) of the Higher Education Act (HEA) (20 U.S.C. § 1067k(3)). This definition of “minority institutions” applies only to the Minority Science and Engineering Improvement Program (MSEIP) and other programs whose statutes or regulations reference the same MI definition.

MII — Acronym for Manufacturing Innovation Institutes, an initiative that seeks to revitalize the U.S.’s domestic manufacturing capability through domestic public-private partnerships that enhance America’s strategic competitiveness while enabling the military of tomorrow primarily through three activities, one, advancing research and development (R&D) to promote American innovation while modernizing our military capabilities, two, growing manufacturing ecosystems to enhance the Nation’s competitiveness, and three, furthering education and workforce development to train Americans of all ages and backgrounds for jobs of the future.

MIDD — Acronym for Munitions Industrial Base Deep Dive, a review process to assess, understand, and address challenges associated with ramping up production to backfill items transferred to Ukraine. This holistic review proposed to address not only short-term constraints but also identify challenges as part of the initial design of future weapon systems and acquisition strategies. It has now been institutionalized as part of the JPAC. See also **JPAC**.

Monopsony (Monopsonist) — A market condition where there is only one buyer. A monopsonist is the single buyer of a product or service from multiple sellers.

MOSA — Acronym for Modular Open Systems Approach, a technical and business strategy for designing an affordable and adaptable system. A MOSA is the DoD preferred method for implementation of open systems, and it is required by United States law.

MYP — Acronym for Multi-Year Procurement, a method of purchasing up to 5 years of requirements in one contract, which is funded annually as appropriations permit. If it is necessary to cancel the remaining quantities in any year, the contractor is paid an agreed-upon portion of the unamortized non-recurring start-up costs. High dollar value MYPs must be specifically approved by Congress.

NATO — Acronym for North Atlantic Treaty Organization, an alliance of 31 countries from Europe and North America that exists to protect the people and territory of its members founded in 1949. The Alliance is founded on the principle of collective defense.

NDS — National Defense Strategy, a DoD document that sets forth how the U.S. military and security community will meet growing threats to vital U.S. national security interests and to a stable and open international system.

Non-Program of Record (NPOR) — Non-Program of Record systems or capabilities are items that are not DoD Programs of Record and may include nonstandard items.

NTIB — Acronym for National Technology and Industrial Base, the people and organizations engaged in national security and dual-use research and development (R&D), production, maintenance, and related activities in industry and technology within the United States, Canada, the United Kingdom, Australia, and New Zealand.

Operational Plans — A complete and detailed plan for conducting military activities prepared in response to actual and potential contingencies

Organic Industrial Base — Network of U.S. government-owned industrial facilities operated by both the Department of Defense and government contractors. See also **GOGO/GOCO**.

POM — Acronym for Program Objective Memorandum, it is a critical part of the PPBE cycle. It is the phase in which the DoD develops and submits its budget requests to the Office of the Secretary of Defense (OSD) for review and approval. The POM contains detailed program and budget information for each defense program and is used to make funding decisions. See also **PPBE**.

PPBE — Acronym for Planning, Programming, Budget, and Execution, it is the overarching framework that the DoD uses to develop, justify, and execute its budget. It is a cyclical process that involves multiple phases, including planning, programming, budgeting, and execution. PPBE ensures that the DoD's financial resources are allocated to the most critical defense priorities.

Production Diplomacy — A production strategy that emphasizes friend-shoring, on-shoring, and working with allies and partners to minimize reliance on products from adversaries

Project Spectrum — A comprehensive, cost-effective platform initiated by the DoD Office of Small Business Programs that provides companies, institutions, and organizations with cybersecurity information, resources, tools, and training. Its mission is to improve cybersecurity readiness, resiliency, and compliance for small/medium-sized businesses and the federal manufacturing supply chain.

RDT&E — Acronym for Research, Development, Test & Evaluation, one of the five major appropriations used by the DoD. RDT&E finances research, development, test and evaluation efforts performed by both contractors and government installations in the development of equipment, material, or computer application software. This includes services (including government civilian salaries), equipment, components, materials, end items and weapons used in such efforts.

REE — Rare Earth Elements, REEs comprise 17 elements, including scandium, yttrium, and the lanthanide series which are used in a range of products and manufacturing processes – including permanent magnets, catalysts, fiber optics, and phosphor displays – critical to wind turbines, cell phones, and electric vehicles, among other modern technologies. REE extraction, separation, and purification from a complex feedstock can be environmentally degrading, energy inefficient, and difficult to permit in the United States.

REP — Acronym for Research and Educational Program for HBCU/MII. Administered by OUSD(R&E), this program aims to enhance research programs and capabilities in scientific and engineering disciplines critical to the national security functions of DoD, enhance the capacity of HBCU/MI to participate in DoD research programs and activities, and increase the number of graduates, including underrepresented minorities, in fields of science, technology, engineering, and mathematics (STEM) important to the defense mission.

REPI — Readiness and Environmental Protection Integration, a DoD Program that preserves military missions by supporting cost-sharing agreements between the military services, other federal agencies, state and local governments, and private conservation organizations to avoid land use conflicts near military installations, address environmental restrictions that limit military activities, and increase resilience to climate change. The REPI Program is administered by the Office of the Secretary of Defense (OSD).

Reskilling — Employee reskilling involves learning new skills outside of the worker's existing skillset. These skills are often closely adjacent to their current function but may sometimes be geared toward a different path entirely.

SBIR — Acronym for Small Business Innovation Research, a program established in 1982 to strengthen the role of innovative small businesses in Federally-funded research or research and development (R/R&D). Specific program purposes are to: (1) stimulate technological innovation; (2) use small business to meet Federal R/R&D needs; (3) foster

and encourage participation by socially and economically disadvantaged Small Business Concerns (SBCs) (SDBs), and by women-owned SBCs (WOSBs), in technological innovation; and (4) increase private sector commercialization of innovations derived from Federal R/R&D, thereby increasing competition, productivity and economic growth.

SCALE — Acronym for Scalable Asymmetric Lifecycle Engagement (SCALE) network, a program for semiconductor workforce development in the defense sector. SCALE provides unique courses, mentoring, internship matching and targeted research projects for college students interested in five microelectronics specialty areas: radiation-hardening, heterogeneous integration/advanced packaging, system on a chip, embedded system security/trusted AI, and supply chain awareness.

SCDTF — Acronym for Supply Chain Disruption Task Force, established by President Biden through Executive Order 14017 in 2021, to address economic recovery efforts following the COVID-19 Pandemic.

Standardization — The process of developing and agreeing on (by consensus or decision) uniform engineering criteria for products, processes, practices, and methods for achieving compatibility, interoperability, interchangeability, or commonality of materiel.

STEM — Acronym for Science, Technology, Engineering, and Mathematics.

STTR — Acronym for Small Business Technology Transfer, a program established in 1992 to expand public/private sector partnerships and stimulates ideas and technologies between innovative SBCs and non-profit Research Institutions. By providing awards to small businesses for cooperative R/R&D efforts through formal collaborations with Research Institutions, the STTR program assists the U.S. small business and research communities by supporting the commercialization of innovative technologies. STTR's most important role is to bridge the gap between basic R&D and commercialization of resulting innovations.

Sub-tier — Any supplier that indirectly provides components or services to the Department indirectly through another contracted entity.

Supply chain visibility — The ability to track different goods and/or products that are components in complex systems, giving a clear view of the origin of raw materials and details of manufacture of each of these components. It enables shippers to improve customer service and cost controls through management of inventory in motion, proactive status updates, limiting disruptions and risk mitigation.

Team Telecom — An interagency committee that advises the Federal Communications Commission (FCC) on national security and law enforcement concerns associated with applications for telecommunications licenses meeting certain thresholds of foreign ownership or control.

Upskilling — Upskilling involves workers expanding their existing skill set to enhance performance for their current or future roles.